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Record 1979/45

GREGORY DOWNS AND RIVERSLEIGH

1:100 000 SHEET AREAS: CATALOGUE

OF GEOLOGICAL COMPILATION SHEETS

by

I.P. SWEET and L.J. HUTTON

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*Geological Survey of Queensland

CONTENTS

FIGURES

FORWARD

This Record has been compiled to make available the compilation sheets of the Precambrian parts of the Riversleigh and Gregory Downs 1:100 000 Sheet areas, and to provide to users the basic field data.

There has been virtually no data processing or interpretation involved - this will come in later Records or Reports; but in releasing the preliminary field data it is hoped that users will comment and provide the compilers with any additional information or changes that should be made to the compilation sheets reproduced here.

INTRODUCTION

This Record contains reproductions of six geological compilation sheets covering the eastern half of RIVERSLEIGH* (reduced to about 1:100 000 scale) and of two sheets covering the southern half of GREGORY DOWNS (reduced to about 1:150 000 scale). The sheets have been released to the public and copies of them at 1:25 000 scale (RIVERSLEIGH) and 1:50 000 scale (GREGORY DOWNS), are available for purchase from the Copy Service, Australian Government Printer (Production), P.O. Box 84, Canberra, ACT, 2600.

The data were obtained during field research in the Lawn Hill region during 1976–78. Compilation sheets for LAWN HILL were released in 1978 and a catalogue accompanied by a brief description of the geology was prepared by Sweet & Hutton (1978).

The RIVERSLEIGH compilation sheets were prepared using 1:25 000 colour airphotos, but only black and white photos at 1:50 000 scale were available for GREGORY DOWNS. Enquiries about airphotos can be made to the Division of National Mapping, P.O. Box 548, Queanbeyan, NSW, 2620.

Figures 1 to 3 are references for Figures 4 to 11, the geological compilation sheets. Figures 4a to 11a show the points at which geological observations were made.

GEOLOGY

Only the Proterozoic rocks of the Sheet areas were examined in detail. They consist of a sequence of volcanics, sandstones, siltstones and carbonates of Middle Proterozoic age.

The Proterozoic sequence was previously mapped by Carter, Brooks & Walker (1961), who named it the Ploughed Mountain Beds except for a few outcrops of Myally Beds. Current field investigations by BMR and GSQ, and recent work by Cavaney (1975), have enabled us to subdivide the Ploughed Mountain Beds into several mappable units.

*1:100 000 Sheet area names are shown in upper case

Nomenclature and symbols

The use of the term Ploughed Mountain Beds has been discontinued. Cavaney (1975) subdivided the sequence into the Fiery Creek Volcanics (previously mapped as Myally Beds and Ploughed Mountain Beds by Carter & others, 1961), and the McNamara Group, consisting of nine formations (replacing the remainder of the Ploughed Mountain Beds). Both the Fiery Creek Volcanics and an older unit, the Quilalar Formation, are present in areas previously mapped as Ploughed Mountain Beds in GREGORY DOWNS. Cavaney's name for the basal formation of the McNamara Group, the Mammoth Formation, has been abandoned; most of this formation is now assigned to the Surprise Creek Formation.

The symbols used on the RIVERSLEIGH compilation sheets (Figs 4-9) have been superseded by those shown on the GREGORY DOWNS sheets (Figs. 10, 11). The two sets of symbols and the relations between them are shown in Figure 1.

DESCRIPTIONS OF UNITS

Quilalar Formation (Pqx, Pqx_q)

Stromatolitic dolomite and lenses or sheets of medium-grained orthoquartzite which crop out below the Fiery Creek Volcanics in GREGORY DOWNS are similar to parts of the Quilalar Formation mapped in ALSACE and MOUNT OXIDE (Derrick, 1978; Derrick & Sweet, 1979) and have therefore been assigned to that unit.

Fiery Creek Volcanics (Pfc_v, Pfc_a)

The Fiery Creek Volcanics were described and named by Cavaney (1975). They were formerly included in the Myally Beds by Carter & others (1961), and probably include equivalents of the Carters Bore Rhyolite, mapped by Hill, Wilson, & Derrick (1975) in MOUNT ISA. They consist of flow-banded rhyolite (Pfc_v) agglomerate, (Pfc_a) in GREGORY DOWNS. To the south, in MOUNT OXIDE,

they include conglomerate, ferruginous sandstone and basalt, and overlie Myally Subgroup and Quilalar Formation with spectacular angular unconformity. They are overlain, with only slight angular unconformity, by the Surprise Creek Formation. Some of the agglomerate in Pfc$_a$ is overlain by conglomerate of the Surprise Creek Formation - for example at grid reference 250 035 in GREGORY DOWNS (Fig. 11). In some cases the exact position of the contact is difficult to determine, and the boundary is shown as approximate.

Surprise Creek Formation (Pra, Prb)

This unit crops out in eastern GREGORY DOWNS. Pra rests unconformably on older rocks, and consists of massive, cross-bedded medium-grained quartzitic and sublithic arenites. Pebbly and conglomeratic lenses are common at the base. The sandstones are overlain by poorly outcropping laminated and thin-bedded, greyish-green siltstone - Prb. The Surprise Creek Formation is equivalent to Cavaney's Mammoth Formation (not including the Torpedo Creek Quartzite Member).

McNamara Group

The basal unit of the McNamara Group, the Torpedo Creek Quartzite Member, will either be assigned to the overlying Gunpowder Creek Formation (as it is in GREGORY DOWNS); or it may be redefined as a formation. The other units in the McNamara Group have been retained as originally defined by Cavaney (1975). The Group appears to rest disconformably on Surprise Creek Formation in MOUNT OXIDE.

Gunpowder Creek Formation (Pmw)

The Torpedo Creek Quartzite Member (Pmw$_a$) consists of two or three prominent white orthoquartzite beds separated by more friable sandstone and siltstone. It has been separated from the underlying Surprise Creek Formation

because mapping in MOUNT OXIDE has suggested a possible disconformity between the two units in the west. It consists of a single white orthoquartzite band, 2-10 m thick, in most outcrops in western MOUNT OXIDE.

$\underline{\text{Pmw}}_{b}$, the remainder of the Gunpowder Creek Formation in GREGORY DOWNS, consists of siltstone, shale, and dolomite. It can be subdivided into at least 3 members in MOUNT OXIDE.

Paradise Creek Formation (Pmx)

The Paradise Creek Formation, as mapped by us, follows Cavaney's (1975) definition; it is bounded at the base by the Oxide Chert Member, and at the top by a series of stromatolitic cherts which are mapped as a separate formation, the Esperanza Formation. The Paradise Creek Formation is thus only the lower part of the unit as it was defined and described by de Keyser (1958) and Carter, & others (1961). The upper part of this previously defined Paradise Creek Formation has been subdivided into the Esperanza and Lady Loretta Formations.

The Oxide Chert Member (Pmo), a 2-5 m layer of laminated and thin-bedded grey chert, defines the base of the Paradise Creek Formation, and is overlain by dolomitic siltstone and dolomite, much of which is stromatolitic in the upper part of Pmx.

Despite poor outcrop, all of the formation can be recognised in GREGORY DOWNS, but only the uppermost part (labelled Pm_{4}) is present in RIVERSLEIGH.

Esperanza Formation (Pmz)

The Esperanza Formation forms a series of ridges which generally allows accurate photointerpretation of the boundaries. Although it is recognised primarily on the basis of the presence of two or three massive stromatolitic chert beds (locally with organ-pipe appearance), siltstone and sandstone are present, and predominate in some areas; for example, the ridge of Esperanza Formation 5.5 km east-northeast of Riversleigh homestead (Pm_{5} in Fig. 4) is formed of sandstone, and stromatolitic chert crops out only in the dip slope to the north. It also contains some dolomitic beds, particularly near the base.

Lady Loretta Formation (Pml)

This formation was originally mapped by Carter & others (1961) as part of their Paradise Creek Formation. It overlies Esperanza Formation apparently conformably.

In many areas a basal unit, P_{ml_b}, has been delineated, consisting of a weathered limonite-cemented chert breccia; the unweathered, subsurface equivalent of this breccia has not been determined. The remainder of the formation consists of laminated, intraclastic and stromatolitic dolomite, and dolomitic siltstone.

It is the youngest Proterozoic unit cropping out in GREGORY DOWNS, and is host to the Lady Loretta Ag-Pb-Zn deposit in MAMMOTH MINES, to the south.

Shady Bore Quartzite (Pms)

A prominent orthoquartzite unit, the Shady Bore Quartzite, conformably overlies the Lady Loretta Formation in RIVERSLEIGH. The boundary between the two formations is defined as the horizon above which sandstone and quartzite predominate. A basal member ($P_{m_{7a}}$) consisting of an orthoquartzite bed overlain by sandstone, siltstone, and dolomite is evident in places.

Riversleigh Siltstone (Pmr)

This formation is predominantly siltstone, but contains numerous sandstone beds and a few dolomite beds near the base in northern RIVERSLEIGH.

Termite Range Formation (Pmt)

The Termite Range Formation, named Quartzite by Cavaney (1975), is mainly lithic arenite and greywacke. It appears to thin and contain a greater proportion of siltstone southwards from LAWN HILL, and forms subdued ridges near the northern margin of RIVERSLEIGH ($P_{m_{13}}$ in Fig. 4).

Lawn Hill Formation (Pmh)

Only the lowermost member (P_{l_o}) of the Lawn Hill Formation crops out in RIVERSLEIGH. It consists of siltstone similar to that of the Riversleigh Siltstone, and where the two units are faulted together it is only the presence of characteristic concretions in the Lawn Hill Formation which has allowed us to distinguish between the two formations.

Phanerozoic units

We did not study the Phanerozoic rocks of the region, which include the Thorntonia Limestone, of Middle Cambrian age, and scattered remnants of a once extensive sheet of sandstone and siltstone of Late Jurassic to Early Cretaceous age. In RIVERSLEIGH the Mesozoic rocks are designated Mullaman Beds (Skwarko, 1966), but the more extensive outcrops in GREGORY DOWNS form the base of the Carpentaria Basin sequence, and are designated Gilbert River Formation (Grimes, 1974).

Tf (laterite and ferruginous soil) is of uncertain age, but is probably older than the Carl Creek Limestone (Tc), which contains a vertebrate fauna of Late Oligocene or Early Miocene age (Tedford, 1967).

The Armraynald Beds (TQn) may be of similar age to some of the Czg.

Czg (gravel terraces a little above modern stream levels) of late Tertiary or early Quaternary age. Czs is a general term for sand, soil, and colluvium, and may include some Czg. Qa and Qha represent older and younger alluvium respectively.

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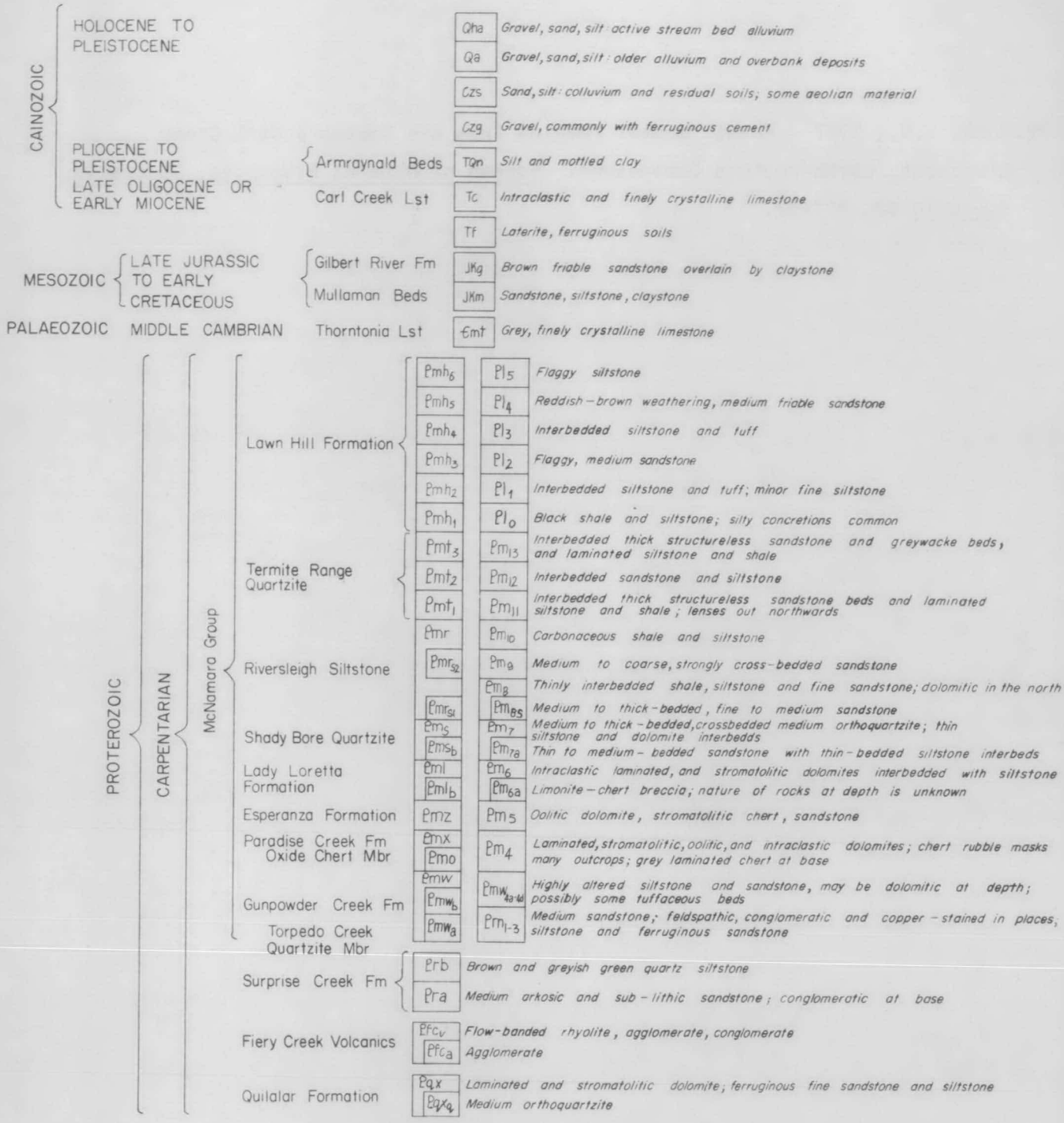

Fig 1: Geological reference to accompany compilation sheets – lefthand column is new terminology used on Gregory Downs compilations

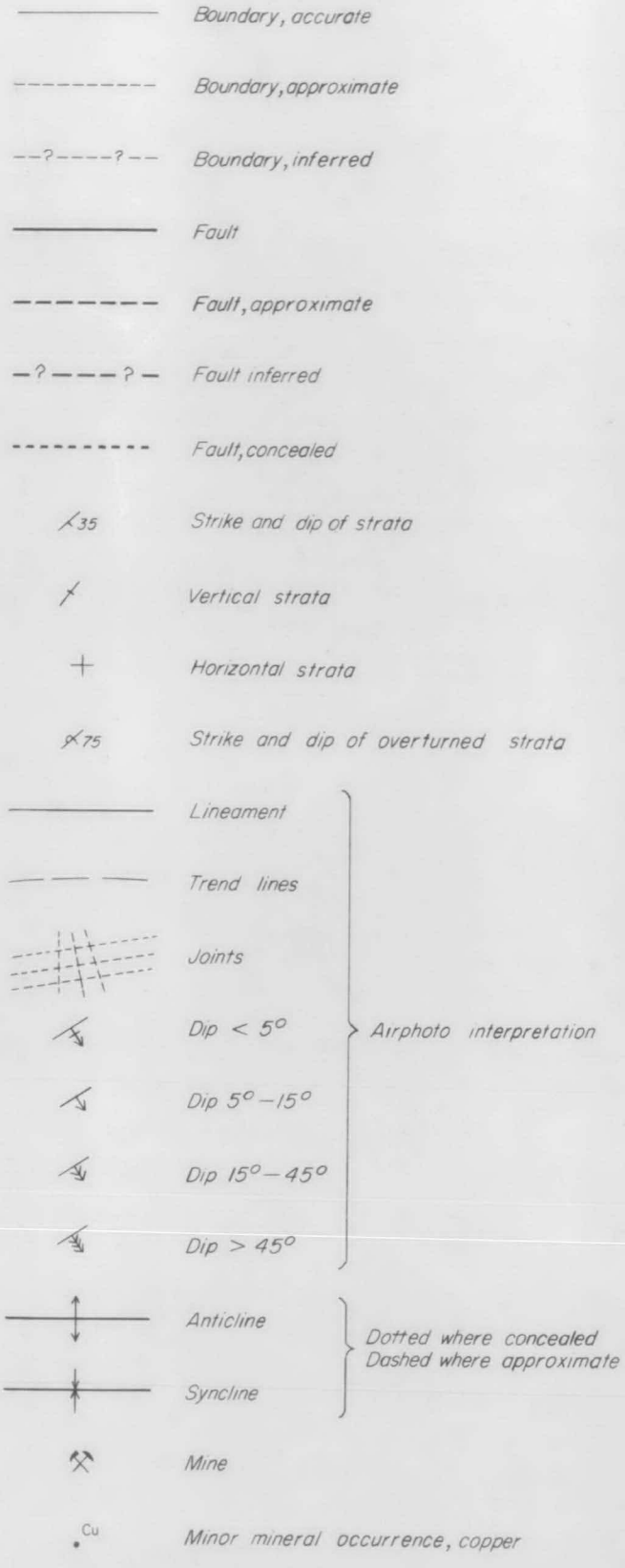

Fig. 2 Symbols used on accompanying compilation sheets (Figs 4 – 11)

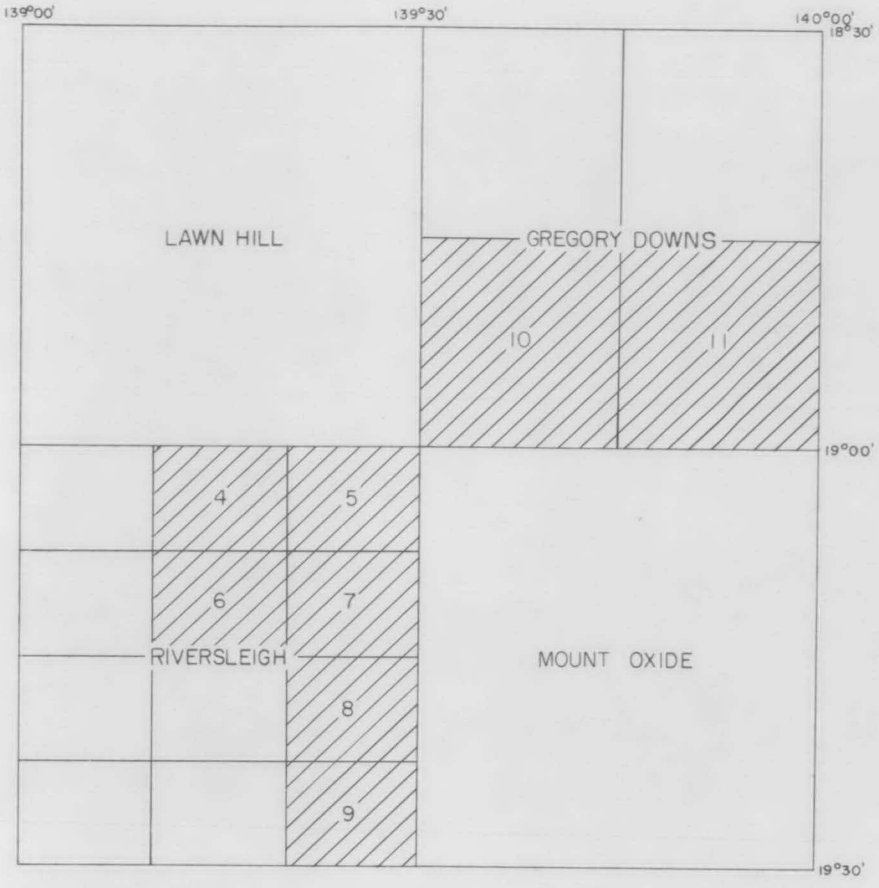

Fig 3 Key to compilation sheets showing figure numbers

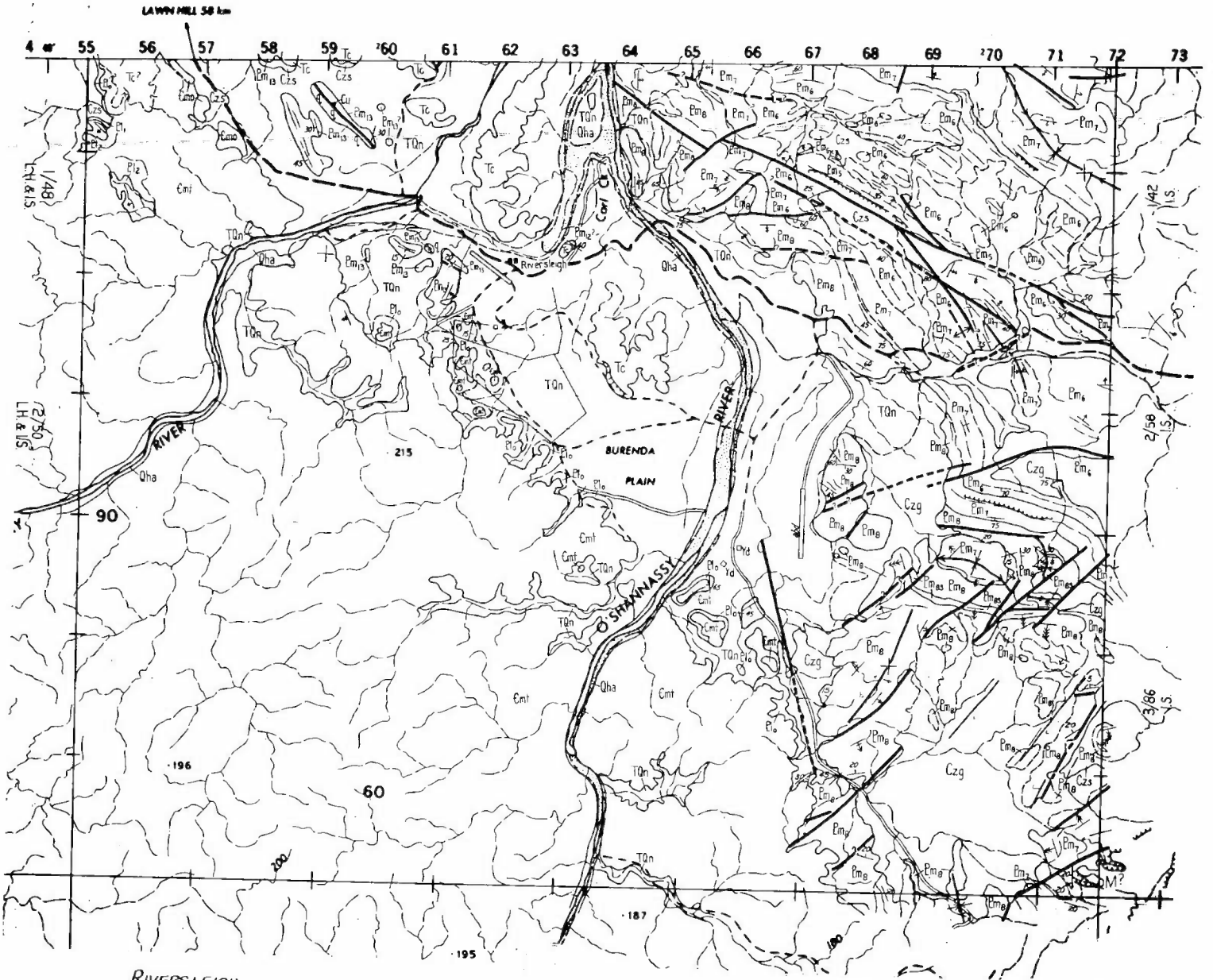

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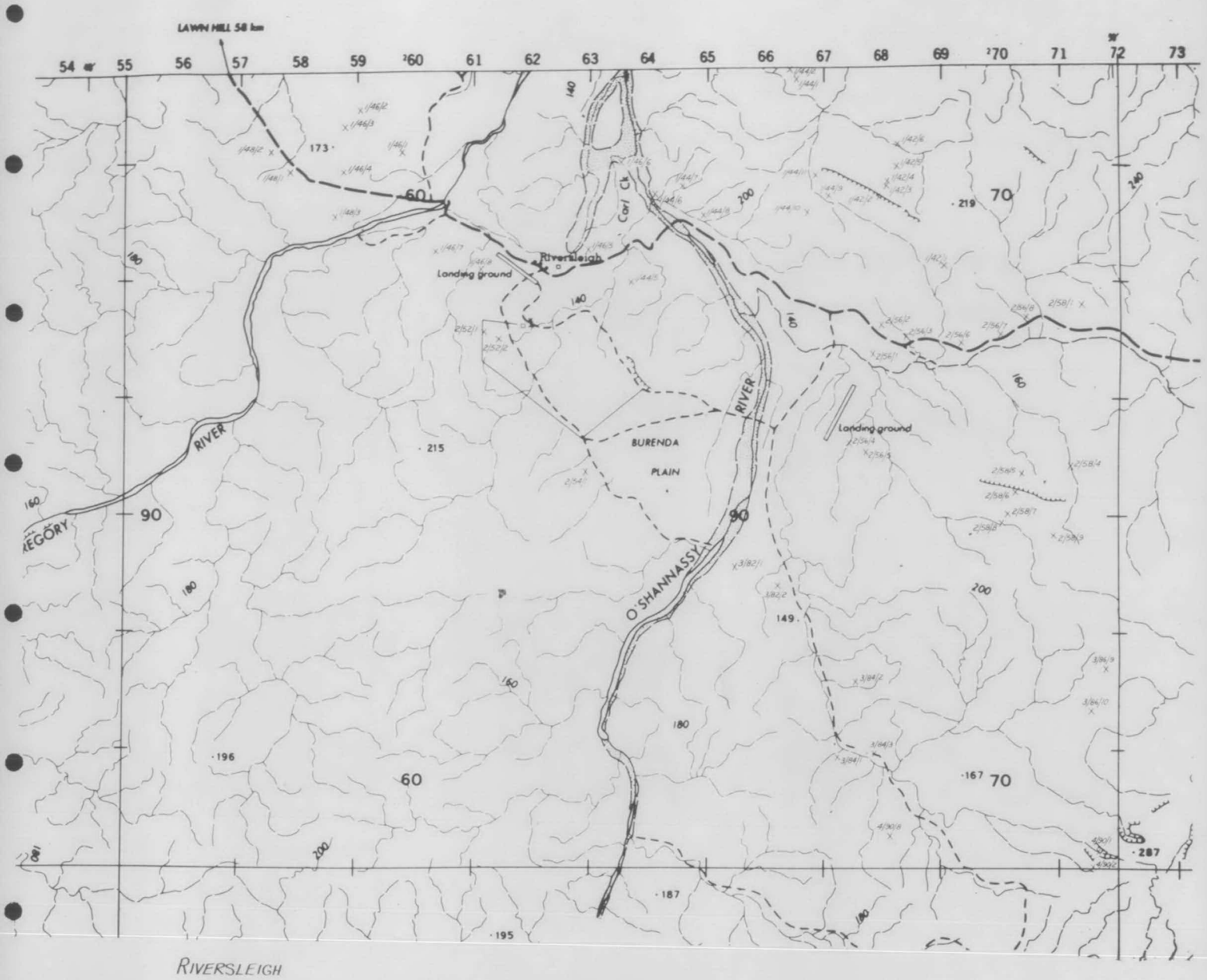
Fig 4

E54/A/66



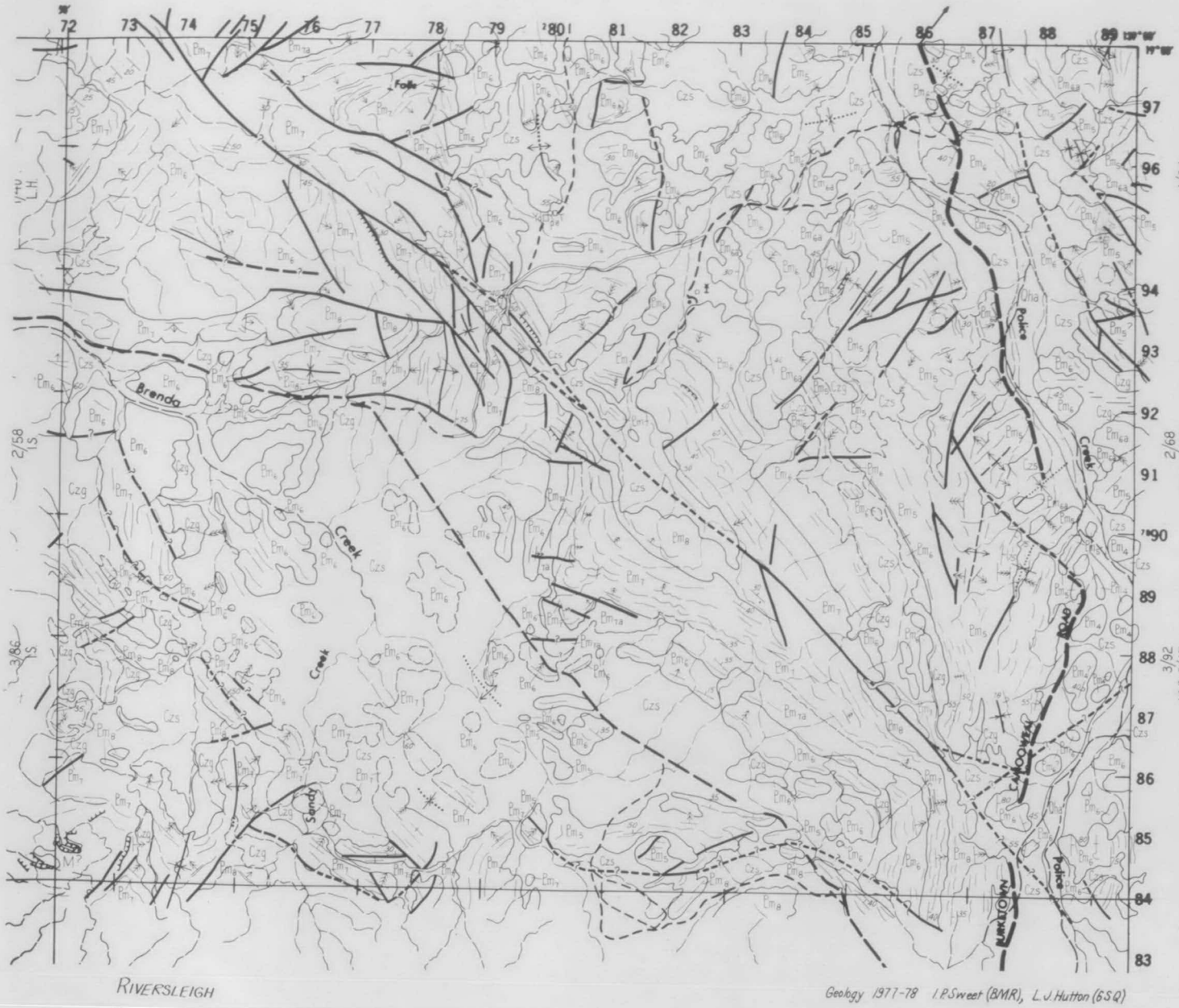
RIVERSLEIGH

0 1 2 3 4 5 Km (approx)

Record 1979/45

Fig 4a Field observation localities

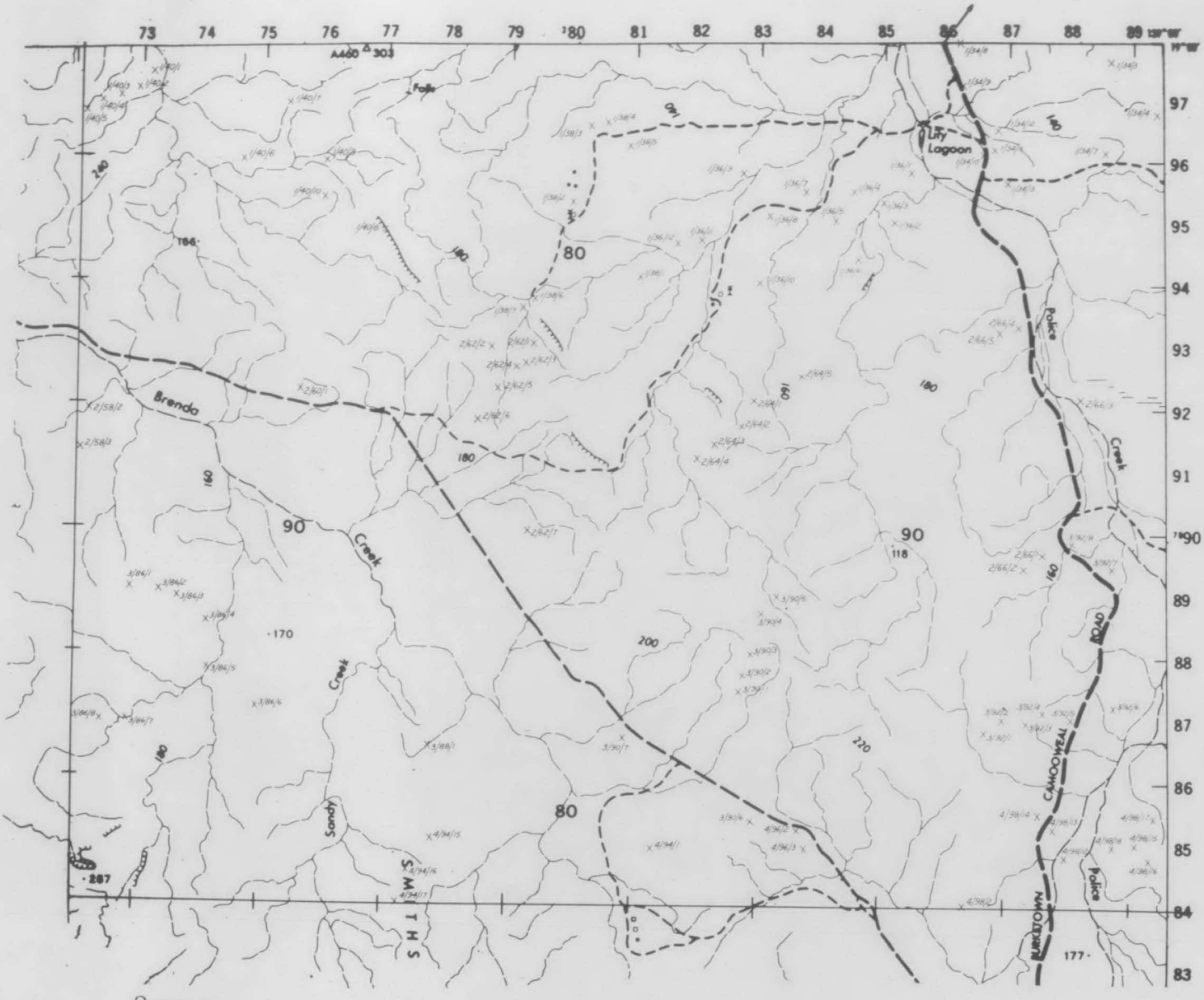
E54/A/66-1



Record 1979/45

Fig 5

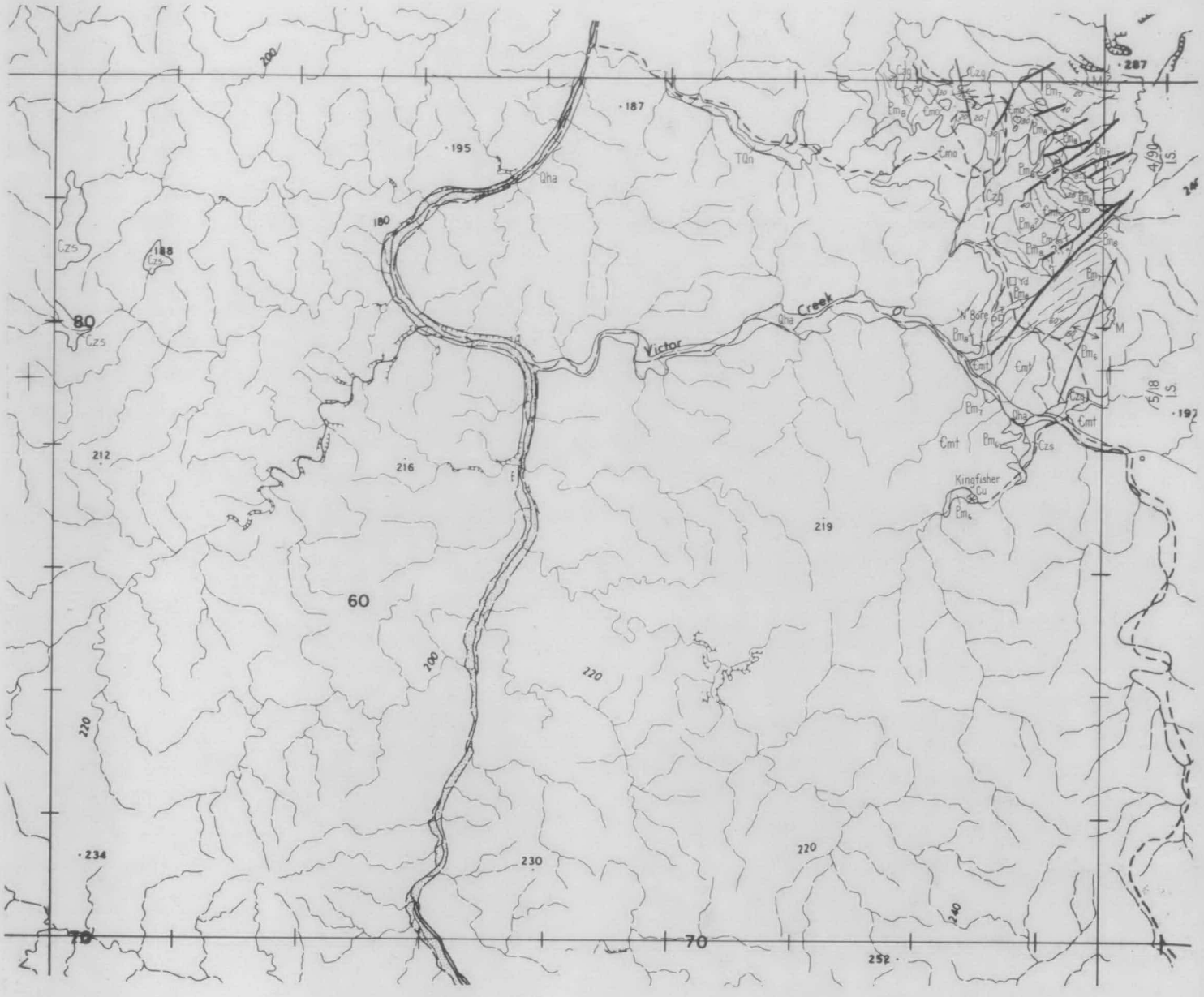
E54/A/67



Record 1979/45

Fig 5a Field observation localities

E54/A/67-1



Geology 1977-78 I.P.Sweet (BMR), L.J.Hutton (G.S.Q.)

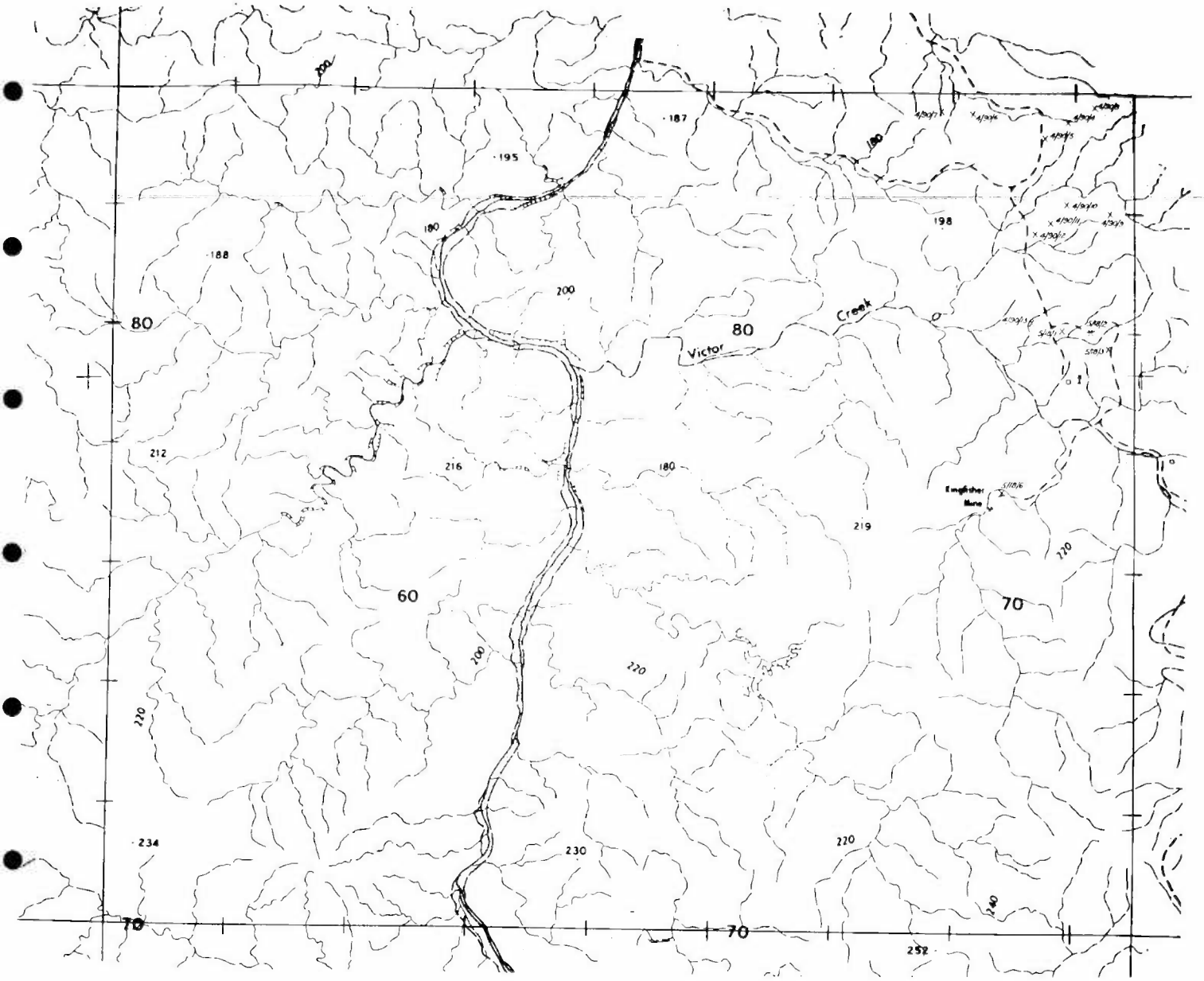
RIVERSLEIGH

0 1 2 3 4 5 Km (approx)

Record 1979/45

Fig 6

E54/A/68



RIVERSLEIGH

0 1 2 3 4 5 Km (approx)

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Fig 6a Field observation localities

E54/A/68-1

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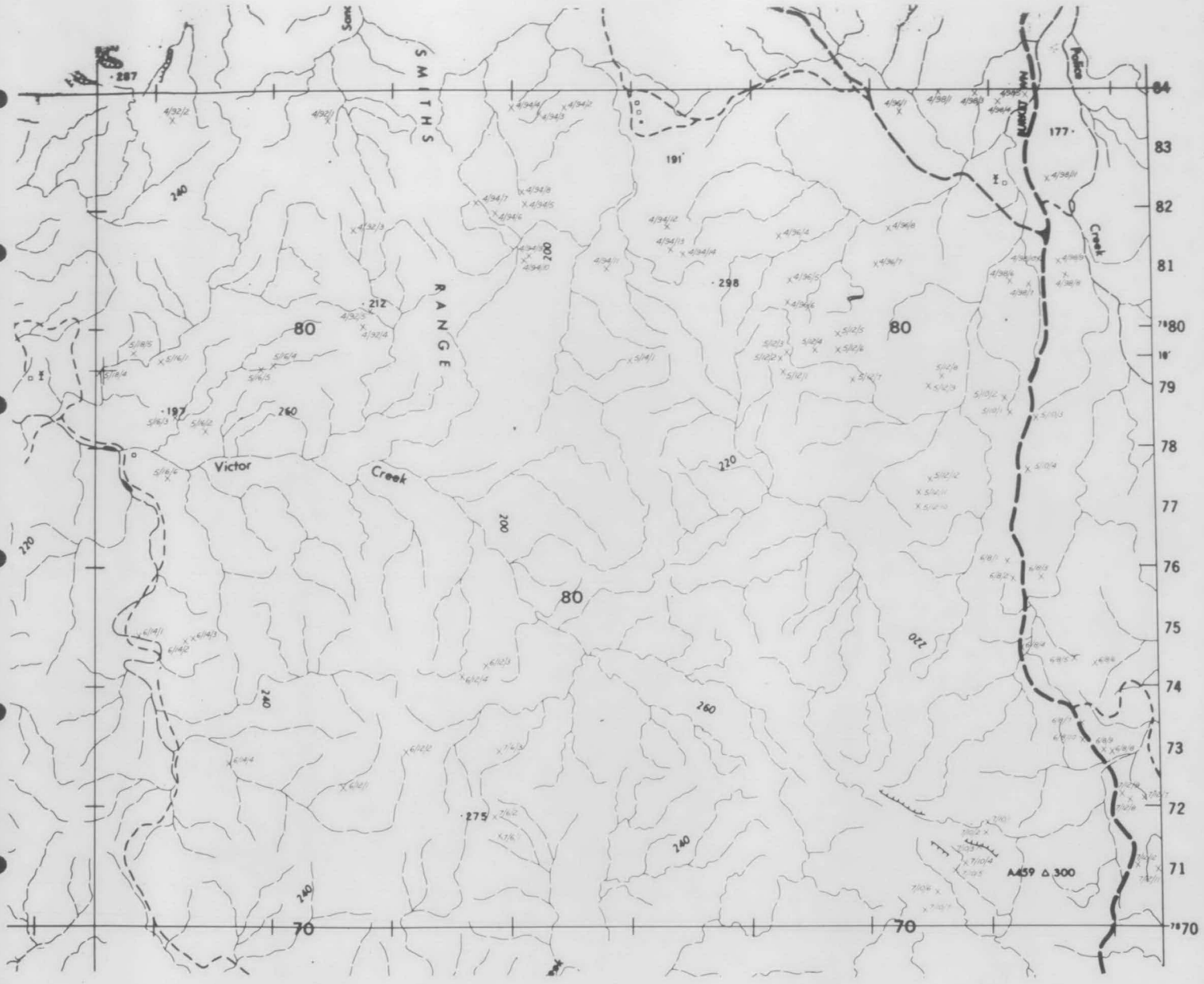
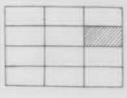
RIVERSLEIGH

0 1 2 3 4 5 Km (approx)



RIVERSLEIGH



0 1 2 3 4 5 km (approx)

Record 1979/45

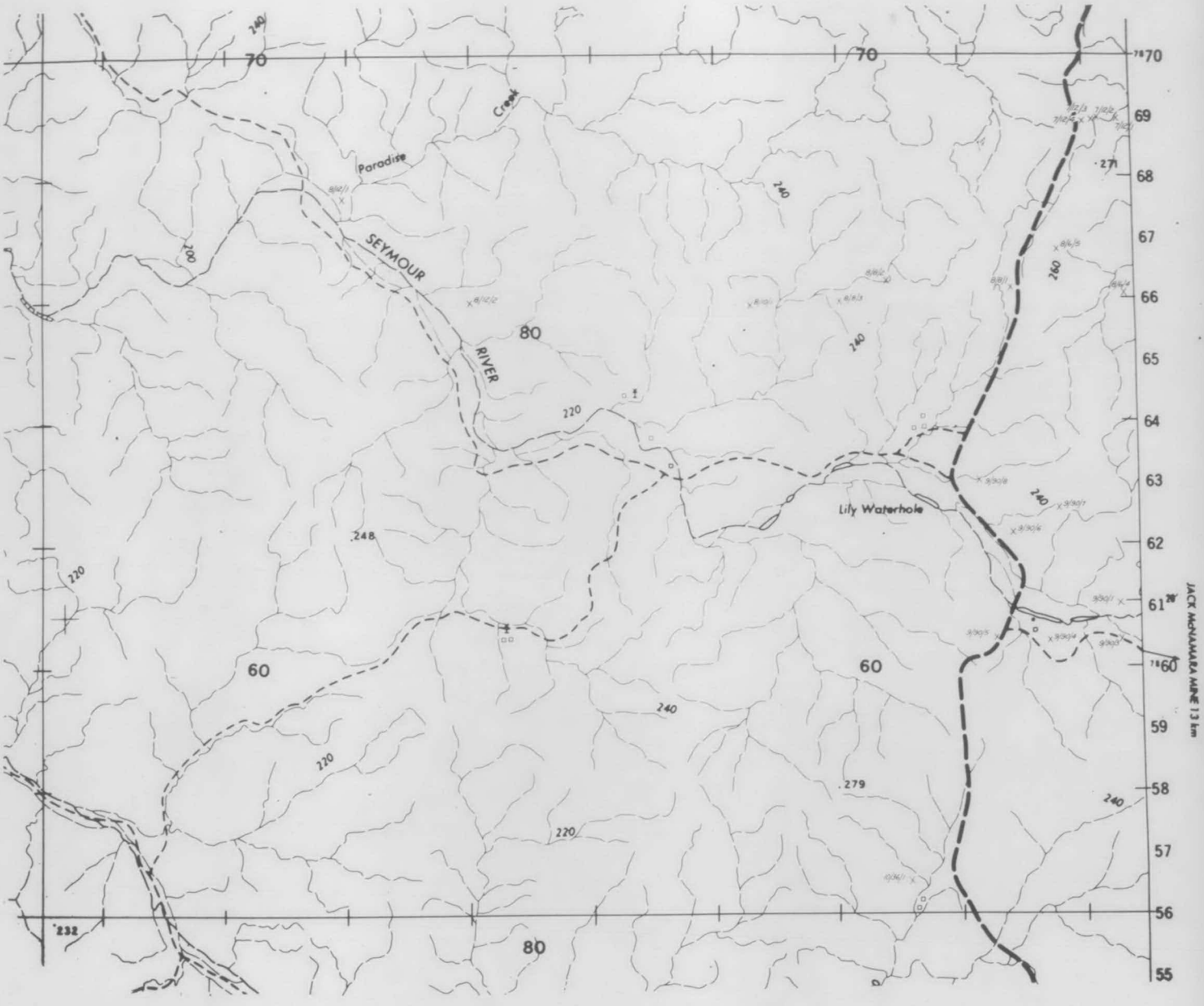
Fig 7a Field observation localities

E54/A/69-1

Record 1979/45

Fig 8

E54/A/70



Record 1979/45

Fig 8a Field observation localities

E54/A/70-1

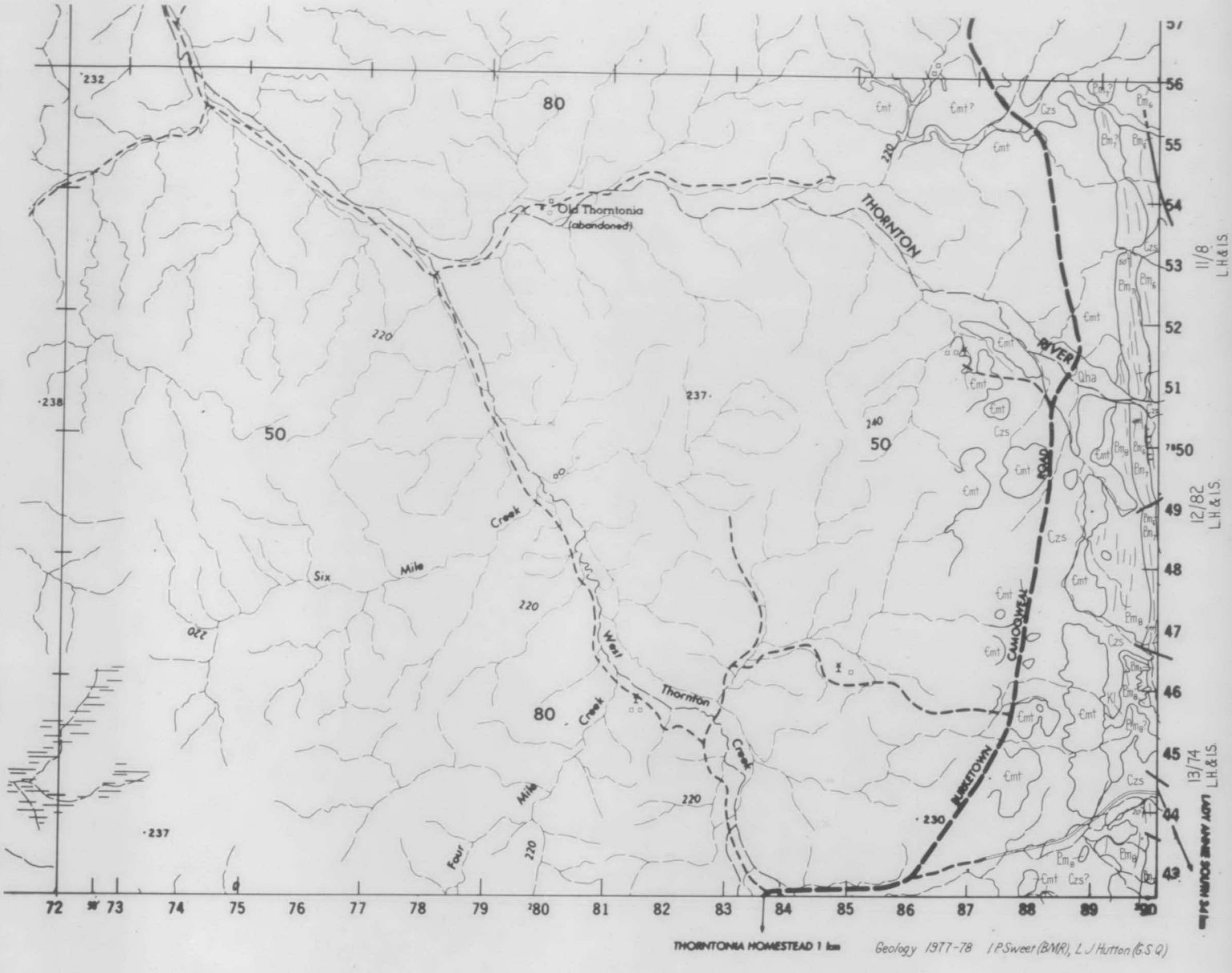


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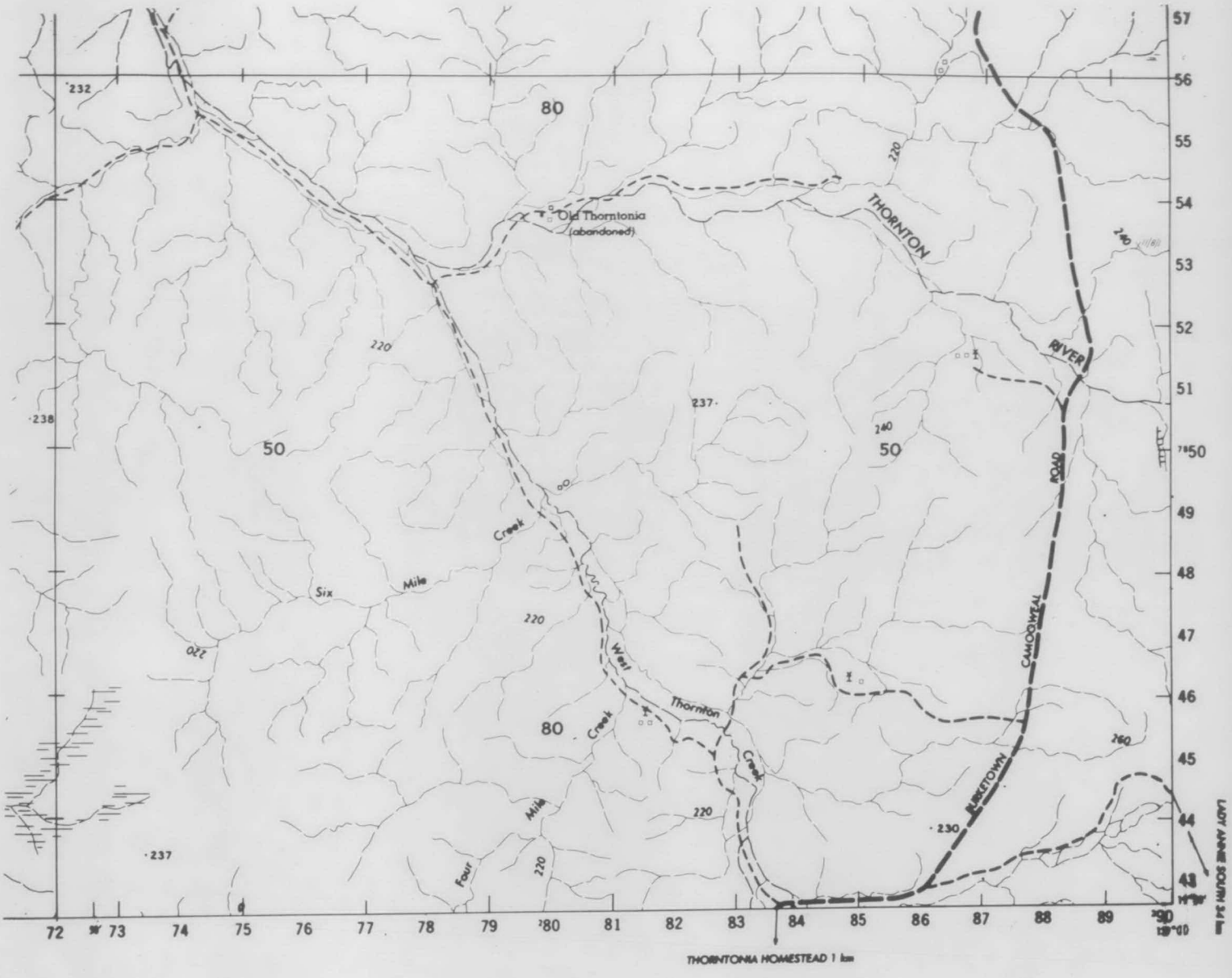
Fig 9

E54/A/71



RIVERSLEIGH

0 1 2 3 4 5 Km (approx)

Record 1979/45

Fig 9a Field observation localities

E54/A/71-1

6760 III ZONE 54

IV	I
III	II

GREGORYDOWNS

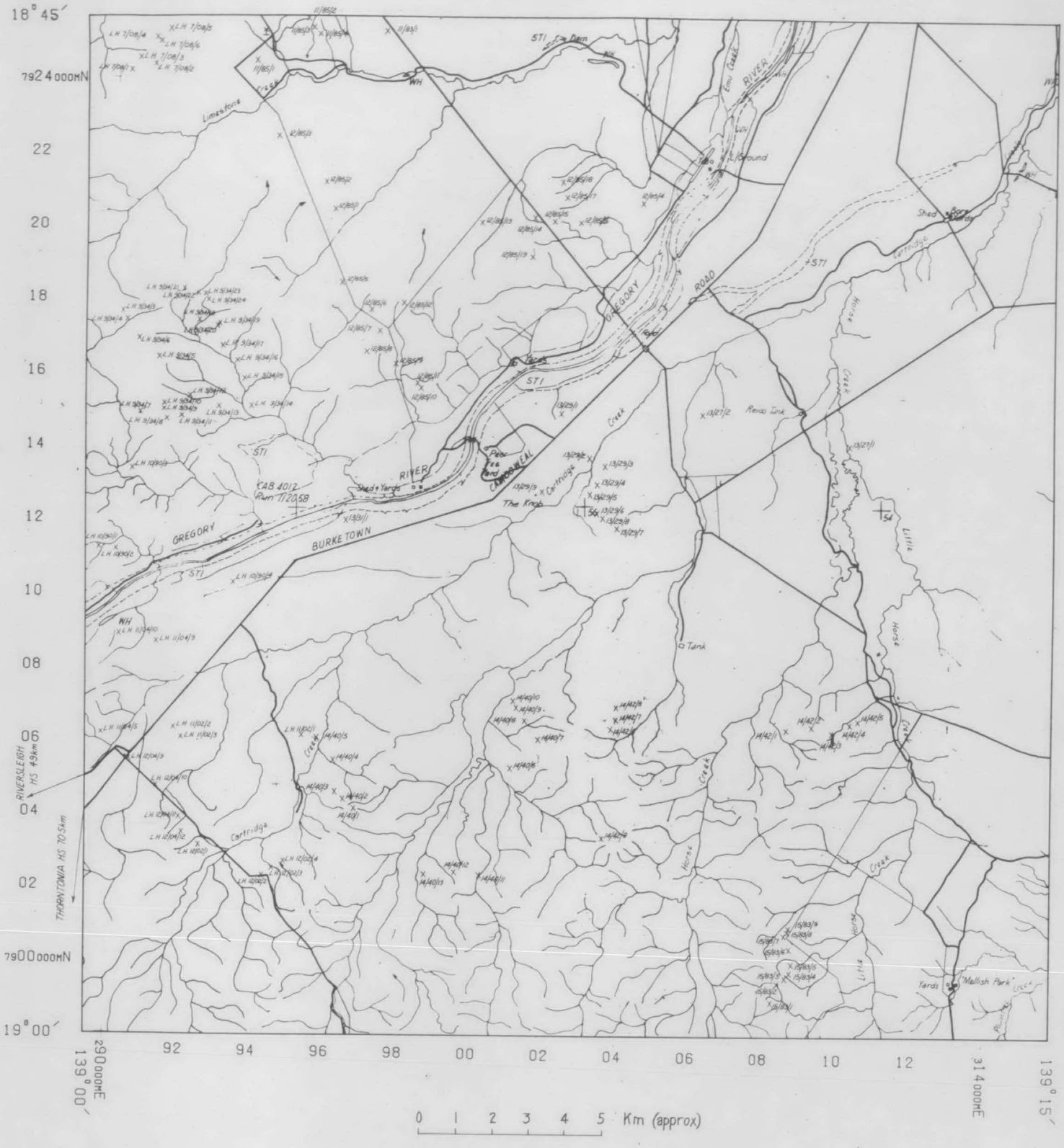
Geology 1977-78 I.P.Sweet (BMR), L.J.Hutton (G.S.Q.)

Drawn 1978-79 J.F.Stirzaker

Fig 10

Record 1979/45

E54/A/72



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6760 III ZONE 54

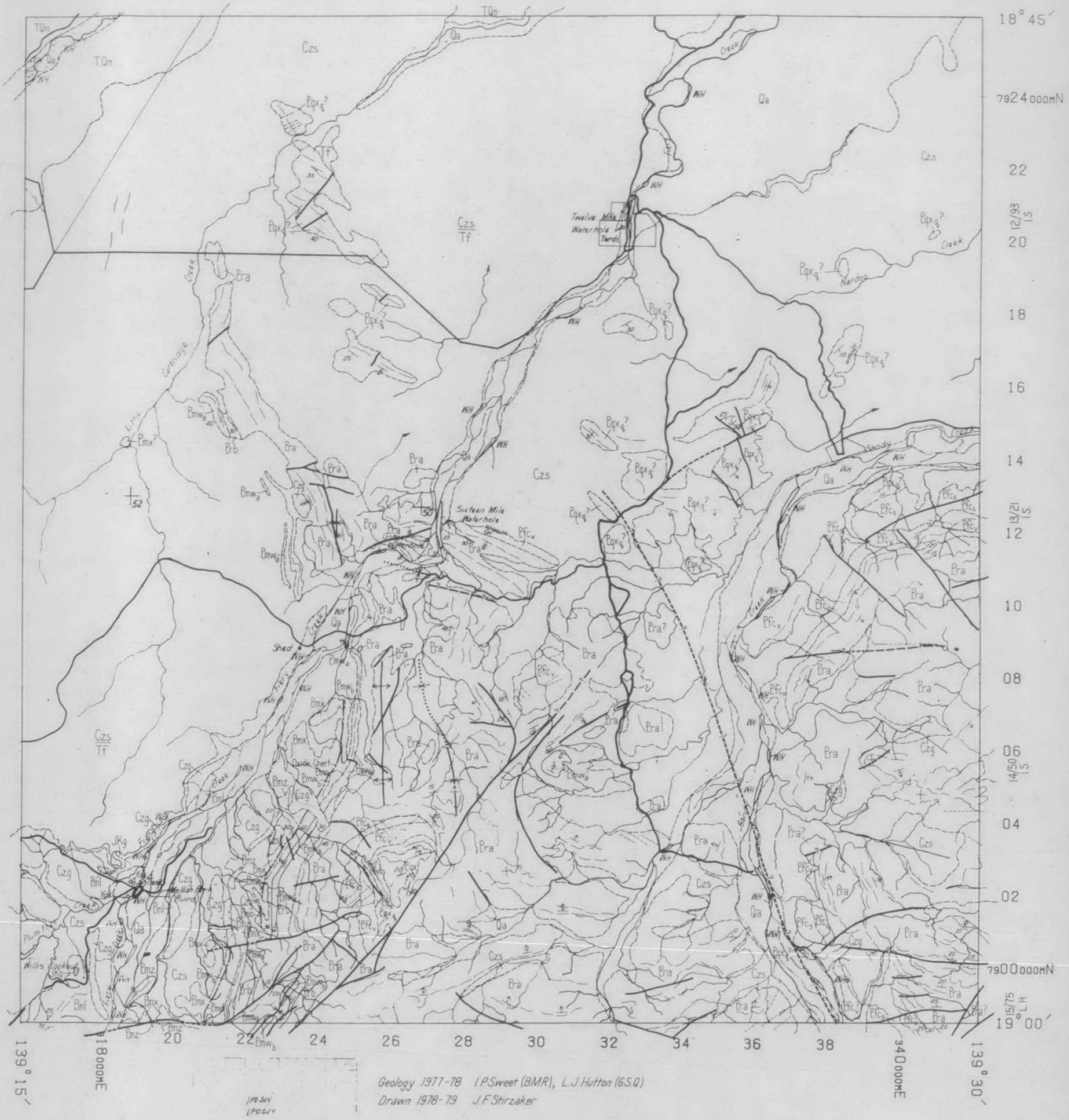
GREGORYDOWNS

IV	I
III	II

Record 1979/45

Fig 10a Field observation localities

E54/A/72-1



Geology 1977-78 I.P.Sweet (BMR), L.J.Hutton (GSQ)
Drawn 1978-79 J.F.Stirzaker

GREGORYDOWNS

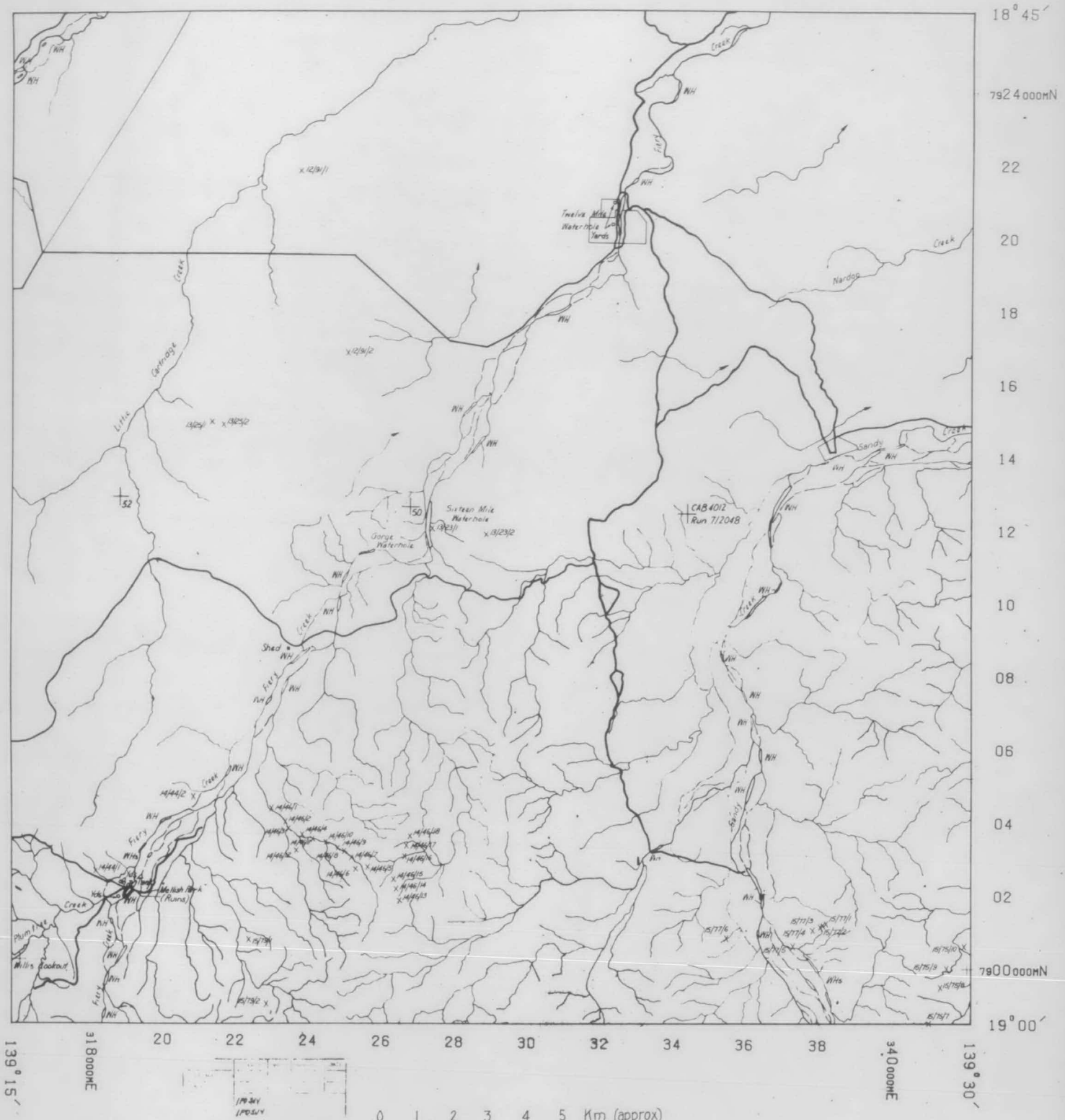
6760 II ZONE 54

IV	I
III	II

Fig 11

Record 1979/45

E54/A/73



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GREGORYDOWNS

6760 II ZONE 54

IV	I
III	II

Record 1979/45

Fig IIa Field observation localities

E54/A/73-1