BLAYNEY
1:100 000 SHEET AREA

NOTES TO ACCOMPANY GEOLOGICAL MAP

BY

D. WYBORN AND G.A.M. HENDERSON

RECORD 1996/56

AGSO
AUSTRALIAN
GEOLOGICAL SURVEY
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DEPARTMENT OF PRIMARY INDUSTRIES AND ENERGY

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ERRATUM

The appendices **BL_CHEM.TXT, BL_MIN.TXT** and **BL_FOSS.TXT** are not included as appendices to this record, but are available as digital files on CD.

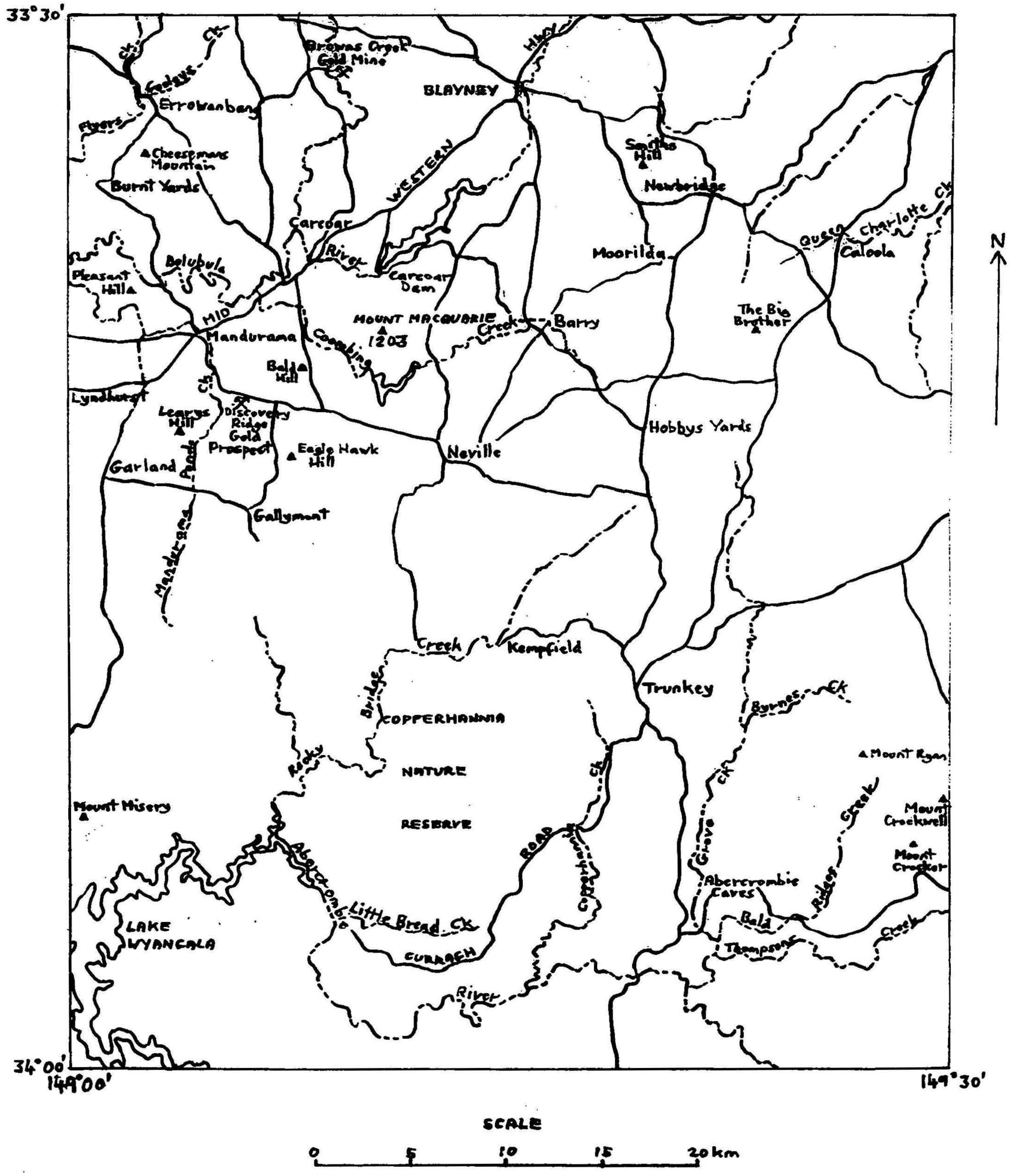
33°30'
Ck
Gadys Ck
Browns Creek Gold Mine
Errowanbang
BLAYNEY
Hwy
Flyers Ck
Cheesemans Mountain
Burnt Yards
WESTERN
Smiths Hill
Newbridge
Carcoar
Queen Charlotte Ck
Calcola
Pleasant Hills
Belubula
River
Carcoar Dam
Moorilda
N
MID
MOUNT MACQUARIE 1203
Creek
Barry
The Big Brother
Mandurama
Coombing
Baldy Hill
Ck
Lyndhurst
Lewes Hill
Discovery Ridge Gold Prospect
Hobbys Yards
Eagle Hawk Hill
Neville
Garland
Pounds
Gallymont
Mandurama
Creek
Kempfield
Bridge
Trunkey
Byrnes Ck
COPPERHANNIA
NATURE
Mount Ryan
Rocky
Ck
Ck
RESERVE
Mount Misery
Mount Crockwell
Grove
Creek
ROAD
Mount Crocker
Abercrombie
Copperhannia
Abercrombie Caves
Ridge
LAKE WYANGALA
Little Bread Ck
Bald
Creek
Thompsons
CURRAGH
River
34°00'
149°00'
149°30'
SCALE
0
5
10
15
20 km

Fig 1

INTRODUCTION

The BLAYNEY[*] (8730) Sheet area lies between latitudes 33°30' and 34°00'S, and longitudes 149°00' and 149°30'E, and covers an area of about 2500 km^2. It was mapped by the Bureau of Mineral Resources (BMR, now Australian Geological Survey Organisation, AGSO) between March 1991 and May 1992; the fieldwork was carried out by the authors, who spent a total of 6 man/months in the field. Some field work was also carried out in BLAYNEY by the authors in 1988 and 1989 on a broader project studying gold mineral potential of central NSW.

The main settlement in the Sheet area (Fig. 1) is Blayney (population 2700), and there are smaller centres along the Mid Western Highway at Carcoar, Mandurama and Lyndhurst. Other small towns include Trunkey, Neville, Barry and Newbridge. There are many pastoral properties in the northern part of BLAYNEY where Tertiary and Ordovician mafic rocks weather to rich soil. To the south and east soil fertility is lower on sedimentary rocks, though some granites provide areas of intermediate fertility. The southern part of BLAYNEY is sparsely populated where the land is deeply dissected down to the Abercrombie River valley and the backwaters of Wyangala Dam.

Vehicular access is good in the north, with formed gravel and sealed roads (Fig. 1), and a network of farm access tracks. In the south vehicle access is more limited, and dominated by fire trails and forestry roads. The main roads through the area are the Mid Western Highway in the northwest and the Bathurst-Trunkey-Tuena-Goulburn road which extends from the NE corner south through the eastern part of the sheet area.

PHYSIOGRAPHY

Elevations range from 370m at Lake Wyangala to 1203m above sea level at Mount Macquarie. There are two main physiographic subdivisions (Fig. 1), the pre-Tertiary planated surface in the north, and the dissected lands in the Abercrombie River catchment to the south. The northern planated surface was once close to base level (?sea level), and has been uplifted, mainly by warping on a meridional axis that lies to the east in OBERON. Some relief on the old surface is related to geological features. Mount Macquarie is a monadnock of particularly resistant chert that stands about 300m above the old surface. Some incision into the western part of the old surface has taken place in tributaries of the Belubula River, such as along Flyers, Gooleys and Mandurama Ponds Creeks. Major incision has taken place in the dissected lands to the south which have been cut down from the uplifted surface by headward erosion on the Abercrombie and Lachlan Rivers. Incision has been up to 600m since uplift.

CLIMATE AND VEGETATION

The mean yearly rainfall in the Sheet area ranges from about 700 mm in the west to 800 mm in the east, the range reflecting a combination of orographic and coastal influences. The mean annual figure for Blayney is 768 mm. Rainfall is relatively constant throughout the year with a slight winter maximum.

At Blayney the average January maximum is 26°C and the minimum is 12°C. In July, the coldest month, temperatures average 10°C (max.) and -1°C (min.). Winter frosts are common and, at times, severe in the higher country.

Vegetation in the less populated southern parts of the Sheet area, such as in the Copperhannia Nature Reserve, consists of Dry Sclerophyll Forests. Most of the original vegetation in the north has been replaced by pastureland and pinus radiata plantations. Much of the area is underlain by rock-types which give rise to relatively fertile soils such as the mafic volcanics of Ordovician age, and the Tertiary basalts.

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[*] Capitalised names refer to 1:100 000 Sheet areas. The Sheet area is covered by 1: 25 000 scale colour aerial photography flown in late 1990 by the New South Wales Central Mapping Authority.

These areas support the most productive farming and timber plantation enterprises.

PREVIOUS INVESTIGATIONS

BLAYNEY has had a long history of geological investigation dating back to the early days of mineral exploration for gold, copper and iron (eg Wilkinson, 1887; Mingaye & David, 1889; Jaquet, 1894, 1901; Pittman, 1900). Mineral exploration has been very active in the area over the last two decades; a list of company exploration reports held by the NSW Mines Department includes exploration programs by Amoco Minerals, BHP, CRA, CSR, Cyprus, Homestake, International Nickel, Jododex, Le Nickel, Newmont, Occidental, Pacific Copper, Pancontinental, Peko Wallsend, Placer Pacific, Shell, St Joe, Teck, and Texins.

The first systematic mapping of the area, the Bathurst 1:250,000 Sheet, was published in 1968 and mainly consisted of a compilation of research from Sydney University (Packham, 1968a). A metallogenic edition of the Bathurst 1:250,000 Sheet area with modified geology was produced by Stevens (1972), and a metallogenic study subsequently published (Stevens, 1975). Mapping of the area around Carcoar and Blayney was carried out by the Geological Survey of NSW in the late seventies (Patterson et al., 1977). Some results of the early work in this current mapping program were published by Henderson (1991).

Notable theses studies in BLAYNEY include Benson (1907) on the geology adjacent to the Copperhannia Fault near Newbridge, Hobbs (1962) on the structure of the Ordovician sediments west of the Copperhannia Fault, Offenberg (1963) and Heyden (1978) on the geology around Junction Reefs and Errowanbang, Shaw (1964) and Mitchell (1968) on the geology of the Gallimont district, Collins (1966), Chin (1972), and Simpson (1982) on the geology of the Abercrombie area, Berents (1977) and Hawley (1989) on the geology of the Neville-Barry region, Close (1978) on the granitic rocks of the Wyangala Batholith, Schmidt-Mumm (1983) on the Brownlea area, and Taylor (1983a) on the geology of the Trunkey Creek district. Specific thesis studies of mineral deposits include Burnham (1976) and DeVries (1988) - Browns Creek gold mine; Derriman (1982) and Grant (1988) - Junction Reefs gold district; and Bygraves (1989) on the Glendale gold deposit.

ORDOVICIAN

ADAMINABY GROUP (Oa)

Derivation of name. The name Adaminaby Group is now proposed to include all Ordovician quartz-rich flysch formations in the eastern part of the Lachlan Fold Belt extending north from the original type area of the 'Adaminaby Beds' (Owen and Wyborn, 1979) as mapped in the Snowy Mountains area. In the Blayney Sheet area the Adaminaby Group includes rocks previously mapped as Abercrombie Beds (Packham, 1968a) and Triangle Group (Stanton, 1956; Packham, 1968a).

Distribution. The rocks crop out in two areas in the Blayney Sheet area. The largest is in the southwest quarter, west of Copperhannia Fault, and is essentially synonymous with Packham's Abercrombie Beds. The other is in the southeast, and coincides with the westernmost area of Stanton's Triangle Group where it occupies the core of an elongated anticlinal dome named by Stanton the Thompson Anticline. The rocks extend west into the Cowra and south into the Crookwell Sheet areas.

Lithology and petrography. The Adaminaby Group west of the Copperhannia Fault is commonly strongly deformed and transposed so that original lithological character is masked. However in some areas, particularly adjacent to the main granite bodies in the area, such as the Sunset Hills and Bugs Ridge Granites, typical deep water turbidite sedimentary structures are discernible. These include graded bedding, with bed thicknesses commonly less than 30cm, but up to 1m, low angle cross bedding, and sole markings such as flute and load casts. Dark grey to black graphitic slate is common in the area, and an attempt to map out these 'black slate' units was made by Hobbs (1962). More recently

Glen & Wyborn (1996) confirmed Hobbs' conclusion that the black slates form mappable units several tens of metres thick. By analogy with similar units in other areas (Warbisco Shale; Vandenberg & Stewart, 1992), they reasoned that these units were likely to be Late Ordovician in age, and sit above the turbidite sequence. They noted that boundaries of the black slate units show common evidence of faulting, and by examining the facing of units on either side of the black slate units deduced that the area was complexly faulted with early near-bedding-parallel thrusts with a N-S transport direction. Long transport movements on these faults are possible, as small masses of mafic volcanics are present adjacent to the black slate units in places, such as at GR 971544 [#]. This locality is equated with the Rockley Volcanics or Coombing Formation, the nearest outcrops of which are over 10km away. Another area of mafic volcaniclastics occurs on the ridge around GR 015575 within Adaminaby Group rocks, but separated from black shale outcrops by the Rocky Bridge Granodiorite.

Adaminaby Group sediments in the southeastern area are well exposed along Thompsons Creek west of 'Collinore' homestead where they consist of generally massive to steeply dipping, fine to medium grained greywacke sandstone with thin interbeds of siltstone. Graded bedding indicating facing to the east is evident in some of the coarser beds in this area. The rocks are also well-exposed west of Mount Crocker, about 5 km to the north, in cuttings along pine forest tracks where they are dominantly cleaved siltstone weathered to purple and yellow-brown colours. Other exposures elsewhere include an atypical weathered mafic volcanic rock in a road cutting at GR 246460 surrounded by the usual sandstones and siltstones; however it is not clear whether or not the volcanic rock is within the sequence or is an outlier or fault slice of the overlying Triangle Formation.

The composition of Adaminaby Group sediments in BLAYNEY is typical for this widespread group, though coarse sandstones of proximal habit that are more common to the south are exceedingly rare. Sandstones are typically dirty with matrix content around 25-40%. Quartz is by far the dominant detrital component, and is normally not more that 0.5mm across. The coarser grained sandstones are commonly bimodal in grain size, with scattered grains around 0.5mm in a matrix with grains around 0.1mm. Other detrital components include rare feldspar (<5%), composite quartz grains, rounded yellow-brown tourmaline commonly around 0.1mm, and elongate muscovite flakes up to 1mm long. Some distinctive quartz sandstones with less matrix are present in the area near the Discovery Ridge gold prospect near the contact with the overlying Coombing Formation. These cleaner sandstones (image 1) contain detrital quartz grains around 1mm, and the same yellow-brown tourmaline as the turbiditic sandstones, but rare tourmaline grains are up to 0.5mm. The cleaner sandstones are associated with grey and black slates in this area, an association similar to that reported for the Warbisco Shale (Glen et al., 1990). In the area east of Neville, cherts are common near the contact with the Coombing Formation (eg. GR 003665; image 2, GR 013660) implying a possible transitional facies prior to volcanism commencing. Attempts to obtain conodonts from the cherts were unsuccessful.

Boundary relationships. The Adaminaby Group on BLAYNEY underlies the Coombing Formation in the west and the redefined Triangle Formation (see below) in the east. The base is not exposed. The southwestern area of outcrop is intruded by granites of the Wyangala Batholith and other granites including the Sunset Hills, Kempfield, Bartletts Creek and Rocky Bridge Granites. The nature of the contact with the Coombing Formation is a major controversy. The contact appears to be conformable, but there is the possibility that the contact is a bedding-parallel thrust fault (Glen & Wyborn,

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[#] Grid references are in zone 55, AMG coordinates, and are given in standard 6 figure easting-northing format to the nearest 100m. Note that most field locations were obtained with a GPS device which in many cases would have given locations more accurate than to the nearest 100m, but at the time of field work, for a given locality, there was no way of knowing whether this was the case.

1996), and on the face of the Blayney 1:100 000 geological map it is shown as such. Geologists from the mining company that is currently preparing to mine the Discovery Ridge gold deposit (Hargraves Resources) are of the opinion that the contact is conformable. It is hoped that the contact will be exposed as mine development proceeds. A problem with the conformable model, is that black and grey shales, common around the contact, may correlate with the Warbisco Shale above the Adaminaby Group further south (Glen et al., 1990), and such shales are Late Ordovician in those other southern localities, whereas the Coombing Formation is overlain by the Weemalla Formation, which contains Darriwillian to Gisbornian (straddling the early - late Ordovician boundary) conodonts, graptolites and trilobites. The suggested age for the Coombing Formation is Darriwillian (early Ordovician), and thus the shales (slates) at the top of the Adaminaby Group near Discovery Ridge would also be early Ordovician. A conformable contact would imply that these shales are not late Ordovician, and would not correlate with the Warbisco Shale.

Thickness. No estimate of the thickness can be made in the southwestern area because of the very complex structure. It is probably at least 1000m thick in the southeastern area.

Environment of deposition. Sedimentary features suggest turbidity flow deposition in a deep marine environment far removed from the sediment source. The absence of detritus of volcanic origin in the Adaminaby Group, and the rarity of quartz detritus in the overlying Coombing Formation imply a rapid change in sediment provenance for these formations. There are two main possibilities: (1) quartzose sediment supply was cut off as the sea-floor rose prior to the breaking out of volcanism, or (2) the volcanic and quartzose sediment facies were a great distances apart, and brought together at a later time.

Age and correlation. An Early Ordovician age, Darriwillian or older, is indicated from graptolites in the overlying Coombing Formation and from recent isotopic age determinations of intrusions into this formation (see below). However late Ordovician graptolites are reported from localities to the south in the Goulburn 1:250 000 Sheet area (Offenberg, 1974). Thus, some of the Adaminaby Group may be a facies equivalent of the Coombing Formation. The upper age limit is dependent on the interpretation of the nature of the Adaminaby Group - Coombing Formation contact, and the age of the black and grey shales at that contact. In the interpretation of Glen & Wyborn (1996), and adopted here, the contact is a bedding parallel thrust fault, the shales are equated with the Warbisco Shale further south, and the Adaminaby Group extends into the late Ordovician

Structure. The rocks west of the Copperhannia Fault are multiply deformed (image 3, GR 056536) and metamorphosed up to upper greenschist facies (biotite grade). Two main deformations are present, and these have been discussed by Hobbs (1965), and Glen & Wyborn (1996). The earliest of the two main deformations is associated with the regional upper greenschist (biotite) grade metamorphism. The analysis by Glen & Wyborn (1996) suggest that this earlier (D1) deformation was east-west to WNW trending in the area, and was responsible for the development of thrust slices and isoclinal folding. The deformation pre-dates the Wyangala Batholith plutons. Cleavage is not strongly developed during D1, but the fact that biotite is commonly developed implies that thermal processes were possibly more dominant than dynamic processes. It is suggested that these thermal processes were part of the thermal event that gave rise to partial melting not far beneath, and the generation of the Wyangala Batholith magmas.

A post granite deformation (D2) has much stronger dynamic effect (image 4, GR 056536), with strong meridional cleavage development and reorientation of earlier D1 metamorphic biotite. Mylonitic rocks have developed in the Kangaloolah Volcanics and Sunset Hills Granite (SE corner) in association with D2, and testifies to the post-Wyangala Batholith age for the deformation.

A third deformation (D3) refolds the earlier D2 meridional folds, particularly in the south, again with a dominant meridional orientation. This refolding of D2 is well displayed in outcrops in creeks that drain westward into the Abercrombie River on the upper reaches of Wyangala Dam, such as Little Bread Creek and Chicken Creek, where D2 cleavage is folded into upright folds. Elsewhere, there is a dominant westerly dip of the D2 cleavage, implying that the Copperhannia Fault dips at moderate angles to the west.

At the northern end of the Garland Granodiorite, south of Learys Hill steep northerly plunging folds with quartz veining parallel to the axial planes may represent products of forceful emplacement of the granodiorite.

KENILWORTH GROUP

COOMBING FORMATION (Oko, Okos, Okot)

Derivation of name. Henderson (1991) named the Coombing Formation after Coombing Creek which joins the Belubula River 3 km southwest of Carcoar.

Nomenclature. The Coombing Formation represents an amalgamation of more or less volcanogenic sedimentary rocks, massive cherts, minor mafic volcanics and sills, previously assigned to other formations including the Malongulli Formation, Angullong Tuff and the former Abercrombie beds.

Distribution. The Coombing Formation is a widespread unit extending from the Lyndhurst area in the west to the Copperhannia Fault in the east. Mafic volcaniclastic units east of the main Copperhannia Fault in the Kempfield area have been included in the Triangle Formation, while those west of the Fault have been termed Coombing Formation.

Type locality. The type locality for the Coombing Formation is around the gorge immediately below Coombing Falls (GR 702745) where cherty and coarser volcanogenic sediments are well exposed together with minor mafic sills and black cherty mudstone.

Lithology and petrography. The dominant lithology is a fine grained dark feldspathic mudstone. The mudstone is commonly silicified (cherty), and in such areas forms positive relief. Mount Macquarie, the highest point on BLAYNEY is the most notable example of such relief. In places, the mudstones have very poorly preserved bedding such as in the creek (GR 973681) south of Bald Hill. These massive mudstones display bedding in thin section that is not visible in hand specimen. Grading is common, and the detritus is mostly feldspar and 'andesitic' rock fragments. Green hornblende is the most common mafic mineral in the rock fragments, but much of this is metamorphic (biotite grade, particularly east of the Carcoar Fault). Clinopyroxene was definitely a precursor to some of the hornblende; other grains may be primary. Quartz is present in small amounts, and seems to be more abundant in the Coombing Formation east of the Carcoar Fault, than west of it. Some quartz grains (0.1mm) are bipyramidal, suggesting a local volcanic origin (eg at GR 974664). Radiolaria are common in the finest grain sized rocks. Coarser, graded, feldspathic volcaniclastic sandstones, such as those well displayed in creek outcrops east of 'Rockville' (image 5, GR 932713), contain no quartz.

In the Kempfield area the Coombing Formation consists of a complex mixture of mudstone, fine quartz sandstone resembling Adaminaby Group, and actinolite schist similar to that in the Rockley Volcanics, and in the Triangle Formation immediately east of the Copperhannia Fault. A good example is at GR 082520 where fine grained orthoquartzites with bimodal quartz detritus are interbedded with chlorite actinolite schists. This locality is just west of what has been shown on the map as the main Copperhannia Fault, but rocks east of the fault are similar. The decision to separate Coombing Formation west of the main Copperhannia Fault from the Triangle Formation to the east is arbitrary and only taken with the assumption that the fault is a major one. In terms of lithologies east and west of the fault there is virtually no difference.

Boundary relationships. The Coombing Formation is interpreted as conformably overlying the Adaminaby Group in the Kempfield area where there appears to be evidence of mixed sources. However, south of Mandurama the boundary is probably a bedding-parallel thrust fault, as discussed above (Glen & Wyborn, 1996). To the north the Coombing Formation is conformably overlain by the Weemalla Formation and Blayney Volcanics.

Thickness. The thickness of the Coombing Formation in most areas is difficult to estimate owing to scarcity of reliable bedding data and incompletely understood structural complications. The thickness west of the Carcoar Fault near Mandurama, where structural complexity is lowest, is estimated at 3000m assuming no repetition by bedding parallel thrust faults.

Environment of deposition. The Coombing Formation represents incipient Ordovician mafic volcanism with deep marine sediment largely derived from reworking of volcanic material not exposed in the area. The predominance of fine grained mudstones implies a starved sequence with a distal source.

Age. The age of the Coombing Formation is early Ordovician based on the late Darriwillian graptolite *Hustedograptus (Glyptograptus) teretiusculus* in the overlying Weemalla Formation at Mandurama Ponds Creek (GR 870767) (Stevens, 1957). Other graptolites also from this locality were recorded by Sherrard (1962); they include *Dicranograptus tardiusculus* and *Amplexograptus arctus*. A late Ordovician graptolite, *orthograptus ?quadrimucronatus*, possibly from the Coombing Formation, is reported from an unspecified location northwest of Trunkey (Sherrard, 1954; Packham, 1969).

INTRUSIONS WITHIN THE COOMBING FORMATION

Throughout the Coombing Formation, particularly just east of the Carcoar Fault, there are common mafic-mineral-rich sills and dykes, which in places become crowded in phenocrysts and approach ultramafic compositions. Typical magnetic susceptibilities of these intrusions are relatively low in the range 50 to 100 × 10^{-5} SI units. Good examples of these sills can be seen in the road cut on the eastern side of the Carcoar Dam wall (GR 023777). Here, four sills 3-5m thick are well exposed. The largest sill (5m) can be traced around the nose of an asymmetric syncline plunging gently to 220°. The rock is a pyroxene-phyric shoshonitic basalt.

The largest sills in the Coombing Formation are well displayed on the hill slopes south of Eagle Hawk Hill (GR 973681), where sills up to 1km long and 200m across can be mapped with a meridional trend. Another large, more irregular intrusion crops out on the hill south of 'Hilton West' (around GR 960700). Its intrusive contact with Coombing Formation sediments is exposed at GR 957697 (image 6). The sills are dominated by clinopyroxene phenocrysts (1-2mm), and those south of Eagle Hawk Hill also contain altered olivine replaced by talc. The intrusion south of 'Hilton West' contains abundant K-feldspar in the groundmass (monzonitic composition) and is clearly typical of shoshonitic late Ordovician magmatic products. The sills south of Eagle Hawk Hill are geochemically quite similar to, but more altered and deformed than, the Hilton West intrusion, and have widespread development of secondary biotite (upper greenschist facies).

Another more equant intrusion about 300m across is exposed on a hill north of the Mandurama-Neville Road around GR 980710. This intrusion is much more felsic than the adjacent sills, the rock being of hornblende-clinopyroxene monzonite to syenite composition. Pyrite is widespread in places in this intrusion indicating the presence of secondary alteration possibly associated with porphyry-style mineralisation.

Other larger intrusions in the Coombing Formation include the Stokefield Metagabbro

(Osg) near Carcoar and an unnamed intrusion that straddles the Mid Western Highway 2km northeast of Mandurama (Oi). The metagabbro is described separately under 'Stokefield Metagabbro'. One sample from the unnamed intrusion, from GR 942757, has an unusual composition. It is a plagioclase-rich leucocratic pyroxene quartz diorite cumulate with plagioclase crystals (An 30-50) aligned in a primary foliation dipping 35° to 170°. The rock is only weakly magnetic, but crops out on the edge of a magnetic anomaly that defines the extent of the intrusion. This sample could be interpreted as Silurian and related to the Carcoar Granodiorite, but it could be a low potassium cumulate related to the adjacent magnetic anomaly, which is likely to be of Ordovician age.

TRIANGLE FORMATION (Okt, Oktv, Okts)

The Triangle Formation as now mapped in BLAYNEY and OBERON has been modified from the Triangle Group of Stanton (1956) who defined this unit in the Oberon 1:100 000 Sheet area.

Distribution. The rocks of this unit crop out mainly in the Oberon Sheet area where they straddle the boundary between the Blayney and Oberon Sheets southeast of Caloola. The formation also crops out around the flanks of the Thompson Anticline southeast of Trunkey, and near Kempfield immediately east of the Copperhannia Fault .

Lithology and petrography. The Triangle Formation southeast of Trunkey is divided into three units. The basal unit (Oktv) consists of actinolite schist up to about 500m thick which corresponds with what Stanton (1956) mapped as Rockley Volcanics. Two types of schist are evident. One is a pale, coarse grained rock containing large tremolite-actinolite crystals with interstitial quartz and antigorite. The other is dark greenish rock containing sparse larger tremolite-actinolite grains in a very fine grained groundmass of indefinite composition. Lenses of quartzite also occur in some places within the schist. The unit is thickest along the northeast side of the Adaminaby Group, and forms an almost continuous belt between 'Fosters Creek' and a point south of Mount Crocker where it terminates against the Collinore Fault. The unit also crops out in the Bald Ridges area near Thompsons Creek on the western side of the Triangle Group. However, it appears to be missing along strike to the north of this area, and to the south is faulted out by a NNE-trending fault.

The schist is overlain by mainly sedimentary rocks (Okt) consisting in outcrop of quartzite and sandstone, with minor slate and schist. In the northeast between 'Fosters Creek' and Mount Ryan a prominent dark area on the radiometric image contains little outcrop, but deep red soil indicates that mafic volcanics or volcaniclastics are possibly present in the sequence. Thickly bedded to massive quartzite containing no volcanics is well exposed in Bald Ridge Creek, and along the Bald Ridges Road to the north of the creek where a cleavage is evident. Although the quartzite is in the same stratigraphic position as the Triangle Formation, and is mapped as such, it represents a facies change towards rocks more similar in lithology to those in the Adaminaby Group. Minor black shale occurs in a road cutting at the boundary between the actinolite schist (Oktv) and the quartzite in this area. Black shale was also observed to the north beside Byrnes Creek (GR 229549) immediately overlying schist belonging to unit Oktv.

An area of pale, leached siltstone in the east between Mount Ryan and Mount Crockwell, mapped as Okts, has also been tentatively included in the Triangle Formation. However, as it is in faulted contact along the Collinore Fault with the rest of the Triangle Formation, it could be an up-faulted part of the Adaminaby Group. The siltstone is not part of the Campbells Formation farther to the east because it underlies a thin lens of Kangaloolah Volcanics that defines the base of the Mumbil Group.

The Triangle Formation in the Kempfield area immediately east of the Copperhannia Fault contains similar lithologies to that southeast of Trunkey, but it has not been possible to subdivide it on the map because of complex structure. A west dipping sequence 1 km north of 'The Reeds' about 10 km southwest of Trunkey probably gives a representative section. Black mudstone is the dominant rock type. It, and mafic volcaniclastic sandstones, occur at the base of the sequence. These are overlain by further massive, black, carbonaceous mudstone followed by fissile, black shale, then quartz sandstone and, at the top, green to brown siltstones. The section is about 1200m thick. The siltstones contain quartz and feldspar detritus in similar proportions, and volcaniclastic sandstones contain abundant actinolite after clinopyroxene detritus. The volcaniclasic sandstones are definitely interbedded with the other rock types. At GR 800477 a coarse volcaniclastic sandstone with basaltic rock fragments up to 5mm also contains detritus of the black mudstone as elongated wispy fragments up to 10mm by 2mm. Quartz detritus is absent. The metamorphic grade is just up to biotite grade (upper greenschist). In the Kempfield area, the similarity of Triangle Formation with Coombing Formation west of the Copperhannia Fault has already been noted in the description of the Coombing Formation.

Boundary relationships. On BLAYNEY the Triangle Formation overlies the Adaminaby Group and is conformably overlain by the Rockley Volcanics. The Triangle Formation - Rockley Volcanics boundary is well exposed in abundant outcrops at GR 317680, where interbedded feldspathic sandstones containing minor quartz, and cherty siltstones are overlain by fine grained actinolite-chlorite-talc schists. The beds dip 70° towards 345°, and the metamorphic grade is upper greenschist. The Triangle Formation is unconformably overlain by the Kangaloolah Volcanics.

Thickness. The thickness of the Triangle Group on BLAYNEY is about 1000m around the Thompson Anticline. Stanton gives a maximum observed thickness for the unit as a whole of 3000m. However this thickness includes beds now mapped as Adaminaby Group.

Environment of deposition. The Triangle Formation is a complex unit with mixed sources in a distal marine environment. Volcaniclastic sediments, probably deriving from the north are dominant, being mostly of feldspathic composition, but some thin lava flows similar to the Rockley Volcanics, and now composed of actinolite schists are present in places. Relatively clean quartz sandstones in the Triangle Formation probably correlate with similar sandstones in the black shales above the Adaminaby Group (Warbisco Shale, and the black shales in the vicinity of the Discovery Ridge gold prospect). Other quartz detritus mixed in with volcaniclastic detritus must be reworked from the Adaminaby Group source in the south. The mixed detritus, and interbedding of rocks of mixed origin in the Triangle Formation provides supporting evidence that the Ordovician volcanically-derived units and the Adaminaby Group were part of the same terrane, and not brought together by amalgamation of disparate blocks of crust in the mid Palaeozoic

Age and correlation. The age of the Triangle Formation is late Ordovician from fossils in the Oberon Sheet area. No fossils have been found in the Formation in the Trunkey area except for the late Ordovician graptolite reported from northwest of Trunkey (see Coombing Formation above) which may be from the Triangle Formation depending on the location in relation to the Copperhannia Fault. The black shales in several places possibly correlate with the late Ordovician Warbisco Shale. An early Ordovician or early Silurian age is possible for the shale unit mapped as Okts southeast of Trunkey, as it is faulted against the rest of the Triangle Formation.

CABONNE GROUP

WEEMALLA FORMATION (Ocw, Ocws, Ocwt, Ocwm)

Derivation of name. The name is derived from the 'Weemalla' property (GR 810884) in the Cowra 1:100 000 Sheet area. The type area occurs in COWRA between Cadiangullong Creek and Swallow Creek, two south flowing tributaries of the Belubula River .

Nomenclature. The nomenclature of the area now designated as Weemalla Formation in BLAYNEY has had a complex history. The Mount Pleasant Basalt Member was used as the boundary between Kenyu Formation and Malongulli Formation on the Bathurst 1:250,000 geology 1st edition and on the metallogenic edition. The upper part of the Formation was included in the Angullong Tuff. More recently Henderson (1991) included much of the unit in his newly introduced Coombing Formation. The main problems relating to stratigraphic nomenclature in this area are (1) the absence of limestone units of the Barrajin Group to mark a clear subdivision between the Kenilworth and the Cabonne Groups, (2) the lack of good fossil control, and (3) the apparent similarity in lithofacies over a prolonged period of sedimentation. The term Weemalla Formation has been applied here to the sedimentary units lying between the Coombing Formation beneath, and the Forest Reefs Volcanics above.

Distribution. The Weemalla Formation extends from its type area in COWRA into BLAYNEY in the area north west of Mandurama where the unit has been divided into a number of unnamed lithological members. An area east of Garland is also included in the Weemalla Formation. Here the unit is undivided.

Lithology and petrography. The Weemalla Formation in BLAYNEY has a great range of lithologies from fine grained grey shales and mudstones, volcaniclastic siltstones, sandstones and conglomerates to volcanically derived debris flows. The Mount Pleasant Basalt Member, towards the base, consists of porphyritic pillow lava. The base of the Weemalla Formation is taken as the incoming of coarse volcaniclastic pebbly sandstones and debris flows on top of the finer grained sediments of the underlying Coombing Formation. This boundary is marked by the development of positive relief over the Weemalla Formation immediately north of Mandurama. These coarse basal sediments contain volcanic fragments commonly up to 10cms in diameter. Chert and mudstone fragments are common in places, and rarely limestone. At GR 863724 the dominant rock is a chert conglomerate with 1cm clast size, but scattered throughout the conglomerate are basaltic and andesitic lava clasts to 10cm, limestone clasts to 3cm and banded mudstone rafts up to 1m by 25cm. Bipyramidal quartz grains, and quartz as phenocrysts in volcanic rock fragments are to be found at this locality. In general, the dominant volcanic detritus consists of clinopyroxene-phyric basaltic fragments and clinopyroxene crystals. Brown hornblende crystals and hornblende-bearing basalt fragments are also common at this level. The hornblende from GR 884744 has been dated by the Ar/Ar technique (see below).

Overlying the basal coarse sediments is a sequence of volcanic sandstones and siltstones estimated to be over 1km thick up to the base of the Mount Pleasant Basalt Member (Ocwm). A monzogabbro sill 300m thick and over 5km long lies within this sequence, and is well exposed on the banks of the Belubula River north of Mandurama. The monzogabbro has a grain size of 2-4mm with much of the mafic mineralogy altered to actinolite and chlorite, though relict clinopyroxene is still common. Olivine is probably the other altered mafic mineral. The monzogabbro is commonly intruded by hornblende monzonite dykes up to 2m across. These dykes are more magnetic (2500 × 10^{-5} SI units) than the host monzogabbro (1000 to 2000 × 10^{-5} SI units).

Above the Mount Pleasant Basalt Member the interbedded sequence of coarse volcanic sandstones (Ocwt) and siltstones and shales (Ocws) continues with mostly gentle dips to the north. The finer grained sediments occupy the more subdued topography in this area and the coarse volcanic sandstones the hillier areas. Finer units appear to thicken to the west, implying a source for the coarser sands to the east. The Weemalla Formation in COWRA cannot be divided into coarser and finer units and is generally finer grained. This is in accord with the source of the coarser detritus being to the east.

The top of the Weemalla Formation is here defined as the base of a thick (500m) volcanic conglomerate (Ocfc) unit here considered as the base of the Forest Reefs Volcanics. The boundary is well defined on the southern slopes of Cheesemans Mountain (GR 896843). In particular, at GR 903840, the contact between the volcanic sandstones and the conglomerate is well exposed. Thin (<1m) units of volcanic conglomerate can be found in the upper part of the Weemalla Formation in this area, at stratigraphic levels as much as 500m below the top (eg. at GR 902830). To the west of Cheesemans Mountain the basal conglomerate of the Forest Reefs Volcanics thins and is overlain by a basaltic lava unit (Ocfb). At Burnt Yards the conglomerate is absent, and the Weemalla Formation is directly overlain by the basaltic lava unit, probably with slight unconformity. The contact between the Weemalla Formation and the basalt is exposed in Flyers Creek at GR 864838, but the basalt is coarse grained and may be a local intrusive body. The contact is steeply dipping, and cuts across gently dipping Weemalla Formation sediments. In this area an open gently north plunging anticline of Weemalla Formation appears to plunge under the contact with the overlying basalt.

The volcanic sandstones in the Weemalla Formation are very distinctive. They commonly occur as rounded cobbles 20-50cm across with exfoliated surfaces akin to the formation of granite tors, but with joint spacing less than 50cm. Inside the cobbles the rock is quite fresh and dark green. Magnetic susceptibilities range from 50 to 200 × 10^{-5} SI units. Most samples are composed entirely of pyroxene basaltic rock fragments and pyroxene crystal. The crystals still have euhedral crystal faces preserved indicating very proximal depositional conditions. Typical grain size is 2-4mm, but some basalt fragments are up to 10mm across. The fragments are dominated by pyroxene phenocrysts, with lesser plagioclase, but some contain altered olivine phenocrysts, and others hornblende. Local sources are again indicated as, where hornblende is present, it is abundant in many rock fragments in the same sample. Elsewhere it is totally absent in all rock fragments from the same sample. Quartz is absent. Not surprisingly, these sandstones have the chemical composition of basalts.

Volcanic sediments both underlying and overlying the Mount Pleasant Basalt Member to the east near 'Beulah Park' (GR 965818) are generally feldspathic rather than pyroxene-rich and may be better placed in the Coombing Formation, but they appear to match with the stratigraphic position of the lower part of Weemalla Formation. The pyroxene-rich upper part is missing, perhaps being replaced by volcanic breccias of the Forest Reefs Volcanics in this area. This implies that the pyroxene rich volcanic sandstones may be shallow water sand deposits developed adjacent to the emerging volcano that formed the Forest Reefs Volcanics.

The finer grained Weemalla sediments (Ocws and Ocw undifferentiated) are well bedded cream to dark grey siltstones and mudstones (images 7, 8, and 9) which break with a conchoidal fracture instead of splitting along bedding surfaces making it difficult to search for fossils. Interbedded fine grained volcanic sandstones display graded bedding, current bedding and convolute bedding (eg. at GR 892797). In the vicinity of the Sheahan-Grants gold mine a sequence of interbedded siltstones and carbonate units occurs, with the carbonate units replaced by skarn assemblages to form the deposit.

Boundary relationships. In BLAYNEY the Weemalla Formation overlies the Coombing Formation with probable conformity, the contact being taken as the incoming of coarse volcaniclastic material just north of Mandurama. It is to be noted that finer grained sediments within the Weemalla Formation are similar to the units within the underlying Coombing Formation. It is possible that the base of the Weemalla Formation is a bedding parallel thrust fault that has brought proximal Weemalla Formation into contact with distal Coombing Formation, and that the two units overlap in age. However no evidence has been found for such a fault.

The top of the Weemalla Formation is here defined as the contact with the basal volcanic conglomerate of the Forest Reefs Volcanics. This contact is conformable, as thin conglomerates are present near the contact within the Weemalla Formation. Further west, near Burnt Yards, the conglomerate is absent and the Weemalla Formation is overlain by basaltic lava of the Forest Reefs Volcanics. Likewise to the east, near 'Beulah Park' (GR 965818) sediments included in the Weemalla Formation are overlain by volcanic breccias (probably hyaloclastic breccias) of the Forest Reefs Volcanics.

In COWRA the Weemalla Formation is in contact with other named units, but these relationships will not be discussed here.

Thickness. The total thickness of the Weemalla Formation in BLAYNEY is estimated to be 3500m including up to 500m for the Mount Pleasant Basalt Member. The unit thins markedly to the east, and is probably only 1300m thick around Beulah Park where the Mount Pleasant Basalt Member is around 300m thick. To the west, in COWRA, the unit probably thins as the amount of coarse volcanic detritus decreases. The Mount Pleasant Basalt Member has not been recognised in COWRA.

Environment of deposition. The Weemalla Formation forms a proximal wedge of shallow marine volcanic debris on the slopes of a volcanic edifice to the east and/or north east. The volcano was probably partly emergent as evidenced by the presence of limestone clasts near the base of the Weemalla Formation, but much of the volcano could have been submarine. The probable source of the detritus was the Blayney Volcanics immediately east of the Carcoar Fault, as these volcanics occupy the same stratigraphic position as the Weemalla Formation immediately overlying the Coombing Formation. To the west, on COWRA, the sequence is more distal and deeper water.

Age and correlation. A late early Ordovician age of the middle part of the Weemalla Formation in BLAYNEY has been ascertained from fossils discovered from Mandurama Ponds Creek (GR 870767) (Stevens, 1957), and is based on the late Darriwillian graptolite *Hustedograptus (Glyptograptus) teretiusculus*. Other graptolites also from this locality were recorded by Sherrard (1962); they include *Dicranograptus tardiusculus* and *Amplexograptus arctus*. Fossils of early and late Darriwillian age have also been recorded in COWRA at several localities

Several carbonate outcrops adjacent to the Sheahan-Grants mine were sampled in this study for conodonts. One sample from GR 847770 contained a useful conodont fauna including *Periodon aculeatus*, *Pseudooneontodus mitratus*, and *Ozrakodina aff. O. sesquipedalis* indicating a late Ordovician (Eastonian to Bolindian) age (R.S. Nicholls pers. comm., 1994). This sample comes from quite high in the Weemalla sequence, possibly 1500m above the Darriwillian horizon discovered by Stevens (1957), so a late Ordovician age is expected.

Hornblende separated from a sample of hornblende-rich sandstone from near the base of the Weemalla Formation (GR 884744) was analysed by the Ar/Ar technique and gave an age of 450.0±1.2Ma (C. Perkins, pers. comm., 1996). This result is somewhat younger than expected for the base of the Weemalla Formation. Earlier Ar/Ar dates, reported by Perkins et al. (1990; 1992) on hornblende-bearing dykes intruding the Weemalla Formation in the vicinity of the Sheahan-Grants mine, giving ages of 470Ma and 480Ma, appear to be too old in relation to the fossil evidence.

MOUNT PLEASANT BASALT MEMBER (Ocwm)

Derivation of name. The name is derived from Pleasant Hill (GR 889769), a prominent hill about 4 km northwest of Mandurama.

Nomenclature. Smith (1966) published the name 'Mount Pleasant Andesite' for a mafic volcanic unit cropping out prominently on Pleasant Hill, the unit having originally been named by Bruce and Langley (1949) in an unpublished thesis. Packham (1968a) included associated coarse volcaniclastic rocks in the unit but did not name it. Henderson (1991) termed the unit the Mount Pleasant Basalt to more accurately reflect the basaltic composition of the main lava flow. The unit as described here is now restricted to the basalt lava flow which has been remapped and shown to be of somewhat different extent from that shown on any previous maps.

Distribution. The unit extends east and northeast from Pleasant Hill to about 7 km north of Carcoar, and southwest to the western margin of the Sheet area. It is displaced in several places by northwest-trending faults. A fault extending from BLAYNEY into COWRA in a NNW direction appears to cut the unit off to the west. However, basalt outcrops on the hill immediately north of Lucan (GR 861672) could be a continuation of the unit in the fault block to the west of the fault.

Type locality. The type locality is around the summit of Pleasant Hill (GR 889769), where excellent pavement outcrops (image 10) displaying the pillow lava character typical of the unit can be observed.

Lithology and petrography. The unit is distinctive and essentially composed of a single lithology, a pale to mid green porphyritic basalt with around 30-40% phenocrysts of plagioclase, clinopyroxene and altered olivine, each around 2mm across (image 11). Magnetic susceptibilities are typically in the range 300 to 1000 × 10^{-5} SI units. In large outcrops, such as those on Pleasant Hill and near 'Montana' (GR 863737), it is clear that the unit is a pillow lava, with very large pillows, commonly 3 to 4 metres across. Pale green to buff interpillow cherty rinds are well developed between the pillows. In the course of this work, these rinds were examined for conodont remains, without success. At localities with poorer outcrop it is not obvious that the unit is composed of pillow lava because of the large size of the pillows, though in the north-eastern outcrops of the unit excellent exposures are not obviously pillowed (GR 980835).

The phenocrysts of the lava are mostly altered, with plagioclase altered to a spongy mix of albite, epidote and sericite. Olivine has been altered to chlorite, carbonate, actinolite and epidote, while clinopyroxene remains largely unaltered, though it is commonly cut by chlorite veins and rimmed by actinolite indicating metamorphism to lower greenschist grade. The groundmass contains elongate needle-like crystals of feldspar with swallowtail terminations indicating quenching.

Chemistry. The composition of the unit is quite consistent from the 9 samples obtained, as expected from the consistent mineralogy. On a Le Bas Diagram (SiO2 versus Na2O+K2O) the samples plot within the shoshonite field, with about 52-54% SiO2, and Na2O about equal in abundance to K2O. The basalt is typically shoshonitic (Wyborn, 1992) in terms of trace elements, with high K2O, Sr and P, relatively low rare earth elements and Zr, and low Nb, TiO2, and Y. The high abundances of Cu, Pd, Pt, and Au indicates the magma came from a sulphur undersaturated source (Wyborn, 1995).

Boundary relationships. The unit is conformably enclosed within the middle part of the Weemalla Formation. Volcaniclastic sediments both below and above are similar, and commonly contain brown hornblende in abundance, despite the fact that hornblende is absent from the Mount Pleasant Basalt Member. These volcaniclastics must have been shed from other volcanic units outside the immediate area.

Thickness. Smith (1966) estimated a thickness of at least 480m in Mandurama Ponds Creek. A maximum thickness of 500m is suggested, but the thickness in the northeast outcrops may be as little as 50m.

Environment of deposition. The pillow lava character, and surrounding mass flow volcaniclastics indicates submarine conditions adjacent to an active volcanic zone.

Age. Darriwillian graptolites were recorded by Stevens (1957) in what is now mapped as Weemalla Formation in Mandurama Ponds Creek at GR 870768 about 200m stratigraphically above the top of the Mount Pleasant Basalt Member. An attempt to obtain zircons for dating from the Mount Pleasant Basalt Member failed owing to the absence of any zircon crystals. The average zirconium content of 9 analyses from the unit is 90ppm.

INTRUSIONS WITHIN THE WEEMALLA FORMATION

The Weemalla Formation contains many intrusions as dyke, sills, and plutons. Virtually all are of late Ordovician age and chemically related to the Forest Reefs Volcanics and the undoubtedly large Ordovician plutonic complex that lies buried beneath the region. The largest exposed bodies are the Tettenhall Monzodiorite, Tallwood Monzonite and Glen Ayr Syenite, and a 300m thick sill of monzogabbro exposed on the banks of the Belubula River north of Mandurama. These larger bodies are described elsewhere in this report.

The smaller dykes and sills are commonly well exposed and distinguished from volcaniclastics in the Weemalla Formation as larger bouldery outcrops. Magnetic susceptibilities are in the range 100 to 1000 × 10^{-5} SI units. Clinopyroxene phenocrysts are noticeable on the surfaces of outcrops, and dominate the rock mineralogy. Some dykes also contain conspicuous plagioclase phenocrysts. One dyke at GR 922822 is a compound dyke with a plagioclase and clinopyroxene phyric dyke intruding an earlier pyroxene phyric dyke with less conspicuous plagioclase phenocrysts (image 12). Another similar compound dyke is exposed on the eastern edge of the Belubula River at GR 839795 in COWRA, except in this outcrop the earlier plagioclase-poor dyke has brown hornblende phenocrysts as well as abundant clinopyroxene phenocrysts.

FOREST REEFS VOLCANICS (Ocf, Ocfb, Ocfc, Ocft)

Derivation of name. The name is derived from Forest Reefs village (GR 940950), Orange 1:100 000 Sheet.

Nomenclature. Offenberg (1963) used the term 'Forest Reefs Beds' for what he interpreted as the topmost part of the Ordovician succession in this area, but his unit was included in the 'Angullong Tuff' by Packham (1968a).

Distribution. The area mapped as Forest Reefs Volcanics occupies much of the northwest section of BLAYNEY northwest of Carcoar, and extends beneath the Tertiary units of the Canobolas volcano. Aeromagnetic data indicates that the highly magnetic Forest Reefs Volcanics extend to about 5km north of Forest Reefs on ORANGE.

Lithology and petrography. The Forest Reefs Volcanics represents the products of one of the most important volcanic centres related to mineral deposits in the Ordovician record of central New South Wales. Rock types range from basaltic lavas and breccias, matrix-supported volcanic conglomerates, volcaniclastic sands and ashes, more fractionated volcanic products including latites possibly deposited as subaerial ignimbrites, and masses and veins of hydrothermally altered rock including sericite-pyrite-quartz rock, tourmaline-quartz-muscovite greisen, and epidote-rich rock. The whole complex is intimately intruded by irregularly shaped high level bodies of mostly monzonite and syenite, which in places, where fine grained and altered, are difficult to distinguish from extrusive and clastic rocks.

As would be expected from a central volcanic complex, no general stratigraphic sequence can be delineated, though local superposition of units is discernible. The oldest unit is a matrix supported volcanic conglomerate (Ocfc) which is spectacularly exposed as pavements (images 13 and 14) and extensive outcrops on the slopes of Cheesemans Mountain (GR 896843), and extending east for several kilometres. To the west of Cheesemans Mountain the conglomerate can be traced for more than 2km across a NNW trending fault to outcrops in Flyers Creek interbedded with coarse volcaniclastic sandstones that dip beneath a pyroxene basalt unit (Ocfb), here informally termed the Burnt Yards basalt. Further west the Burnt Yards basalt overlies volcaniclastic sandstone and siltstone of the Weemalla Formation, indicating that the conglomerate has lensed out completely in this area. The conglomerate unit is essentially a transitional unit between the Weemalla Formation beneath and volcanics above. Thin (1-2m) volcanic conglomerate beds are interbedded in the Weemalla Formation up to 500m beneath the base of the main conglomerate unit. However, the conglomerate is included in the Forest Reefs Volcanics because it contains rounded basalt lava fragments similar in composition to that of the overlying basalt, and appears to grade upwards into the basalt via a transition to angular volcanic breccia and matrix-rich breccias to the NE of Cheesemans Mountain in Cheesemans Creek valley. A hornblende-rich basaltic breccia/matrix rich breccia is common at around the transitional boundary. Lower down, a range of pyroxene and feldspar phyric basalts are the most abundant rock type in the conglomerate, and most of these clasts are rounded. Magnetic susceptibilities range up to 5000 × 10^{-5} SI units for some larger fresher pyroxene basalt clasts. At some localities susceptibilities in the matrix are relatively high with readings around 700 to 1000 × 10^{-5} SI units, elsewhere the range is 100 to 200. Most clasts are about 150mm in diameter, but the largest are over 300mm. In the transitional breccia zone basalt blocks megabreccia 10's of metres across are probably present. The conglomerate unit probably formed as a series of subaerial to shallow marine mud-slides down the face of a growing volcanic edifice.

The basaltic unit (Ocfb) which lies above the conglomerate, consists of breccias and ?megabreccia blocks north of Cheesemans Mountain extending into a basalt lava in the west. In the east, the basaltic breccia lenses out above and below a tongue of volcaniclastic sandstones and siltstones, with the uppermost lens dominated by more fractionated feldspar-phyric breccias and coarse volcaniclastics made up of fragments of feldspar-phyric lava. The lower lens is dominated by pyroxene phyric lava fragments, commonly forming a jigsaw breccia with small amounts of comminuted fragments of the same material between fragments. Such textures can be seen at outcrop and down to thin section scale. An excellent exposure occurs in a creek bed at GR 934823. It is unclear whether the brecciation event was depositional, like a hyaloclastic breccia, or imposed on an existing rock by some kind of phreatic explosion in a confined environment. Rarely, pyroxene-phyric lava is interbedded within the lower part of the eastern volcaniclastic package, such as on the hill at GR 980883.

The basaltic lava in the west is pyroxene-rich and commonly strongly magnetic (2000 to 7000 × 10^{-5} SI units). Good exposures can be seen on Flyers Creek at the ford on Old Errowanbang Road. Excellent exposures are present further down Flyers Creek as far as its junction with Burnt Yards Creek, where the basalt overlies, with possible slight unconformity, volcaniclastic sandstone and siltstone of the Weemalla Formation. At the creek junction, an open gently north plunging anticline (limb dips 10-20°) in Weemalla Formation plunges beneath the basalt. Further south, roof pendants of the basalt occur in the Tettenhall Monzodiorite.

The basalt as seen in thin section consists of scattered phenocrysts of clinopyroxene and plagioclase around 1-2mm, and a second population of crowded microphenocrysts of the same minerals plus the alteration products of possible orthopyroxene. Microphenocrysts of magnetite (0.01mm) are abundant, and in some rocks rare hornblende phenocrysts (1-3mm) are entirely altered to opacite or have opacite rims. At some localities the rock has a microcrystalline groundmass possibly indicating a shallow level intrusive origin. In this regard small stocks within the basalt are similar in chemical composition to the Tettenhall Monzodiorite, and there is an overall strong chemical similarity between the basalt and the monzodiorite, as well as the mineralogical similarity of both containing orthopyroxene (or altered orthopyroxene in the case of the basalt), a rare mineral in Ordovician volcanics of the Lachlan Fold Belt (Wyborn, 1992).

The volcaniclastic sediments inter-tonguing with the basaltic breccia in the east dip generally through N (GR 959833) and NW to W (GR 972869). Further north dips in these sediments are very shallow (generally <20°) to either the south or the north. Good exposures of silicified volcaniclastic sandstone beds dipping at 40° to the south-south- west beneath the overlying latite unit (Ocft) can be seen in the gully at GR 920888. These overall changes in bedding direction, and the semicircular pattern of outcrop of the latite unit, provides compelling evidence that the whole central part of the Forest Reefs Volcanics sequence has collapsed into an underlying magma body producing a caldera some 7 to 8 kilometres across, with the associated intrusive units (Errowan Monzonite, Glen Ayr Syenite and Tallwood Monzonite and other small unnamed intrusive bodies) forming the caldera walls.

Above, and inwards from the basaltic breccia in the south and the volcaniclastic sediments in the east and north lies the distinctive latitic unit (image 15) (Ocft), here informally named the Nullawonga latite after the 'Nullawonga' property (GR 943842). The latite is a pale green to grey rock with weakly aligned phenocrysts of plagioclase (image 16). In the southern outcrops (south of the centre of caldera collapse) the latite is relatively unaltered, and estimated to be 250m thick. The freshest samples occur in an area of scattered outcrops on the hill slope around GR 929846, where fresh biotite phenocrysts can be seen in hand specimen. Magnetic susceptibility is high, at 5000 to 6000 × 10^{-5} SI units in all the southern outcrops. In thin section (image 17) the freshest samples can be seen to have phenocrysts of plagioclase, clinopyroxene, biotite and magnetite. Rare K-feldspar phenocrysts up to 5mm long are also present. The groundmass consists of devitrified glass with well developed spherulitic devitrification textures cutting aligned microgranules indicative of eutaxitic layering, and suggesting that the latite was possibly deposited as a subaerial ignimbrite in this area.

The latite in the northern exposures has been altered by epidote, chlorite, pyrite and carbonate veining and replacement of phenocrysts. Chloritised phenocrysts of biotite are still recognisable in the least altered samples with highest magnetic susceptibilities (1000-3000 × 10^{-5} SI units). Decreased magnetic susceptibilities can be correlated with veins and fractures between fresher more massive rock, and is part of a regional demagnetisation of rocks in the Forest Reefs Volcanics associated with possible fluid evolution from an underlying porphyry mineralisation system. The system is relatively deep, as epidote is widespread, and high-level epithermal vein textures are absent.

Above the latite, and central to the proposed caldera collapse structure, lie further outcrops of volcanic breccia and coarse fragmental volcaniclastics. These outcrops are the highest in the Forest Reefs Volcanics sequence. Latitic rock fragments and plagioclase feldspar dominate in the breccias and volcaniclastics of these units.

Hydrothermal alteration products. Alteration of the volcaniclastic and latitic rocks in the central and northern parts of the caldera collapse structure is widespread, and is manifest by demagnetisation associated with sericite-pyrite-epidote-carbonate alteration and veining. An even more extreme alteration product consists of veins (image 18) and irregular bodies up to 10 or more metres across of tourmaline-quartz-(sericite) rock. These bodies are common in the catchment of Gooleys Creek such as at GR 934898 and GR 934892. Even more spectacular bodies up to 100m across occur at Black Rock (GR 930928, Orange 1:100 000 Sheet area). All stages of replacement of the original feldspathic volcaniclastics by sericite, quartz and tourmaline can be seen in those samples which retain some original feldspathic texture. Fracture-filled veins are also common, such as the exposure in a road cut at GR 946905. Apatite and possible topaz (anhedral low birefringent plates with low negative 2V) are present in some samples. A tourmaline-bearing quartz-sericite greisen is exposed in a creek bank at GR 942833 adjacent to a stock of quartz syenite. The quartz syenite has a distinct low magnetic signature on the aeromagnetic image compared to the highly magnetic volcaniclastics into which it intrudes.

The hydrothermal alteration products are enriched in arsenic, and are almost certainly the result of fluid exsolution from an underlying porphyry mineralising intrusion. The scale of the alteration system over an area of some 20 square kilometres indicates that a potentially large copper/gold mineral deposit occurs at depth. At the time of writing no such deposit has been found, despite intensive exploration and drilling.

Chemistry. All 15 analyses from volcanic units of the Forest Reefs Volcanics are shoshonitic in the sense of the Le Bas diagram (Na2O+K2O versus SiO2), plotting in the trachybasalt, shoshonite and latite fields. The informal unit, the Nullawonga latite plots close to the latite-trachyte boundary, but just within the latite field. The comagmatic intrusions associated with the Forest Reefs Volcanics plot in the same range of compositions, but spread to slightly higher and lower SiO2 contents. In most respects the Forest Reefs Volcanics geochemical samples produce classic fractional crystallisation trends, displaying decreasing MgO, FeO, CaO, TiO2, Ni, Cr, Co, Sc, V and Pt and increasing SiO2, K2O, Na2O, Rb, Zr, Nb, Th, U, Ga, and light rare earth elements with fractionation. Other elements, such as Au, Zn, Pb, Sr, Ba, and S, are somewhat scattered because of alteration and mineralisation. Chalcophyle elements (Cu, Pd) and phosphorous display a very interesting pattern of increasing abundance with fractionation in the mafic rocks, but are significantly lower in relatively unaltered samples of the Nullawonga latite. For Cu and Pd, the increasing abundance with fractionation is typical of Ordovician shoshonites of the region that have fractionated in sulphur undersaturated conditions (Wyborn & Sun, 1994; Wyborn, 1996). The decreased abundance in the latite could indicate that volatiles carrying Cu, Pd, and Au were lost prior to or during extrusion of this rock, possibly owing to its inferred eruption as an ignimbrite.

Tourmaline alteration chemistry. Tourmaline-quartz rocks from the Forest Reefs Volcanics, and the quartz-sericite tourmaline greisen from GR 942833 are higher in silica than all other rocks from the volcanics. They also have high aluminium saturation index [ASI = molecular (Al2O3/(Na2O+K2O+CaO-P2O5))] and low K/Rb. Two types of tourmaline alteration are identifiable from the 4 samples analysed, (1) the greisen type which has a geochemical signature that extends beyond the most fractionated compositions of the comagmatic intrusives, which are high in light rare earth elements, Zr, Nb, Y, Ga, Ga/Al, Th and U, and (2) a volcanic replacement type higher in FeO, MgO, TiO2, V, Sc, Ni and Cr. Ore elements such as Cu, Pb, S and As seem to have a wide range of values, but are can be correlated from sample to sample. These important rocks, which are indicative of possible Cu/Au mineralisation beneath (Wyborn & Sun, 1993) require further detailed study to determine their significance in the mineralising process.

Boundary relationships. The Forest Reefs Volcanics conformably overlie the Weemalla Formation west of the Carcoar Fault and are unconformably overlain by the Silurian Cadia Coach Shale near the northwest corner of BLAYNEY. They are intruded by numerous comagmatic bodies of mainly monzonitic and syenitic composition including the Tallwood Monzonite, Glen Ayr Syenite and Errowan Monzonite.

Thickness. The volcanics have formed as a typical stratovolcanic edifice, initially in shallow marine conditions, and later in a subaerial environment. As such it is expected that facies changes and thickness ranges are extreme. In a section from Cheesemans Mountain northeastwards to the centre of the proposed caldera collapse, a total thickness of around 1.5 kilometres is likely consisting of 500m of conglomerate, 500m of basaltic lava breccia, 250m of latite and a further 250m of breccia. In the north where volcaniclastics dominate, the lower parts of the sequence are not exposed, so thicknesses are unknown.

Environment of deposition. The Forest Reefs Volcanics have built up from shallow marine conditions in the underlying Weemalla Formation. The conglomerate is matrix supported and probably resulted from debris slides and mud flows down the slope of the emerging stratovolcano. Much of the basaltic breccia may have formed by hyaloclastic processes in shallow seas, but the eutaxitic layering in the latite indicates that this rock formed as a subaerial ignimbrite. Fine grained volcaniclastic sediments in the north may have formed as intra-caldera sediment and ash fill. The structure of the volcano indicates that the central part collapsed into a large underlying monzonitic magma chamber represented at the surface by comagmatic monzonitic and syenitic intrusives that form an irregular ring around the zone of collapse. Collapse would have taken place late in the history of the volcano over a roughly equant zone about 7 or 8 kilometres across.

Age and correlation. The Forest Reefs Volcanics are of late Ordovician age, as they are underlain by Weemalla Formation volcaniclastics containing late Darriwillian graptolites and carbonates with late Ordovician conodonts. Also they are intruded by comagmatic monzonites dated as late Ordovician by zircon ion probe analyses. The volcanics may correlate approximately with coarse volcaniclastic sediments of the Millimbri and Angullong Formations to the west, and the Oakdale Formation to the north. The Blayney Volcanics to the east are petrographically and geochemically distinct (more mafic) and thought to be older.

BLAYNEY VOLCANICS (Ocb)

Derivation of name. The name is derived from the town of Blayney (GR 090870), Blayney 1:100 000 Sheet.

Nomenclature. The term 'Blayney Andesite' was first used by Booker (1939). Packham (1968a) included the 'Blayney Andesite' in the 'Angullong Tuff'. Bowman and others (1977a) reintroduced the term as a subdivision of the Angullong Formation (equivalent to the 'Angullong Tuff') together with a much less extensive overlying unit named the 'Quigleys Hill Tuff'. Henderson (1991) renamed the 'Blayney Andesite' the Blayney Basalt to more accurately reflect the basaltic rather than andesitic composition, but did not differentiate the 'Quigleys Hill Tuff'. The term Blayney Volcanics is now introduced to indicate the presence of multiple basalt flows and to reflect the inclusion of the minor volcaniclastics including the 'Quigleys Hill Tuff'.

Distribution. The Blayney Volcanics extend from Newbridge to about 10 km west of Blayney and north into ORANGE, where they are probably overlain by the Byng Volcanics, a unit of a similar mafic basaltic composition, but exhibiting a much stronger magnetic signature. To the south volcaniclastic sediments of the Coombing Formation underlie the Volcanics. No type locality is given, but the best exposures are on the hills to the west of the road between Blayney and Millthorpe, extending from BLAYNEY onto ORANGE (image 19). Other areas with excellent exposures include Smiths Hill 7.5km ESE of Blayney, but in general exposures are readily found.

Lithology and petrography. By far the dominant rock type is a green basalt with abundant phenocrysts of clinopyroxene conspicuous in hand specimen. In larger outcrops the basalt can be seen to consist of a diffuse breccia consisting of spherical or ellipsoidal zones up to 0.5m across containing euhedral pyroxene phenocryst, and obviously of the composition of a relatively fresh lava, separated by narrow (50-100mm) zones of the same composition, but where the phenocrysts have been comminuted to a granular sandy aggregate. This brecciation possibly formed partly from hyaloclastic brecciation, and partly from pillow lava development in a shallow to moderately deep marine environment. Definite pillow lavas up to 0.4m across can be seen at GR 127860.

The magnetic susceptibility of the Blayney Volcanics is low (50-200 $\times 10^{-5}$ SI units) compared to the Forest Reefs Volcanics, and to other volcanic and volcaniclastic units in the Orange-Molong area, but is similar to units further east and NE such as the Sofala and Rockley Volcanics (excluding ultramafic phases). The less oxidised nature (lower magnetic susceptibility) is probably a primary characteristic rather than a result of destruction of magnetite by low grade regional metamorphism, as the metamorphic grade is no different from that of the Forest Reefs Volcanics. This is also borne out by the similarity of magnetic susceptibility for associated intrusives (see Moorilda Monzonite).

Imposed structure is weak, with cleavage only common close to major bounding faults. The impression is that the rocks have not been strongly folded or inclined to steep attitudes. A zone of shearing trending 030° and dipping steeply to the east is associated with the Browns Creek copper gold deposit, and may be the conduit for mineralising fluids emanating from the volcanics into the Cowriga Limestone Member.

Rocks that could be regarded as volcaniclastics are rare in the Blayney Volcanics, but near the contact with the underlying Coombing Formation coarse sandstones of volcanic origin are present, and similar to the volcaniclastic sandstones in the Weemalla Formation. However in the main areas of Blayney Volcanic outcrops in BLAYNEY and ORANGE the porphyritic pyroxene basalt breccia is almost ubiquitous.

In thin section the basalt is seen to consist of abundant (25%) euhedral crystals of augite, commonly displaying strong zoning 1-2mm across, with larger grains composed of composites of several irregular grains, but with a euhedral outline. Olivine (5-10%) is mostly around 1mm, but grains up to 4mm occur in some samples. The olivine is euhedral, but totally replaced by low temperature alteration minerals. Different olivine alteration mineral assemblages occur in different localities. Antigorite is the most common, but chlorite, quartz, zeolites, hydrogarnet, calcite, and pumpellyite are present in places, the last four minerals testifying to the mobility of calcium. Euhedral plagioclase (15%) is less conspicuous than the mafic phenocrysts, as it is highly altered and in thin section blends in with the brownish granular groundmass. Only rarely is fresh calcic plagioclase preserved. Primary hornblende is exceedingly rare. One grain is present in a thin section samples from GR 028961 in ORANGE, and a hornblende phenocryst-rich sample from GR 152760 is possibly a fine grained dyke rock, though geochemically quite similar to analyses of the Blayney Volcanic. Amygdules are common in places, such as in the road cutting at GR 127860, where parts of the exposure contain up to 30% rounded amygdules 1-3mm across (image 20) composed of pale pink to white orthoclase and lesser chlorite and calcite. At this locality rounded pillow lavas up to 0.4m across have amygdules distributed around the pillow rims.

Boundary relationships. The Blayney Volcanics conformably overlie the Coombing Formation east of the Carcoar Fault. In ORANGE they area probably overlain by the Byng Volcanics. They are intruded by the Carcoar and Barry Granodiorites and by bodies of intermediate composition comagmatic with the basalts, such as the Moorilda Monzonite and the Fernside Monzodiorite. The Volcanics are unconformably overlain by Tertiary basalt north of Blayney, and further north are probably equivalent to volcaniclastics of the Oakdale Formation.

Thickness. No thickness can be estimated as the volcanics possess no structures indicative of bedding attitudes.

Environment of deposition. The Blayney Volcanics represent the outpourings of shallow to moderately deep marine volcanism, spread over an area of about 15 kilometres by 15 kilometres. The source for the volcanism is unclear, but much of the lava may have derived from the Moorilda Monzonite which, based on the extent of the magnetic anomaly of the monzonite, underlies much of the Blayney Volcanics in the south east.

Age and correlation. The age is probably early in the late Ordovician correlating approximately with Weemalla Formation to the west and the Oakdale Formation to the north. These correlatives are possibly volcaniclastic sediments derived from erosion of the Blayney Volcanics. To the east the Volcanics may also correlate in time with the upper part of the Triangle Formation and the Rockley Volcanics. Pyroxene phenocryst-rich Rockley Volcanics in the east of BLAYNEY around Brownlea such as at GR 311721 are similar to the Blayney Volcanics, except that the rocks are metamorphosed to upper greenschist grade.

Chemistry. The Blayney Volcanics show the typical geochemistry of late Ordovician shoshonitic volcanics of the Lachlan Fold Belt (Wyborn, 1992), being basaltic in composition

(49-52% SiO2), and enriched in K2O, P2O5, Ba, and Sr relative to light rare earth elements, TiO2, Zr and Y when normalised to primordial mantle. On the Le Bas diagram (SiO2 versus K2O+Na2O) samples plot in the basalt, trachybasalt or shoshonite fields, but K2O contents range from 1% to 5% indicating that redistribution of alkalis is common. Some of the alkali variability is caused by phenocryst concentration, as these rocks contain abundant phenocrysts of clinopyroxene, plagioclase and altered olivine, and there is an inverse correlation of MgO with K2O. High MgO rocks have abundant phenocrysts, and high K2O rocks have higher proportions of groundmass.

Compared to the Mount Pleasant Basalt Member, the Blayney Volcanics are lower in light rare earths (La, Ce, Nd) and high field strength elements (Ti, Zr, P). Compared to the basaltic components of the Forest Reefs Volcanics the Blayney Volcanics are more magnesian, but both would fit reasonably well on fractionation curves from the same magma.

COWRIGA LIMESTONE MEMBER (Ocbl)

Derivation of name. The name is derived from Cowriga Creek, 8 km west of Blayney.

Nomenclature. Packham (1968a) showed the unit as part of the 'Panuara Formation'. Bowman and others (1977b) introduced the name 'Cowriga Limestone' for the unit which they interpreted as being at the top of the Ordovician succession and down-faulted into the 'Blayney Andesite'. Taylor (1983b) retained the name but interpreted the limestone as conformable within the 'Blayney Andesite'. This interpretation has been borne out by subsequent work and therefore requires that the limestone be given member status.

Distribution. The main outcrop area of this unit is in and around the Browns Creek copper/gold mine. Other discontinuous inliers occur to the north extending into ORANGE.

Lithology. The main rock is a recrystallised white limestone or marble, but against the Carcoar Granodiorite calc-silicate minerals such as wollastonite and grossularite are strongly developed, and it is from these skarn-rocks that the Browns Creek ore is won. On the contact of the main outcrop of limestone with the Blayney Volcanics a limonitic clayey zone is enriched in gold (pers. comm. John Surman, BHP Gold, 1990). In the open cut at Browns Creek the limestone is cut by basaltic dykes of the same composition as the Blayney Volcanics.

Boundary relationships. The unit is conformable within the Blayney Volcanics.

Age and correlation. Conodonts from the limestone indicate a Late Ordovician age (R.S. Nicholls, pers. comm., 1995).

BYNG VOLCANICS (Ocl)

The Byng Volcanics crops out mainly in ORANGE. The only outcrop in BLAYNEY is a narrow strip of basalt resembling that in the Blayney Volcanics extending NNW from Newbridge. Basalt in the Byng Volcanics appears to have a stronger magnetic response to that in the Blayney Volcanics. The two units are separated by a fault and their stratigraphic relationship is uncertain, but it is probable that in ORANGE the Byng Volcanics overlie the Blayney Volcanics.

ROCKLEY VOLCANICS (Ocr, Ocru)

The definition of the Rockley Volcanics as mapped in BLAYNEY conforms with that in OBERON following the original definition of Stanton (1956).

Distribution. The rocks of this unit crop out mainly in the Oberon Sheet area. In the Blayney Sheet area they occur along the central eastern margin of the Sheet as a belt 1-3km wide and 20km long

Lithology and petrography. In BLAYNEY the Rockley Volcanics consist mostly of metabasaltic breccias (image 21), actinolite schists, meta-ultramafics and ultramafic breccias (image 22). Magnetic susceptibilities range from less than 100 in some basalts to over 20,000 times 10^{-5} SI units in the ultramafics. Susceptibilities commonly range greatly in any one area of outcrops. Metamorphic grade is mostly upper greenschist, and considerable metamorphic recrystallisation has taken place in most localities so that the original igneous texture has been destroyed, but in places, such as at GR 311721 original coarse pyroxene phenocrysts are still recognisable, although pseudomorphed by tremolite-actinolite+biotite+epidote. The texture and geochemistry of such rocks are very similar to those in the Blayney Volcanics. However the dominant rock type is a fine grained tough actinolite-rich rock. Other minerals present include relatively little plagioclase, chlorite, epidote, biotite, magnetite, talc and calcite. Coarse masses up to 2mm across of crystalline talc are present in some magnesian basalts such as at GR 296626.

Ultramafic rocks are abundant in the Brownlea area, and occupy the low lying country extending into OBERON to Dunns Plain. However ultramafics are also present elsewhere on a local scale in areas mapped as metabasalt. A good example is Barnes trig point (GR 299642), where there are massive outcrops of tremolite-chlorite-magnetite rock with 25% MgO. An ultramafic breccia at GR 301632 has rounded fragments 30-50mm across, and is composed of a mass of almost pure antigorite, set in a matrix of antigorite and opaques. In places the matrix contains outlines of original euhedral olivine up to 1mm separated by a fine groundmass of opaques and very fine antigorite or chlorite. Possibly this rock is an ultramafic lava breccia. A rock from GR 310701 contains euhedral to rounded olivine (40%) to 2mm pseudomorphed by antigorite and opaques in a groundmass of mainly tremolite. A few patches of tremolite up to 2mm have euhedral outline suggestive of original clinopyroxene phenocrysts. This rock has the appearance of an ultramafic lava, which is borne out by its MgO content of 26%. A talc-carbonate-magnetite rock from a small quarry at GR 306715 with 27.6% MgO has rounded and euhedral shapes outlined by magnetite granules indicating original olivine phenocrysts. The carbonate (possibly magnesite or siderite) occurs as brown rhombs rarely up to 10mm across. This rock was also possibly an ultramafic lava.

The close spatial relationship of mafic rocks of definite extrusive origin and ultramafic rocks in the Brownlea-Dunns Plain area, and the textural features of the ultramafics, indicate that the area was the site of Ordovician shoshonitic ultramafic volcanism (Wallace, 1996).

Chemistry. Most of the Rockley Volcanics in BLAYNEY are still recognisably of basaltic composition, despite their metamorphic overprint. The basalts are mainly more magnesian (11-13% MgO) than the Blayney Volcanics (7-11% MgO), and consequently lower in Al2O3. One sample, from GR 314696, is transitional to an ultramafic composition with 17.65% MgO. The most recrystallised actinolite schists have the lowest K2O possibly indicating loss during metamorphism. The sample most resembling Blayney Volcanics, from GR 311721, and mentioned above under 'Lithology and Petrography' has the highest K2O content (4.21%). Despite the metamorphism, the shoshonitic character of high K2O, Ba, Sr and P2O5 and low TiO2, Zr and Y that is displayed by the Blayney Volcanics is evident in Rockley Volcanics basalt analyses as well. TiO2, Zr, and Y contents are virtually identical to those of the Blayney Volcanics, but light rare earth elements are lower, possibly partly because of metamorphic loss, but more likely because of the more magnesian character of the Rockley Volcanics.

The ultramafic rocks from the Rockley Volcanics also have a shoshonitic character like the mafic rocks. Relatively high Sr and P2O5 contents provide the most obvious evidence when plotted on multi-element mantle-normalised diagrams. However K2O and Ba are low suggesting that a strongly accumulative character has given these rocks their ultramafic composition. MgO contents of ultramafic rocks range between 20 and 28% MgO. P2O5, rare earth elements, Zr, Nb, and Y are all lower than in the Rockley Volcanics metabasalts. The ultramafics are high in Cr and Ni with up to 2800ppm and 1400ppm respectively.

The Rockley Volcanics are high in precious metals, like other Ordovician shoshonitic rocks in the central Lachlan Fold Belt (Wyborn, 1990). The metabasalts are higher in Pd than Pt and the ultramafics tend to be the reverse, in keeping with early fractionation of a Pt-rich phase (Wyborn, 1990; Wallace 1996). The relatively high abundance of Pt in the ultramafics, and the undoubted large scale recrystallisation and alteration of these rocks, including carbonate metasomatism, suggests that Pt concentrations may be present in places up to economic levels.

Boundary relationships. The Rockley Volcanics conformably overlie the Triangle Formation and are unconformably overlain by the Fosters Creek Conglomerate, Campbells Formation and Bells Creek Volcanics. At GR 296684 the overlying Fosters Creek Conglomerate contains ultramafic cobbles and stretched carbonate cobbles (image 23) derived from the underlying volcanics, and testifying to the unconformable nature of the contact. North of the Brownlea area the volcanics are intruded by rhyolite porphyry associated with the overlying Bells Creek Volcanics.

Age and correlation. The volcanics are of similar late Ordovician age to the Blayney Volcanics though probably derived from a separate volcanic centre. Further east in OBERON true lavas give way to a volcaniclastic apron of probable similar age. These volcaniclastics correlate with the Sofala Volcanics. Ultramafic rocks in the Orange area are very similar to the ultramafics in the Rockley Volcanics, but at Orange the metamorphic grade is much lower.

SILURIAN
ASHBURNIA GROUP

CADIA COACH SHALE (Sac)

Only a small area of the Cadia Coach Shale occurs in BLAYNEY in the northwest corner. The shale is part of the early Silurian Ashburnia Group, formerly the Cadia group, as correlated with the mapping of Jenkins (1978). The outcrops consist of fine grained feldspathic siltstone disconformable or unconformable on the Weemalla Formation, and are the southern extremity of more extensive Silurian rocks in the Cadia area to the north and northwest.

MUMBIL GROUP

WOMBIANA FORMATION (Smz, Smzl)

Derivation of name. The name is derived from Wombiana, a locality 3 km north of Blayney.

Nomenclature. The name Wombiana Formation was introduced by Bowman and others (1977a) for a belt of previously undifferentiated sedimentary rocks, striking northwest through the town of Blayney, which they interpreted as Silurian and overlying the surrounding Ordovician volcanics.

Distribution. The formation crops out on the northwest outskirts of Blayney but its limits and the full length of the belt are not very well defined owing to lack of outcrop elsewhere. It probably does not extend as far south as shown by Bowman and others (1977a).

Lithology. The unit contains siltstone and limestone. Steeply dipping limestone and interbedded cleaved siltstone are exposed in a small abandoned quarry at GR 073885. Weathered siltstone is also exposed in a railway cutting 600m to the east. The BY gold mine on the outskirts of Blayney at GR 077885 was developed in limonitic clayey material adjacent to massive limestone. The limestone was spectacularly exposed in the open pit of the mine as smooth spires over 10m high. Apparently the clayey material adjacent to the limestone provided a favourable chemical trap for precipitation of gold-bearing low temperature metamorphic fluids almost certainly derived from the adjacent gold-rich Blayney Volcanics.

Boundary relationships. The formation appears to be down-faulted into the Blayney Volcanics. It was probably contiguous with the Mumbil Shelf on the western margins of the Hill End Trough.

Thickness. Owing to the lack of outcrop and the faulted boundaries it is difficult to give any reliable estimate of thickness.

Age and correlation. Fossils collected by mining company geologists from limestone at the BY gold mine have been identified as Silurian in age (Pickett, 1990).

ANSON FORMATION (Smf)

The type section and most outcrop of the Anson Formation occurs in ORANGE. A narrow strip of the formation is inferred to extend into BLAYNEY adjacent to the Copperhannia Fault where it consists of sparsely outcropping leached and weathered felsic volcanics.

FOSTERS CREEK CONGLOMERATE (Smr)

Derivation of name. The name is derived from the nearby 'Fosters Creek' homestead (GR 238538) about 9 km east of Trunkey.

Distribution. The unit crops out along Byrnes Creek north of 'Fosters Creek' homestead. It possibly extends farther to the west and southwest of the outcrop area shown on the map, but appears to lens out to the east and southeast. A possible outcrop consisting of conglomeratic siltstone occurs along the Bald Ridges Road at GR 219447. The conglomerate also occurs in the eastern edge of BLAYNEY where it overlies the Rockley Volcanics around Triangle Flat. Here the unit thins to the north and is absent above the Rockley Volcanics north of Brownlea.

Type locality. The type locality is in the bed of Byrnes Creek around GR 229541 where steeply dipping, thickly bedded conglomerate and quartzite is well exposed.

Lithology. At the type locality and in other places along Byrnes Creek the unit consists of conglomerate and conglomeratic quartzite, the clasts being of similar composition to the matrix. The conglomeratic nature of the rock is most obvious where the rounded, cobble-sized clasts have weathered out. Graded and current bedding are evident. The possible outcrop of this unit along the Bald Ridges Road consists of siltstone with a few small weathered out clasts, and is exposed in contact with overlying Kangaloolah Volcanics to the west with part of the siltstone incorporated and squeezed up into the base of the volcanics. At the eastern edge of BLAYNEY at GR 310583 soft sandstone containing mud clasts appears to correlate with conglomerate both to the north of Triangle Flat and to the south on the Oberon Sheet. Farther to the north near the Rockley-Newbridge Road the clasts in the conglomerate consist of mafic and ultramafic volcanics derived from the underlying Rockley Volcanics (image 23). Here the clasts are up to 300mm long flattened in the near-vertical foliation.

Boundary relationships. The Fosters Creek Conglomerate unconformably or disconformably overlies the Triangle Formation along Byrnes Creek and the Rockley Volcanics near Triangle Flat. It is conformably overlain by the Kangaloolah Volcanics or the Campbells Formation.

Thickness. The maximum thickness of the unit is not known. A thickness of not less than 100m is exposed at the type locality. Adjacent to the Rockley-Newbridge Road the conglomerate is about 50m thick.

Environment of deposition. The Fosters Creek Conglomerate probably represents reworking of Ordovician sandstones and mafic volcanics on an uplifted land surface.

Age. An absence of fossils precludes a precise age for the formation. It is probably of similar late Silurian age to the overlying Kangaloolah Volcanics and Campbells Formation.

KANGALOOLAH VOLCANICS (Smk, Smkd, Smkl, Smkr)

Derivation of name. The name is derived from Kangaloolah Creek, in CROOKWELL.

Nomenclature. The Kangaloolah Volcanics were first named by Mutton (1960, unpublished) and published by Markham (1961). Stanton (1956) and Packham (1968a) did not recognise the Kangaloolah Volcanics as a separately named unit in the Bathurst 1:250 000 Sheet area, although Stanton's map differentiates areas of porphyry corresponding with some of the volcanics. Packham included a part of the volcanics west of the Thompson Anticline, mapped by Hobbs (1962) as 'Thompsons Volcanics', in the Burraga Group, an area mapped by Chin (1972) as 'Thompson Formation'. Another part to the east of the Thompson Anticline is shown by Packham as part of the 'Campbells/Kildrummie Group'. Subsequently the volcanics were mapped in the Goulburn 1:250,000 Sheet area (Brunker and Offenberg, 1970; Offenberg, 1974) and in the Taralga 1:100,000 Sheet (Scheibner, 1973), and their extension north into the Blayney Sheet area was indicated by Pogson (1972).

Distribution. The volcanics occur in three areas in the Blayney Sheet area. The widest belt occurs east of Grove Creek (Chin's 'Thompson Formation') and extends north from the Abercrombie River with diminishing width to where it lenses out a few kilometres east of Trunkey. Another belt of Kangaloolah Volcanics crops out near the eastern margin of the map Sheet area, and a third belt occurs immediately east of the Copperhannia Fault. The volcanics also extend a few kilometres north from Kempfield and small outliers are found around the northern nose of the Thompson Anticline east of Trunkey. An outcrop of dacite, probably belonging to the Kangaloolah Volcanics, occurs near the eastern edge of the Sheet at GR 306583. The outcrop is between outcrops of Fosters Creek Conglomerate to the east and siltstone of the Campbells Formation to the west.

Type section. Scheibner (1973) suggested a type section for the Kangaloolah Volcanics in Peelwood Creek (incorrectly named Kangaloolah Creek on the Goulburn 1:250,000 Sheet) near GR 235795 yd. (The true Kangaloolah Creek is farther to the south near Binda).

Lithology and petrography. The volcanics east of Grove Creek can be divided into three units. At the base is a mainly massive dacite with sparse, small plagioclase and small, indistinct quartz phenocrysts overlain by feldspathic siltstone and sandstone, both well exposed along the Bald Ridges Road. Limestone lenses (Smkl) separate the lower and upper units. The uppermost unit (Smkr) is mainly coarse, foliated rhyolite and dacite with large quartz and plagioclase (An_{35}), and smaller biotite phenocrysts. A few thin interbeds of siltstone separate the flows in the uppermost unit. The limestone lenses between the lower and upper volcanic units occur in two places, one south of the Bald Ridges Road (GR 226415) and the other at 'Lochylynne' near the Abercrombie River (GR 228364).

The belt on the eastern margin of the map Sheet area consists almost entirely of coarse, foliated rhyolite and dacite similar to that in unit Smkr; the lower units appear to be missing in this area. This belt is about 1 km wide in the south and narrows to the north to lens out east of Mount Crockwell where a narrow zone of weathered dacite can be observed in cuttings along pine forest roads. A few outcrops of rhyolite or dacite occur between Mount Crockwell and Byrnes Creek around the nose of the Thompson Anticline, but they appear to be isolated lenses and outliers.

The third belt of rocks interpreted as Kangaloolah Volcanics and shown as undivided Smk occurs immediately east of the Copperhannia Fault. The lithology there is more varied than to the east and includes volcaniclastic rocks, rhyolite, and dacite lacking quartz phenocrysts. The subdivisions made to the east cannot be recognised in this area. These volcanic rocks are correlated with the Kangaloolah Volcanics because of their similar stratigraphic position immediately above the Triangle Formation but may have been derived from a different source. The volcanics extending north from Kempfield consist of foliated and mylonitised quartz dacite porphyry overlying the Coombing Formation and Adaminaby Group.

Boundary relationships. The Kangaloolah Volcanics overlie the Triangle Formation, the Coombing Formation, the Adaminaby Group, and the Fosters Creek Conglomerate. The volcanics have been described in some detail in the Taralga 1:100 000 Sheet area by Scheibner (1973) who regarded the volcanics as conformable on either the Triangle Formation or Rockley Volcanics. However, where they extend into the Trunkey area the overlap of the older formations is sufficient in some places to suggest an unconformable rather than a conformable relationship. The volcanics immediately precede, and probably also interfinger with, the late Silurian Campbells Formation in the Trunkey area.

Thickness. As indicated above, the thickness of the volcanics is variable, reaching a maximum in BLAYNEY of possibly 2000m east of the Abercrombie Caves. Other estimates of thickness are 1200m near Peelwood (Mutton, 1961) and 550m and 180m on the western and eastern limbs respectably of the Burraga Syncline (Dunnet, 1961).

Environment of Deposition. The presence of limestone lenses indicate that deposition was at least partly marine in a shallow water environment. The exact location of the volcanic centre is not known. It was probably an island surrounded by a shallow sea. A gravity low in the area probably corresponds to the source granite body at depth. This is analogous to the gravity low over the Davies Creek Granite on OBERON which was the source for the Bells Creek Volcanics.

Age and correlation. The Kangaloolah Volcanics immediately underlie and probably to some extent interfinger with the late Silurian Campbells Formation and are therefore regarded as also of late Silurian age. This implies a considerable time interval of non-deposition, apart from the laterally restricted Fosters Creek Conglomerate, between the volcanics and the underlying Ordovician formations. The Kangaloolah, Bells Creek and Mullions Range Volcanics all formed at a rather early stage in the development of the Hill End Trough. All are in part submarine with associated massive sulphide mineralisation, and all form thick volcanic piles which thin rapidly and change facies away from the source of volcanism. They were all probably related to separate granite plutons beneath.

BELLS CREEK VOLCANICS (Sml, Smll)

The type section of the Bells Creek Volcanics is in BATHURST.

Distribution. The volcanics straddle the boundary between BLAYNEY and OBERON east of Caloola and extend south to near the Caloola-Rockley road. The best areas of exposure are in the valley of Queen Charlotte Creek, and south of the Carboniferous Gresham Granite. The area is complexly faulted and metamorphosed, both by regional metamorphism to upper greenschist facies in the south, and overprinted by strong hornfelsing adjacent to the Gresham Granite in the north.

Lithology and petrography. The volcanics consist of meta-dacite and meta-rhyolite. These rocks have been intensively foliated and are metamorphosed to upper greenschist facies. Despite the metamorphism, original porphyritic textures are still quite easily discernible, with original plagioclase phenocrysts recrystallised to andesine and crowded with inclusions of biotite, epidote and, less commonly, muscovite. Quartz is common as a phenocryst phase in some localities, but rare in others. The quartz phenocrysts exhibit undulose extinction and have begun to break up into a mosaic of smaller grains. Original mafic phenocrysts are now a mass of biotite flakes elongated in the metamorphic foliation. The groundmass consists of a felted aggregate of quartz, feldspar, biotite, muscovite, chlorite, and epidote with foliation wrapping around phenocrysts, and showing signs of metamorphic differentiation into mica-rich and mica-poor bands. Close to large faults, such as at the faulted contact with chlorite-actinolite schists of the Rockley Volcanics at GR 288774 the quartz feldspar porphyries are mylonitic.

Both rhyolitic and dacitic porphyries occur as high level intrusives within the Bells Creek

Volcanics, particularly in the south, such as at Ben Lomond Hill (GR 308742), where a rhyolite of probable intrusive origin and displaying sparse quartz phenocrysts, is exposed.

In the vicinity of the Caloola gold prospect (GR 298791) the volcanics are particularly sheared and altered to a sericite-rich rock adjacent to a large meridional fault. The sericitisation is possibly related to the mineralising event. Pods of limestone (Smll) up to 100m long have been caught up in the fault around GR 296795 and GR 296803. Immediately west of the fault in this area, the quartz-feldspar porphyry is sufficiently coarse grained in the groundmass to be interpreted as intrusive.

Boundary relationships. The volcanics form a volcanic pile analogous in stratigraphic relationships to that of the Kangaloolah Volcanics with the Campbells Formation farther to the south. They unconformably overlie the Ordovician Rockley Volcanics and are intruded by the Carboniferous Gresham Granite.

Age. The age is late Silurian. A sample of the Bells Creek Volcanics from BATHURST has been dated at 424±3Ma using zircons.

CAMPBELLS FORMATION (Smc, Smcl, Smcv)

The Campbells Formation is defined in the Oberon 1:100 000 Sheet area.

Nomenclature. The 'Campbells Group' and overlying 'Kildrummie Group' were mapped as separate successive units by Stanton (1956). However, most subsequent workers have found difficulty in applying the subdivision away from the type areas and have amalgamated the two units (eg. Packham, 1968a). What is now mapped as Campbells Formation in the Blayney Sheet area includes all rocks previously mapped as Campbells and Kildrummie Groups.

Although the Silurian 'Colo Creek Formation' has been formally defined in the area northwest of Trunkey (Royle, 1973) the recent mapping in this area indicates that it contains rocks which can be assigned to already named Ordovician and Silurian formations, including the Coombing Formation, Campbells Formation, Kangaloolah Volcanics and Box Ridge Volcanics. Consequently the 'Colo Creek Formation' has been dropped as a stratigraphic name.

Distribution. The Campbells Formation is widespread in OBERON and is also extensive in the east and southeast of BLAYNEY. The Copperhannia Fault defines the western limit of the formation.

Lithology. The Campbells Formation in BLAYNEY consists mainly of siltstone and slate. Limestone (Smcl) is prominent locally, and a persistent tuffaceous quartz sandstone (Smcv) bed possibly related to the Kangaloolah Volcanics forms a useful marker in places in the east.

Brown siltstone belonging to the Campbells Formation is extensive in the east and extends west around the nose of the Thompson Anticline. A conglomeratic limestone bed a few metres thick, with cobble-sized limestone clasts in an impure limestone matrix, occurs in two places (GR 246553 and GR 251551) near the base of the formation near the nose of the Thompson Anticline. The Campbells Formation appears to be relatively thin in the Abercrombie Caves area, where it includes extensive limestone and marble, although some of the formation could have been removed by faulting. The limestone is only locally developed and gives way to phyllite farther to the south near the Abercrombie River.

The Campbells Formation also occurs along the Curragh Road southwest of Trunkey from which it extends south across the Abercrombie River to the southern margin of the Sheet area. This area was mapped as ‘Copperhannia Formation’ (see below) by Hobbs (1962) and as 'Yarraman Formation' by Green (1980). Prominent limestone outcrops occur beside the Curragh Road (GR 115482) and south of the Abercrombie River immediately east of the Copperhannia Fault. The remainder of the unit in this area consists of slate.

Other outcrops of Campbells Formation, consisting mainly of siltstone and shale occur northwest of Trunkey in part of an area previously mapped as the Silurian 'Colo Creek Formation' (Royle, 1973), and subdivided as such by Taylor (1983a).

Boundary relationships. The Campbells Formation in BLAYNEY conformably overlies the Kangaloolah Volcanics, Bells creek Volcanics and Fosters Creek Conglomerate. Where these formations are missing it overlies Ordovician rocks with probable unconformity. It is conformably overlain by the Box Ridge Volcanics and the Crudine Group.

Thickness. The Campbells Formation is probably about 1000m thick in the southeast corner of BLAYNEY, but appears to vary in thickness in relation to the thickness of the underlying Kangaloolah Volcanics, being thickest where the volcanics are absent and thinnest where the volcanics are most developed. As such it can be interpreted as filling the troughs left by the uneven development of the volcanics.

Environment of deposition. The limestones in the formation indicates a shallow marine environment of deposition. These limestones may have formed as coral reefs and shoals around the volcanic centres which produced the Kangaloolah and Bells Creek Volcanics.

Age and correlation. Fossils from GR 120590 in a part of the 'Colo Creek Formation' now mapped as Campbells Formation include corals, trilobites and brachiopods, as listed by Pickett (1982); they are regarded as indicating a late Silurian age. Late Silurian conodonts have been recovered from the upper part of the now redefined Kildrummie Formation south of Rockley in the Oberon Sheet area (De Deckker, 1976).

BOX RIDGE VOLCANICS (Smxt, Smxs, Smxk)

Derivation of name. The name is derived from Box Ridge, west of Tuena (GR 228797 yd), Goulburn 1:250 00 Sheet (Offenberg, 1974).

Nomenclature. The unit first appeared in publication as the Box Ridge Formation (Brunker and Offenberg, 1970). Previously it had been mapped under other names including Box Ridge Member (Roy, 1961) and Pine Ridge Volcanics (Hobbs, 1962; Collins, 1966). The relationship of the Box Ridge Volcanics to surrounding formations has been the subject of various interpretations since the unit was first described by Raggatt (1934). The main body was at one time regarded as a western inlier of the Ordovician Rockley Volcanics (Hobbs, 1962). Later mapping (Collins, 1966) suggested that it was part of the Silurian sequence above rocks now mapped as Campbells Formation. Packham (1968a), however, continued to show the formation as part of the Rockley Volcanics. The most recent mapping, combined with some reinterpretation of student maps (Collins, 1966; Chin, 1972; and Green, 1980) confirms that the volcanics are Silurian and conformably overlie the Campbells Formation with some interfingering at the contact. Basic volcanics extending south from the Abercrombie Caves which are included in Chin's (1972) 'Grove Formation' are now also interpreted as part of the Box Ridge Volcanics.

Distribution. The main development of the volcanics is straddling the Abercrombie River west of Abercrombie. From here a narrow belt extends north to the west of Trunkey and almost to Newbridge. This belt is repeated by faulting farther to the west in part of the area northwest of Trunkey. The volcanics also extend south from the Abercrombie Caves to a point where they appear to be faulted out south of the Abercrombie River.

Type locality. Collins (1966) selected a type section for the Box Ridge Volcanics along the Abercrombie River, approximately between GR 122410 and GR 127404, where he measured a thickness of 600m. According to the more detailed mapping by Green (1980) this section would include only the uppermost subunit Smxk with some possible repetition by folding and therefore overestimation of thickness. Nevertheless a type locality here is representative.

Lithology and petrography. Petrographic examination indicates that the spilitic basalt composition of the Box Ridge Volcanics is different from that of the Ordovician volcanics with which they were originally correlated. In thin section the Box Ridge Volcanics are seen to be dominated by albite, chlorite and opaques. In some sections calcite is common; others contain distinctive, sparse, rounded quartz xenocrysts. Unlike Ordovician volcanics, pyroxene phenocrysts are inconspicuous. The Box Ridge Volcanics show up clearly as dark areas on the radiometric image without the maroon colour caused by relatively high potassium content of Ordovician volcanics. They have a strongly positive signature on the magnetic image, presumably related to the magnetic character of the abundant opaque mineral content. Hand specimens of the volcanics commonly give high magnetic susceptibility readings up to 4000 times 10^{-5} SI units.

The thickest development of the Box Ridge Volcanics is to the west of Abercrombie where they occur in the core of a major syncline. Green (1980) has divided the volcanics in this area into a lower unit of spilitic lavas ('Pine Ridge Volcanics'), a mainly sedimentary middle unit of slate with minor volcanics ('Crawford Formation'), and an upper unit containing keratophyre, chert, ignimbrite and volcaniclastics as well as spilite ('Barrier Volcanics'). These subunits are shown on the map as Smxt, Smxs and Smxk respectively rather than by recognising Green's stratigraphic names formally. Green also mapped numerous mafic sills within the volcanic pile. The lowermost spilite unit extends north along Copperhannia Creek in an almost continuous, narrow belt to at least 10 km north of Trunkey as mapped in part by Sheppard (1981) and Taylor (1983a), and is clearly indicated on the magnetic image.

In the area extending south from the Abercrombie Caves, spilite is well exposed in cuttings along Bald Ridges Road immediately west of Grove Creek (GR 180426). It is also exposed in the bed of the creek upstream from the road bridge, where pillow lava development is evident indicating submarine deposition. The pillows are strongly flattened in the foliation and mostly about 600mm long. Less deformed pillow structures are common also in the bed of the Abercrombie River in the western belt. The volcanics in the Abercrombie Caves belt are partly faulted against adjacent formations and their full thickness may not be exposed.

The Box Ridge Volcanics and Campbells Formation south of the Abercrombie River and west of the Trunkey-Tuena Road are intruded by several small bodies of coarse dolerite shown on the map as Sd. The spatial association of these bodies with the volcanics indicates a related origin. However the dolerite has a low magnetic susceptibility whereas that of the volcanics is high. The dolerite consists of plagioclase (An_{35}), interstitial clinopyroxene and chlorite.

Chemistry. The Box Ridge Volcanics are moderate to high titanium tholeiites, in keeping with other Silurian mafic igneous rocks of the Lachlan Fold Belt (Wyborn, 1992). In the belt of Box Ridge Volcanics north of Kempfield it is the geochemical signature that provides the best evidence that this belt of mafic volcanics is not of Ordovician age.

Boundary relationships. The Box Ridge Volcanics conformably overlie the Campbells Formation and are conformably overlain by the Crudine Group. The Box Ridge volcanics are best developed where the Crudine Group is thinning to the west as the margin of the Hill End Trough is approached. The presence of mafic volcanics on the margins of the Hill End Trough suggests that possible deep structures confining the Trough may have acted as feeders for the volcanics.

Thickness. Estimates of the thickness of each subunit near the Abercrombie River are Smxt - 300m, Smxs - 150m, and Smxk in excess of 200m giving a total thickness of at least 650m. The thickness diminishes to the north where only the lowermost subunit Smxt is present. Raggatt (1934) measured two sections of 914m and 728m.

Environment of deposition. The pillow structures in the lavas and the interbedded sedimentary rocks with limestone lenses indicate a submarine environment of deposition.

Age. The age of the Box Ridge Volcanics is late Silurian or early Devonian. Limestone lenses contain crinoid ossicles and favositid corals (Collins, 1966) which indicate a general Siluro-Devonian age.

DEVONIAN

CRUDINE GROUP (Dc, Dcd, Dcu)

Nomenclature. The Crudine Group (Packham, 1968b), formerly mapped as part of the Burraga Group (Stanton, 1956; Packham, 1968a) in BLAYNEY, is defined in the Bathurst 1:100 000 Sheet area. The reason for the nomenclature change is to indicate that no stratigraphic discontinuity exists between the Trunkey-Burraga areas and those areas north of the Bathurst Batholith.

In the Burraga area the Crudine Group has been divided into the Dunchurch Formation (Dcd) consisting of coarse volcaniclastics, at the base, succeeded by the Buckburraga Slate (Dcu) (Dunnet, 1961; Gemuts, 1961). These divisions show clearly on the radiometric image where the two units occur in the southeast corner of BLAYNEY. Part of the Crudine Group south of Trunkey was mapped as 'Mulgunnia Formation' by Chin (1972) and Taylor (1983a).

Distribution. The Crudine Group crops out in a wide belt northeast of Trunkey and extends south along a narrower belt to beyond the Abercrombie River east of Abercrombie. A very narrow north-south belt also occurs west of Trunkey. As indicated above the, Crudine Group also occurs in the Burraga area in the southeast corner of BLAYNEY.

Lithology and petrography. The Crudine Group east and northeast of Trunkey is characterised by thick, massive, coarse to medium grained, feldspathic volcaniclastics and greywacke interbedded with thick siltstone units. Feldspar is the dominant mineral in the volcaniclastics, followed by quartz, minor altered mafic minerals such as epidote and chlorite, and a few rock fragments. Grains are angular to sub-rounded and generally less than 2mm. Good examples of these volcaniclastic beds can be seen south of Triangle Flat, such as at GR 288588 and GR 290584. Well bedded, thinner units are exposed to the south of Trunkey in cuttings along the Trunkey-Tuena Road, and where bedding can be readily observed.

In places, such as GR 227790 and GR 253674 plagioclase pyroxene porphyries very similar to the overlying Bushranger Volcanics are exposed as rounded tor-like outcrops. These may, in fact, be part of the overlying unit, but cannot be mapped out because of poor exposure. The locality at GR 227790 is close to exposures of Cunningham Formation siltstones and shales, which overly the volcanics, so it is probable that the Bushranger Volcanics extends through this area.

The metamorphic grade of the Crudine Group on BLAYNEY is mostly upper greenschist facies, with a tendency to increase in grade to the north. This is not a function of the proximity to the Carboniferous Bathurst Batholith, the metamorphism is regional in extent, and is overprinted by contact metamorphism within 1km of the Batholith. One volcaniclastic sample from GR 249787, and about 2.5km from the Batholith contains metamorphic blue-green hornblende implying that lower amphibolite facies conditions were reached. The volcaniclastic character of the rock is discernible in thin section, as volcanic rock fragments, recrystallised quartz grains and plagioclase detritus can still easily be recognised.

Boundary relationships. The Crudine Group in the Trunkey area conformably overlies the Campbells Formation except locally where it overlies the Box Ridge Volcanics. It is conformably overlain by the Bushranger Volcanics.

Thickness. The Crudine Group east of Trunkey is probably many hundreds or even thousands of metres thick in the east, but diminishes rapidly in thickness to the west as the margin of the Hill End Trough is approached. Lack of outcrop and reliable bedding data makes it difficult to estimate thicknesses. Only a narrow belt of Crudine Group not more than 300m thick overlies the Box Ridge Volcanics west of Trunkey. This belt is faulted out along strike to the south and may lens out as well where the underlying Box Ridge Volcanics become thicker.

Environment of deposition. The Crudine group in BLAYNEY consists of volcanogenic material deposited in a basin generally remote from the source of volcanism. The basin fill thickens to the east.

Age and correlation. The Crudine Group north of the Bathurst Batholith was regarded on palaeontological evidence as straddling the Silurian-Devonian boundary (Pickett, 1982). However, recent mapping suggests that it lies entirely within the Devonian. It correlates with the Bay Formation in the Orange Sheet area.

BUSHRANGER VOLCANICS (Dcr, Dcra)

Derivation of name. The name is derived from Bushranger Hill (GR 130469), 9 km south-southwest of Trunkey.

Nomenclature. Green (1980) introduced the term 'Bushranger Ignimbrite' for what is now mapped as an andesitic subunit (Dcra) of the Bushranger Volcanics in the western belt of this unit south of Trunkey. An eastern belt of andesite extends south into the Goulburn 1:250 000 Sheet area where it was incorrectly shown as part of the Kangaloolah Volcanics by Brunker & Offenberg (1970).

Distribution. The unit crops out along a belt extending from Newbridge to south of Trunkey. The narrow western belt is separated from the eastern belt by the Trunkey syncline composed of the overlying Cunningham Formation, and south of Trunkey it terminates immediately north of the Abercrombie River. The wider eastern belt continues south of the river. North of Trunkey the andesite gives way to andesitic to dacitic volcaniclastics.

Type locality. Although Green's type locality for the andesite subunit is presumably Bushranger Hill a more accessible locality is on the Colo Creek Road 500m NNW of Arkell trig (GR 134585). Here weakly magnetic (25×10^{-5} SI units) foliated plagioclase andesite porphyry is exposed in a road cut. The rock has been metamorphosed to lower greenschist facies, with plagioclase phenocrysts replaced by albite, and clinopyroxene phenocrysts replaced by actinolite.

A suitable reference locality for the volcaniclastic component is beside the main Trunkey-Bathurst road 9 km northeast of Trunkey where boulders of banded dacitic volcaniclastics are exposed.

Lithology and petrography. The andesite is a greenish, coarsely porphyritic rock with 30-40% phenocrysts, 1-2mm across, of albitised plagioclase and clinopyroxene in a microcrystalline groundmass. Generally the clinopyroxene is partly or completely altered to pale tremolite-actinolite. Some patches of chlorite, opaques and sphene could be pseudomorphing biotite phenocrysts. Such chloritic patches are stretched out in the foliation associated with the relatively strong deformation in the region. Because of the coarse grain size this rock, along with some of the coarse volcaniclastics in the Crudine Group, was originally regarded as intrusive porphyrite (Raggatt, 1934). The andesite shows a texture in thin section which could be interpreted as indicating an intrusive origin. However, its consistent stratigraphic relationship with adjacent formations, particularly the presence of outliers in the core of a syncline near the Abercrombie River to the east of the main body, suggest that the rock is extrusive. The metamorphic grade is lower greenschist facies.

Boundary relationships. The Bushranger Volcanics form the topmost part of the Crudine Group in the Trunkey-Newbridge area. They are conformably overlain by the Cunningham Formation and the Copperhannia Member.

Thickness. The Bushranger Volcanics occur on the flanks of a major syncline, the Trunkey

Syncline, whose axis lies a short distance to the west of Trunkey. The andesite is about 300m thick on the eastern flank between Trunkey and the Abercrombie River and thinner on the western flank. The volcaniclastics to the north are probably of similar thickness.

Environment of deposition. The unit represents submarine volcanic activity from a local but unidentified source.

Age and correlation. The Bushranger Volcanics correlate with the Merrions Formation (Packham, 1968b) to the north of the Bathurst Batholith. The Merrions Formation is regarded as early Devonian and therefore the Bushranger Volcanics are also likely to be early Devonian as well. However the volcanism that sourced the Merrions Formation is likely to be well to the east of BLAYNEY, whereas the Bushranger Andesite is almost certainly locally sourced in the Trunkey area.

UNGROUPED FORMATION

CUNNINGHAM FORMATION (Dn)

The main outcrop of the Cunningham Formation is to the north of the Bathurst Batholith where it has been defined by Packham (1968b).

Nomenclature. Part of the Cunningham Formation in the Blayney Sheet area now includes rocks previously mapped as the informally named 'Trunkey Formation' of Green (1980) and Taylor (1983a), and earlier included in the Campbells/Kildrummie Group (Packham, 1968a). The term 'Trunkey Series' (Booker, 1939) has also appeared in the literature.

Distribution. In the Blayney Sheet area the Cunningham Formation crops out east and northeast of Newbridge, and along a belt extending through Trunkey to south of the Abercrombie River.

Lithology. The formation consists of slate with occasional thin silty interbeds which define bedding. Two 10 cm thick coarse, weathered volcaniclastic beds occur in the slate in a quarry east of the Trunkey-Tuena Road south of the Abercrombie River, but in general volcanics are rare or absent. Limestone locally occurs at the base of the formation (see Copperhannia Member below).

Boundary relationships. The Cunningham Formation conformably overlies the Bushranger Volcanics and forms the core of the Trunkey Synclinorium and a corresponding syncline east of Newbridge. The top is not preserved in the Blayney Sheet area.

Thickness. Owing to tight folding it is difficult to estimate the thickness of the Cunningham Formation in the Trunkey area, but it could be more than 1000m thick. A comparable thickness is probably present east of Newbridge.

Age. The age of the Cunningham Formation north of the Bathurst Batholith is regarded as early to middle Devonian.

COPPERHANNIA MEMBER (Dnc)

Derivation of name. The name is derived from Copperhannia Creek which flows south from near Trunkey into the Abercrombie River, Blayney 1:100 000 Sheet.

Nomenclature. The name 'Copperhannia Formation' was previously used on an informal basis to include in many cases a greater stratigraphic range of sedimentary units. The Copperhannia Member is here restricted to the usage of Green (1980) for a limestone-bearing unit conformably overlying the Bushranger Volcanics and Box Ridge Volcanics on the western flank of the Trunkey Syncline.

Distribution. The rocks crop out north and south of the Abercrombie River and cross the river about 1.5 km west of Abercrombie. They die out to the north about 4 km south of Trunkey but continue south into the Goulburn 1:250 000 Sheet area.

Type locality. A type section is proposed along the Abercrombie River 1.5 km west of Abercrombie between GR 130405 and GR 132405.

Lithology. The unit contains calcarenite, slate, carbonaceous slate and minor conglomerate as well as limestone. Two types of limestone are shown by Green (1980). At the base of the formation, on the western side, lenses of white marble ('Freeman Marble') appear in places to interfinger with the top of the Box Ridge Volcanics, the Bushranger Volcanics and the rest of the Crudine Group being absent here. Black, impure limestone lenses occur at higher levels, and the top of the formation on the eastern side is regarded as the uppermost limestone horizon. A lens of the black limestone crops out close to the Trunkey-Tuena Road at GR 135366.

Boundary relationships. The Copperhannia Member occurs at the base of the Cunningham Formation and conformably overlies the Bushranger Volcanics and Box Ridge Volcanics.

Thickness. The thickness ranges up to at most about 300m.

Environment of deposition. The limestone in the formation indicates shallow marine deposition. The formation appears to be restricted to where the thickest part of the Box Ridge Volcanics would have been deposited. This suggests that the Box Ridge Volcanics may have remained as a volcanic island or seamount around which the limestones of the Copperhannia Formation developed as coral reefs and shoals. Silty detritus of the Cunningham Formation would have been excluded by the volcanic rise.

Age. Raggatt (1934b) recorded the corals *Cyathophyllum* sp. and *Heliolites* sp. from limestone in the Copperhannia Formation 3 km north-northeast of Tuena at the southern edge of the Blayney Sheet. However these fossils do not indicate a precise age for the formation. Only a probable early Devonian age can be inferred from the stratigraphic position.

TERTIARY

Tertiary rocks include numerous residuals of basalt (Tb) and minor silcrete (Ti). Most of the basalts appear to be of Miocene age judging from age determination results for samples from the Blayney Sheet and immediately adjacent areas (Wellman & McDougall, 1974). However some may be as old as Eocene, as a sample from The Big Brother (GR 216743) has yielded an age of 51±2.5Ma (Dulhunty, 1973). The basalts fall into two groups, an early group in the eastern and southeastern part of BLAYNEY extruded from several small centres such as The Big Brother and Mount Crocker, and a middle Miocene group in the northwest originating from the Canobolas volcanic centre. Some of the older basalts in the SE and related plugs show reverse magnetisation, and are very conspicuous on the magnetic image. The largest is 1.5 km across, and is composed of a mixture of fine grained black basalt and coarse dolerite. Almost all basalts are of the alkali-olivine basalt group, with fresh olivine and titan-augite phenocrysts.

QUATERNARY

Thin deposits of Quaternary alluvium (Qa) occur along most of the main creeks on the tableland in the north. Alluvium is absent in most places along entrenched creeks in the rugged country around the Abercrombie River in the south. Alluvial deposits including sand and gravel are found along sections of the Abercrombie River and terraces adjacent to the river.

INTRUSIVES

ORDOVICIAN INTERMEDIATE TO MAFIC STOCKS

Numerous small gabbroic to syenitic intrusions that crop out in the northwestern part of the area were originally interpreted as Devonian (Packham, 1968a), but it is now known from age dating and geochemical studies that these rocks are comagmatic and contemporaneous with the Ordovician volcanics which they intrude. Monzonite is by far the dominant composition of these intrusions. Some of the larger bodies have been given formal names.

STOKEFIELD METAGABBRO (Osg)

Derivation of name. The name is derived from Stoke Hill (GR 979790) immediately western of Carcoar, Blayney 1:100 000 Sheet.

Nomenclature. The name was introduced by Bowman and others (1977b).

Distribution. The intrusion occupies an area of about 4 km^2 centred on the village of Carcoar.

Type locality. The type locality is here given as a road-cut exposure on the SE side of the Mid Western Highway at Carcoar (GR 981779), where a coarse amphibolitised gabbro exhibits a primary foliation of aligned plagioclase crystals dipping 60° towards 120°. Some individual plagioclase laths are up to 10mm long. The bulk of the rock is made of green actinolite after pyroxene.

Lithology and petrography. The dominant rock is a plagioclase-phyric metagabbro, which is well exposed on the Mid Western Highway in roadcuts, including at the type locality. Elsewhere on Stoke Hill meta-diorite is common and contains relict primary brown hornblende and clinopyroxene. More leucocratic phases are also present (possibly dykes or veins) which contain quartz and microcline perthite and are of quartz monzodiorite composition. Magnetic susceptibilities range from 500 to 3000×10^{-5} SI units. Geochemically the two samples analysed are quite similar. They are low in incompatible elements, and have negative niobium and positive strontium and phosphorous anomalies in a mantle normalised multi-element diagram.

Boundary relationships. The unit intrudes the Coombing Formation and is intruded by the Carcoar Granodiorite. It is truncated on the western side by the Carcoar Fault.

Age. The composition of the metagabbro suggests an affinity with the volcanics of the Kenilworth Group and a similar early Ordovician age is therefore inferred.

INTRUSIONS ASSOCIATED WITH THE FOREST REEFS VOLCANICS

TETTENHALL MONZODIORITE (Opm)

Derivation of name. The name is derived from the ‘Tettenhall’ property which is underlain by the monzodiorite at GR 866804, BLAYNEY.

Nomenclature. Smith (1966) mapped this unit as a two-phase intrusion of porphyritic and aphyric diorite and named it the 'Prince of Wales Diorite'. This name is invalid, so the unit has been renamed Tettenhall Monzodiorite. The dominant rock type is a medium grained pyroxene monzodiorite.

Distribution. The intrusion occupies an area of about 10 km^2 straddling the boundary of BLAYNEY and COWRA south of Burnt Yards and north of the Belubula River.

Type locality. The type locality lies within COWRA at GR 848802, where pavements and rounded boulders less than 1m across of fresh, grey, coarse grained two pyroxene monzodiorite are well exposed. The rock has a magnetic susceptibility of 6000×10^{-5} SI units.

Lithology and petrography. The rock has the typical monzodiorite composition of an Ordovician mafic intrusion, dominated by pyroxene (partly actinolitised) and plagioclase (An70-50), with interstitial K-feldspar and biotite, minor quartz, and a grain size of 1-4mm. However, it is unusual in that it contains pink orthopyroxene as well as the common clinopyroxene. This is possibly because the magma includes some crustal components, perhaps contaminated during its path from the mantle to the upper crust.

Boundary relationships. The unit intrudes the Weemalla Formation, and contains roof pendants of basalt from the Forest Reefs Volcanics. The contact metamorphic effects in the roof pendants are very minor. The Glendale Quartz Monzonite is wholly contained within the Monzodiorite, and is presumably a later intrusion fractionated from the Monzodiorite.

Age. Two isotopic age determinations in close agreement have been carried out on this unit, an Ar/Ar age of 439± 1.0 Ma (Perkins & others, 1990) and a Rb/Sr biotite-whole rock isochron age of 439± 3 Ma (AMDEL Report G7766/89, unpubl.) from the type locality.

JUNCTION REEFS MONZODIORITE (Ojm, Cowra 1:100 000 sheet area)

The Junction Reefs Monzodiorite is briefly referred to here as it is thought by Climax Mining geologists to be at the centre of, and the cause of, the metasomatism that produced the skarn mineralisation in the Junction Reefs mineral field, including the Sheahan-Grants, Cornishmans and Frenchmans deposits, which are dispersed around the Monzodiorite. The rock only crops out at one locality, but has been intersected in a number of drill holes. It is an even textured quartz- and hornblende- bearing monzodiorite, with decidedly porphyritic texture of plagioclase and greenish brown hornblende phenocrysts about 1-2mm across in a micropolygonal groundmass of feldspar and quartz. A chemical analysis from drill core from hole FMD2 (76.1-77m) has 58.82% SiO2 and plots in the latite field on a Le Bas diagram (SiO2 versus Na2O+K2O).

GLENDALE QUARTZ MONZONITE (Ogm)

Derivation of name. The name is derived from 'Glendale' homestead (GR 866812), BLAYNEY.

Distribution. The unit crops out in a small area about 1 km northwest of 'Glendale', where it is approximately 500m across. The quartz monzonite forms a prominent magnetic low within the high of the surrounding Tettenhall Monzodiorite, and has a distinctive pink radiometric signature.

Lithology and petrography. No type locality has been designated, as surface outcrops are highly altered and commonly sheared, but representative exposures are present in the gully draining into the Glendale open cut from the NE around GR 857816, where the freshest outcrops consist of a relatively even grained (0.5mm) mix of albite, K-feldspar, chlorite, calcite, quartz and sulphides. Rare blue-green tourmaline alteration is also present. A fresher sample of drill core (Climax Mining DDH GL 26 at 60.3m) has a similar texture and grain size, but chlorite and calcite are rare, and pale green hornblende, primary magnetite, and sphene are present. The rock is a quartz monzonite, with about equal proportions of plagioclase and K-feldspar.

Boundary relationships. The unit is wholly enclosed within, and presumably intrudes, the Tettenhall Monzodiorite.

Age. The intrusion is probably only slightly younger than the late Ordovician Tettenhall Monzodiorite. Perkins et al (1992) dated sericite alteration from the Glendale gold deposit, wholly contained within the Glendale Quartz Monzonite, giving an Ar/Ar age of 439.3±2Ma, indicating that the intrusion of the Tettenhall and Glendale bodies, and the mineralising event, are all indistinguishable in age.

ERROWAN MONZONITE (Oem)

Derivation of name. The name is derived from the 'Errowanbang' property (GR 896858) 12 km north-northwest of Mandurama.

Nomenclature. The name was introduced by Smith (1966) for the northwestern part of the intrusion which he named the 'Errowan Syenite'. Another area of similar monzonite to the southeast, and outside the area mapped by Smith, is also included in the unit.

Distribution. The unit is irregularly distributed around an area north of Errowanbang, up to 'Triangle Park', and includes a low area of poor outcrop west of 'Willow Park'. Total area is about 6 km^2.

Type Locality. The type locality is on the hill west of Flyers Creek at GR 883882, where there are several outcrops of rounded boulders of relatively fresh quartz- bearing biotite clinopyroxene monzonite with a magnetic susceptibility of 6000×10^{-5} SI units. Average grain size is 2-3mm, and the K-feldspar present forms irregular interstitial plates up to 4mm, giving a typical monzonitic texture. Quartz and pale green amphibole are also late interstitial phases. The biotite is almost completely altered to chlorite, opaques and prehnite.

Lithology and petrography. The monzonite is somewhat zoned through clinopyroxene monzonite and quartz-hornblende monzonite, with olivine bearing clinopyroxene dioritic cumulates on its southern margin near GR 912858. Around Soda Gully (GR 900880) the monzonite has a highly irregular distribution, is hydrothermally altered, fine grained and porphyritic, and difficult to distinguish from the hydrothermally altered trachyte of the Forest Reefs Volcanics which occurs as rafts within the monzonite. Rare K-feldspar is amongst the phenocryst population in this area. The area has been the focus of attention for porphyry-style mineralisation.

Boundary relationships. The monzonite intrudes the Forest Reefs Volcanics and is unconformably overlain by Tertiary basalt. The monzonite is probably part of the magma chamber into which the Forest Reefs Volcanics collapsed during late cauldron subsidence in the development history of the Forest Reefs volcano.

Age. A relatively imprecise zircon age of 450±10Ma was obtained from a sample from the type locality.

TALLWOOD MONZONITE (Otm)

Derivation of name. The name is derived from the Tallwood locality (GR 978906) 12 km west-northwest of Blayney.

Distribution. The unit crops out over an area of about 10 km^2 extending south and west of Tallwood.

Type locality. The type locality is here defined as the area on the side of the hill south of Platform Road at GR 982881, where fresh medium grained biotite-clinopyroxene monzonite is found as boulders less than 0.5m across. The rock is quite fresh with unalbitised plagioclase (An_{55} cores), interstitial orthoclase perthite giving a monzonitic texture, and exceedingly rare quartz. The clinopyroxene has, however mostly been pseudomorphed by actinolite, and the biotite has been replaced by chlorite, epidote, sphene and opaques. Magnetite occurs as subhedral octahedra commonly around 0.5mm across or in clusters with other mafic minerals and sphene, and the magnetic susceptibility is up to 10,000×10^{-5} SI units. The high oxidation state renders the K-feldspar dark pinkish red.

Lithology, petrography and chemistry. Outcrop is poor in the northern area where the monzonite underlies the planated surface that was once covered by basalt flows from the Tertiary Canobolas volcano. One sample from float at GR 955897 is quite similar to that from the type locality except it is slightly more felsic with more K-feldspar and quartz. South of Platform Road, where relief is greater the outcrop is much better. Excellent platform outcrops of porphyritic micro-monzonite can be examined in the creek at GR 975864, and further south similar micro-monzonites become dominant. Around GR 983851 the micromonzonite consists of a complex of dykes intruding volcaniclastic rocks and the Mount Pleasant Basalt Member. Field identification of the different rock-types is difficult because of the fine grained nature of volcaniclastics, intrusives and lavas in this area, despite the excellent exposure.

Four samples from the monzonite (two even-grained monzonites and two micro-monzonites from the southern exposures) all have quite similar chemistry, with around 53-58% SiO2 and 4% K2O. The most northern sample is from GR 955897, and has the highest SiO2. In the Le Bas diagram all four samples plot near the shoshonite-latite boundary, with 7-8% Na2O+K2O.

Boundary relationships. The monzonite intrudes the Weemalla Formation and Forest Reefs Volcanics, and is unconformably overlain by Tertiary basalt. It is truncated on the eastern side by the Carcoar Fault (see image 24, GR 982855, for deformation effects). The monzonite is probably part of the magma chamber into which the Forest Reefs Volcanics collapsed during late cauldron subsidence in the development history of the Forest Reefs volcano.

Age. Like other intrusions associated with the Forest Reefs Volcanics, the intrusion is thought to be late Ordovician, but no isotopic dating has been attempted.

GLEN AYR SYENITE (Ogs).

Derivation of name. The name is derived from 'Glen Ayr' homestead (GR 932809) 6 km west-northwest of the village of Carcoar.

Distribution. The unit crops out over an area of about 7 km^2 along both sides of the Carcoar-Errowanbang road. The syenite is easily weathered and eroded and occupies a distinct area of low relief centred on Dirt Hole Creek.

Type locality. The type locality is in Dirt Hole Creek at GR 931820 where an excellent exposure of medium to coarse grained pale biotite-ferrohastingsite-ferrosalite syenite is seen in the northern bank of the creek. The exposure is a sloping pavement 10m long (image 25). Quartz is exceedingly rare in the rock, and is probably sub-solidus.

Lithology, petrography and chemistry. Probably much of the central and northern part of the intrusion is of syenitic composition like at the type locality, but outcrop is sparse, as suggested by the name of the creek that the intrusion is centred upon. A sample from GR 949806 is more mafic than that from the type locality, and approaches a monzonite in composition. It has more abundant clinopyroxene with a higher mg number, and ferrohastingsite is absent. The rock has virtually identical chemistry to the latite unit within the Forest Reefs Volcanics. On the southern margin of the intrusion darker monzonites are present, such as at GR 943802 and GR 961786. These rocks are closer in composition to the Errowan and Tallwood Monzonites, but quartz is absent. It appears that the Glen Ayr Syenite is slightly less saturated in silica than the monzonites associated with the Forest Reefs Volcanics.

Boundary relationships. The syenite intrudes the Weemalla Formation and the Forest Reefs Volcanics. It cuts off a thick sequence of Weemalla Formation volcaniclastic sandstones and siltstones against basaltic breccias of the Forest Reefs Volcanics. The syenite is probably part of the magma chamber into which the Forest Reefs Volcanics collapsed during late cauldron subsidence in the development history of the Forest Reefs volcano.

Age. The syenite from the type locality was dated using zircons, but a poor age of 435±10Ma was obtained because the zircons were high in uranium and suffered from lead loss, due to metamictisation. The age estimate is a $^{207}Pb/^{206}Pb$ age projected onto concordia, rather than the more commonly used $^{206}Pb/^{238}U$ age. Like other intrusions associated with the Forest Reefs Volcanics, the intrusion is late Ordovician.

INTRUSIONS ASSOCIATED WITH THE BLAYNEY VOLCANICS

FERNSIDE MONZODIORITE (Ofd)

Derivation of name. The name is derived from 'Fernside' homestead (GR 078772) 4 km northwest of Barry.

Nomenclature. Berents (1977) introduced the name 'Fernside Diorite' for this intrusion of monzodiorite composition.

Distribution. The unit crops out along the crest of a northeast-striking ridge 1 km east of the Blayney-Neville road and straddles the Carcoar-Barry road.

Type locality. Outcrops of the monzodiorite occur on the ridge immediately south of the Carcoar-Barry road at around GR 077778.

Lithology and petrography. The monzodiorite is an even grained grey rock with relatively low magnetic susceptibility of $200\text{-}300\times10^{-5}$ SI units. In thin section it appears rather altered and albitised, but consists of typical mineralogy and texture for an Ordovician intrusion from the region. Actinolitised clinopyroxene and albitised and sausuritised plagioclase (1mm) are enclosed in pools of microcline commonly over 5mm. Biotite is common, and, in a sample collected from the southern end of the monzodiorite, quite fresh. Apatite prisms are common, but quartz is absent. Opaques are relatively uncommon, and the monzodiorite has a similar composition to the Moorilda Monzonite. Both plutons intrude the Blayney Volcanics, and both are less oxidised than the intrusions associated with the Forest Reefs Volcanics.

Boundary relationships. The unit intrudes the Blayney Volcanics.

MOORILDA MONZONITE (Omm)

Derivation of name. The name is derived from the village of Moorilda, 12 km southeast of Blayney.

Distribution. The unit occurs in two small areas within 2 km west (here called the SW zone) and northwest (here called the NE zone) of Moorilda where it occupies low-lying country surrounded by slightly higher hills composed of Blayney Volcanics. A prominent magnetic anomaly centred on the monzonite indicates that it is far more extensive at depth. The anomaly is approximately elliptical in shape, with maximum and minimum dimensions of 9km and 5km, with the long axis oriented NNW. The NE zone is close to the centre of the ellipse.

Lithology, petrography and chemistry. No type locality has been given, as undoubtedly the monzonite is chemically zoned based on the range of signatures displayed on the aeromagnetic image. Most of this variation occurs at depth, so the outcrops are probably unrepresentative of the intrusive body as a whole. There are only four known outcrops of the monzonite, two in the NE zone at GR 162786 and GR 161793, and two in the SW zone at GR 152783 and GR 152780. The most accessible outcrop at GR 162786 is the freshest, and consists of several small tors up to 0.5m high beyond the fence on the south side of the Blayney-Moorilda Road. The rock has a typical monzonitic texture with clinopyroxene and plagioclase enclosed in pools of slightly perthitic orthoclase. Grain size is 1-2mm, but the orthoclase pools are up to 10mm, though this is not visible in hand specimen. Biotite, and pseudomorphs of probable olivine altered to actinolite+chlorite+opaques, are also present. Magnetite is uncommon, and quartz is absent. The rock has a magnetic susceptibility of only 80×10^{-5} SI units, and the orthoclase shows no signs of pink coloration. The rock, like the Fernside Monzodiorite, is definitely less oxidised than the monzonites associated with the oxidised Forest Reefs Volcanics, since the lower magnetic character is caused by a lower abundance of primary magnetite. The lower magnetic character is not caused by post magmatic magnetite destruction that could be attributable to metamorphism or hydrothermal alteration. This is also in keeping with the relationship with the host Blayney Volcanics which are also less oxidised than the Forest Reefs Volcanics, thus providing an argument that the Moorilda Monzonite was a major eruptive centre for the Blayney Volcanics. The other outcrop from the NE zone is quite similar to the rock described above, but the grain size is slightly smaller. Samples from the two exposures in the NE zone are similar in chemistry, with 52-53% SiO2 and 4% K2O. They have typical shoshonitic character, with high K2O, P2O5, Ba and Sr, and low TiO2, Nb, Zr and Y. The sample from GR 162786 has been analysed for its neodymium isotopic content. It has εNd of +6.28 at 450Ma, in keeping with other Ordovician magmatic rocks in the Lachlan Fold Belt (Wyborn & Sun, 1993).

The two outcrops from the SW zone are altered, and cut by a stockwork of feldspar veins (image 26), and narrow seams of dark blue clinozoisite. Their original monzonitic texture has been completely obliterated, and there has been almost complete loss of potassium. The original plagioclase is still discernible in outline, but has been altered, along with the original orthoclase, to a mix of albite, sericite, clinozoisite and calcite. Original clinopyroxenes have also partly broken down to this assemblage, but are mostly still remaining with a ragged appearance. There is no development of actinolite. Compared to the relatively unaltered monzonites from the NE zone, the SW zone samples have lost FeO, K2O, Ba, Rb, and possibly Cu. They have gained CaO, Na2O and Al2O3, and possibly the high field strength elements Ti, Nb and Zr. SiO2 (53.5 to 54%) is only slightly higher.

Near the centre of the intrusion two intense magnetic anomalies that show up on aeromagnetic images, have been more accurately delineated with ground magnetics by mining companies. The anomalies are over low marshy areas with no outcrop. A percussion drill hole into one anomaly produced chips of magnetite-biotite-olivine(altered)-clinopyroxenite with 1-2mm grainsize. The clinopyroxenite is cut by talc-carbonate alteration veins.

Boundary relationships. The monzonite intrudes the Blayney Volcanics, and as mentioned above, could be the main eruptive source for much of the Blayney Volcanics.

Age. A late Ordovician age is assumed, based on the relationship with the Blayney Volcanics, and the shoshonitic character of the fresh samples from the NE zone.

OTHER MINOR INTRUSIONS (Oi, Ofi)

Many small, unnamed, generally monzonitic intrusions occur in the northwest part of BLAYNEY. Some of them are shown on the map and designated Oi where they intrude the Coombing and Weemalla Formations and Ofi where they intrude the Forest Reefs Volcanics. The main bodies within the Coombing and Weemalla Formations have been described under those formation descriptions. Other small bodies are known but very detailed mapping would be required to identify all of them. They are generally similar in compositional range to the main bodies as described above.

SILURO-DEVONIAN PLUTONS

Granites and granodiorites of known or inferred late Silurian to early Devonian age intrude the Ordovician sedimentary and volcanic rocks. Both S-type and I-type varieties are represented, but most are I-type. According to Close (1978) the latter are the older where relationships are exposed within the Wyangala Batholith, but this has not been confirmed in this study. Some of the more felsic plutons, and the more foliated plutons, such as the Mount Misery, Little Forest, Bugs Ridge, and Bartletts Creek plutons, are difficult to classify using the S-I classification scheme. Plutons previously described as adamellite are now described as granite in accordance with the normal nomenclature adopted for granitic rocks (Streckeisen, 1976).

WYANGALA BATHOLITH

MOUNT MISERY GRANITE (Smg)

Derivation of Name. The name is derived from Mount Misery (GR 858494), a prominent hill north of Lake Wyangala, in BLAYNEY.

Nomenclature. The name 'Mount Misery Adamellite' was introduced by Close (1978).

Distribution. The unit lies mainly in BLAYNEY about 5 km north of Lake Wyangala but also extends into COWRA.

Type locality. The type locality is here given as outcrops at GR 851502 beside a road north of Lake Wyangala, where fine grained felsic granite is abundantly exposed.

Lithology, petrography and chemistry. Much of the granite consists of reasonably abundant exposures of weakly deformed felsic granite to aplitic granite, with degree of deformation and alteration strongest at the northern end. The granite is well exposed at the southern end in the vicinity of Mount Misery, where there is abundant evidence of a complex mixing of the normal felsic granite with a magma of mafic composition. On the ridge around GR 684500 quenched scalloped chilled margins of quartz diorite are in contact with aplitic granite (image 27), and complex contaminated mixes of the two end members are well displayed. Most of these intermediate rocks have hornblende quartz tonalite and granodiorite compositions, with quenched textures indicated by the presence of needle apatites. Grainsize is mostly less than 0.5mm.

Geochemically, the granite is a high silica (73-75%SiO2) granite with slightly high Rb indicating some fractionation may have taken place. Compared to other Wyangala Batholith plutons it shows closest affinities to the Bigga and Wyangala Granites, with slightly elevated TiO2, Zr and rare earth elements. However the Mount Misery Granite does not have the high P2O5 of these S-type granites (c.f. Chappell & White, 1992), and is difficult to place in terms of the S-I classification. High REE's, Th, U, Y, and Zr indicate that it is relatively rich in accessory minerals.

Boundary relationships. The unit intrudes the Adaminaby Group. In COWRA it is also in contact with the Wyangala Granite.

WYANGALA GRANITE (Swg)

Derivation of name. the name is derived from the Wyangala Dam.

Nomenclature. The name 'Wyangala Adamellite' was introduced by Close (1978).

Distribution. The unit crops out mainly in COWRA but extends into BLAYNEY about 14 km south of Lyndhurst.

Lithology, petrography and chemistry. In BLAYNEY the Wyangala Granite consists of foliated porphyritic biotite granite with large K feldspar phenocrysts. The deformation has resulted in the recrystallisation of quartz into elongated multi-domainal polygonal aggregates, bending and recrystallisation of biotite, fracturing of feldspars with fractures healed with quartz, and the formation of microcline perthite. Extended patches of sericite like those in the Roseburg Granite (see below), may have been original cordierite, suggesting that the pluton is an S-type granite. The foliation is steeply dipping and strikes NNE.

Two geochemical samples from the Wyangala Granite in BLAYNEY from GR 817587 and GR 877578 have 75 and 73 % SiO2 respectively. The second sample is from close to the contact, and is highly deformed. As a result, it has a higher Na2O content (3.5%) than the first sample (2.5%, which would be more typical of the unit as a whole), and lower K2O. This alteration has moved the composition from that of an S-type into the field of an I-type. Compared to typical I-type granite from the Wyangala Batholith, the Wyangala Granite has higher aluminium saturation index, and higher P2O5, and lower Sr and Fe2O3, all of which suggest an S-type character.

Boundary relationships. In BLAYNEY the unit intrudes the Adaminaby Group to the south. A narrow screen of Adaminaby Group separates it from the very similar Roseburg Granite in the east. To the north the contact with the Garland Granodiorite is not exposed, so intrusive relations have not been established.

ROSEBURG GRANITE (Sog)

Derivation of name. The name is derived from Roseburg State Forest (spelt Roseberg on the Blayney topographical map) south of Lyndhurst.

Nomenclature. The name was introduced by Close (1978).

Distribution. The unit occurs in a meridionally elongate zone in the Roseburg State Forest area between Lyndhurst and Lake Wyangala.

Type locality. The type locality is here given as road-side exposures at GR 881470 about 1.2km south of Spicers Mountain.

Lithology, petrography and chemistry. The Roseburg Granite is very similar to the Wyangala Granite, both petrographically and geochemically. The degree of deformation (image 28) is also equally intense. The eastern boundary consists of a number of embayments that appear to be folds on a wavelength of about 0.5km interfolded with adjacent Adaminaby Group sediments. The airborne gamma ray response of the granite is slightly more intense than that for the Wyangala Granite, implying a slightly more felsic composition, and this is borne out geochemically by slightly higher Rb and U.

Typically the rock is a porphyritic granite with perthitic microcline phenocrysts to 15mm, in a foliated groundmass of about 1-2mm of granitic composition with minor biotite and muscovite. Quartz commonly fills fractured feldspars, and patches of fine sericite and green biotite are almost certainly after cordierite. The colour index is about 4, and magnetic susceptibility less than 5×10^{-5} SI units.

Boundary relationships. The unit intrudes the Adaminaby Group. It is also in contact with the Bigga Granite and the Mandurama Ponds Granodiorite, but their relative ages are not known.

BIGGA GRANITE (Sig)

Derivation of name. The name is derived from the village of Bigga, in CROOKWELL.

Distribution. The unit extends north from CROOKWELL across Lake Wyangala as far as the Roseburg State Forest.

Lithology, petrography and chemistry. This unit, possibly consisting of a composite body of more than one pluton, is very similar to the Wyangala and Roseburg Granites. The airborne gamma-ray response is slightly greater than that of these two bodies, and is appreciably higher south of Lake Wyangala where exposure is excellent, and the vegetation is largely cleared. North of the lake the response is lower, possibly because the hills are still tree-covered.

Analyses of six geochemical samples from BLAYNEY are almost identical to the analyses from the Wyangala Granite, and slightly less siliceous than those from the Roseburg Granite. The Bigga Granite is an S-type, and has relatively low Na2O despite the moderately strong deformation.

The granite is intruded by a number of NNE trending dolerite dykes such as at GR 891418 and GR 955401. These dykes are deformed along with the host granite, indicating that they are older than the deformation, and probably only slightly younger than the granite.

Boundary relationships. The unit intrudes the Adaminaby Group. It is also in contact with the Roseburg Granite and the Streamville Granodiorite.

LITTLE FOREST GRANITE (Sfg).

Derivation of name. The name is derived from 'Little Forest' homestead (GR 960617), 4km south of Gallymont.

Nomenclature. The name 'Little Forest Adamellite' was introduced by Close (1978).

Distribution. The main area of outcrop is about 1.5 km^2 immediately west of 'Little Forest'. A smaller area also occurs south of the homestead.

Type locality. The type locality is here given as GR 944606, where tor-like exposures of aplitic leucogranite are adjacent to a farm track.

Lithology, petrography and chemistry. The Little Forest Granite is a fractionated fine grained aplitic granite, and is the most felsic of all the granites in BLAYNEY. It is well exposed on the hill slopes surrounding Forest Trig (GR 947609), and a separate body about 200m across and 1km long occurs in the valley south of Little Forest homestead.

Two analyses of the granite indicate fractionation with high Rb around 500ppm and very low Ba and Sr, and a low mg number. The low P2O5 in the rock suggests that it is a fractionated I-type rather than a fractionated S-type (Chappell & White, 1992). The rock is high in Sn (22 and 31ppm for the two analyses) indicating that the granite is reduced rather than oxidised, so that during fractionation, Sn would have remained in the melt as Sn^{2+}, rather than being scavenged in biotite and sphene as Sn^{4+} in oxidising conditions.

Boundary relationships. The unit intrudes the Adaminaby Group. It is also in contact with the Mandurama Ponds Granodiorite. The western side of the main body is cut off by the southern extension of the Carcoar Fault.

BUGS RIDGE GRANITE (Sug)

Derivation of name. The name is derived from Bugs Ridge southeast of Gallymont.

Nomenclature. The name 'Bugs Ridge Adamellite' was introduced by Close (1978).

Distribution. The area of outcrop is a narrow zone about 14 km long and 1-2km wide following Bugs Ridge. A further body of a little more than 2km^2 occurs in the valley of Fell Timber Creek north of Somers trig (GR 985650).

Type locality. The type locality is here given as outcrops of foliated biotite muscovite leucogranite at GR 964590 on the Carrollina Forestry Road. This locality is in a tongue that extends along the western side of the main mass, similar to the tongues of granite that occur on the east of the Roseburg Granite that are interpreted as folds after the intrusion of the granite. The colour index is 3, but in places in the main mass of the granite the colour index is as high as 10.

Lithology, petrography and chemistry. Most of the body is strongly foliated biotite muscovite granite, with minor altered cordierite. Phenocrysts are absent, and typical grain size is 1-2mm. The strong foliation is less discernible in outcrop, than in thin section, because of its felsic character. At the type locality the rock is more felsic, and altered cordierite is absent.

The separate body north of Somers trig is poorly exposed. One sample from GR 981653 is a porphyritic muscovite-biotite granite with phenocrysts of microcline and quartz. The microcline phenocrysts are up to 10mm long. Minor altered cordierite testifies to the similar S-type composition to the main Bugs Ridge mass. At the southern end of this northern body there is an unexplained magnetic anomaly centred immediately west of Somers trig. The anomaly may have economic potential as it lies at the boundary of the Adaminaby Group and the Coombing Formation like the nearby Discovery Ridge gold prospect, but the magnetic anomaly has the additional potential of contact metamorphic upgrading by the Bugs Ridge Granite.

A geochemical sample from the type locality is almost as fractionated as the Little Forest granite , with 376ppm Rb and low Sr and Ba. The rock also has high P2O5, Sn, and U and a high U/Th ratio. The high P2O5 suggests that it is a fractionated S-type, rather than a fractionated I-type like the Little Forest Granite. As would be expected for a fractionated S-type granite, the Sn content is high at 20ppm.

At GR 978607 an exposure of dolerite is seen to cut the Bugs Ridge Granite. The dyke trends at 110°, and can be followed on the aeromagnetic image westward for almost 40km across BLAYNEY and COWRA. At Bugs Ridge the dyke is only 4m wide, but still shows up well on the magnetic image. It has a magnetic susceptibility of 900$\times10^{-5}$ SI units, where as the granite is less than 10$\times10^{-5}$ SI units. The dyke trends parallel to the elongation of the Carboniferous Bathurst Batholith, and is therefore probably Carboniferous as well. It is a titanaugite bearing high titanium tholeiite with and analysis giving 45.85% SiO2 and 2.15% TiO2.

Boundary relationships. The unit intrudes, and is entirely surrounded by, the Adaminaby Group.

BARTLETTS CREEK GRANITE (Sag)

Derivation of name. The name is derived from Bartletts Creek, a small tributary of the Abercrombie River at GR 972468.

Distribution. The unit extends in a zone of variable width for about 5 km northwest from Mount Davies to the Abercrombie River. The granite was not previously mapped, but is distinct on the airborne gamma-ray image.

Type locality. The type locality is here given as exposures at GR 968429, about 50m west of the Trig point on Mount Davies.

Lithology, petrography and chemistry. The granite is quite well exposed on the slopes of Mount Davies, and consists of weakly strained, but somewhat recrystallised, biotite granite with an average grain size of about 2mm. The biotite occurs as polygonal aggregates suggesting metamorphism to greenschist facies along with the weak deformation. K-feldspar is microcline perthite, and plagioclase is albitised with inclusions of coarse sericite and clinozoisite. The colour index is around 10, and magnetic susceptibility around 10×10^{-5} SI units.

One geochemical analysis from the type locality has 72.4% SiO2 and 3.08% Na2O. The relatively high Na2O suggests that it is an I-type granite, but this is possibly because of plagioclase albitisation. More suggestive of its classification is that it has high P2O5, TiO2, Y, and Zr, like the S-type Wyangala and adjacent Bigga Granites. The Bartletts Creek Granite is probably an S-type, but is not as fractionated as the Bugs Ridge Granite.

Boundary relationships. The unit intrudes the Adaminaby Group.

STREAMVILLE GRANODIORITE (Ssg)

Derivation of name. The name is derived from Streamville Creek which enters Lake Wyangala at GR 872406 in BLAYNEY.

Nomenclature. The name was introduced by Close (1978).

Distribution. The unit crops out beside Lake Wyangala in the southwest corner of the Sheet area southwest of Grabine, but it is more extensively exposed in COWRA, where it is suggested that the type locality be located.

Lithology, petrography and chemistry. The Streamville granodiorite is a reduced I-type biotite hornblende granodiorite with even grain size of 1-2mm. One reference locality was sampled in BLAYNEY at GR 866401. The granodiorite has a colour index of 20 and magnetic susceptibility of 15×10^{-5} SI units. The rock is weakly deformed and metamorphosed, with biotite and hornblende slightly recrystallised and bent. Reddish brown biotite is more abundant than hornblende (X= pale green, Y= green, Z= brownish green). Quartz grains exhibit undulose extinction, but only some grains have broken into multi-domainal aggregates. Plagioclase cores are sericitised, and the uncommon K-feldspar is microcline.

Boundary relationships. The unit intrudes the Adaminaby Group. It is also in contact with the Bigga Granite, but relative ages have not been established.

GARLAND GRANODIORITE (Sxg)

Derivation of name. The name is derived from the Garland locality 5 km south-southwest of Lyndhurst.

Nomenclature. The name was introduced by Close (1978).

Distribution. The unit straddles the boundary between BLAYNEY and COWRA from 5 to 15 km south of Lyndhurst.

Type locality. The type locality is here given as the large tors several metres high 400m south of 'Avondale' at GR 920674, where the rock is a biotite hornblende granodiorite with 2-4mm grainsize and a weak secondary foliation. The foliation is meridional and near vertical, but there is also a primary foliation defined by the elongation of scattered mafic enclaves that dips 45° towards 105°.

Lithology, petrography and chemistry. The Garland Granodiorite, like the Streamville Granodiorite, is a reduced biotite hornblende I-type granodiorite. The pleochroic scheme for the hornblende and biotite is similar to that in the Streamville, and the magnetic susceptibility is similar. In general the colour index at around 15, is lower than that in the Streamville, but more mafic compositions are also present such as at GR 922636. The degree of deformation and metamorphism is also similar to that in the Streamville, and weaker than the S-types such as Wyangala, Roseburg and Bigga. This is mainly because of the lower abundance of quartz, and higher abundance of plagioclase in the I-types, and does not imply that the I-type granites are much younger than the S-types.

Geochemically the Garland Granodiorite has around 70% SiO2, and plots on chemical element trends in conformity with the other Wyangala Batholith I-types. It has no distinctive elemental abundances.

Boundary relationships. The unit intrudes the Adaminaby Group. It is also in contact with the Wyangala Granite and Mandurama Ponds Granodiorite, but age relations are uncertain.

MANDURAMA PONDS GRANODIORITE (Sqg)

Derivation of name. The name is derived from Mandurama Ponds a tributary of the Belubula River, which rises in a basin composed mostly of the granodiorite.

Nomenclature. Close (1978) named this intrusion the 'Sunnyside Granodiorite'. This name is invalid as it has previously been used elsewhere in New South Wales.

Distribution. The unit occupies a 10 km^2 area 12 km south of Lyndhurst, where it occupies a distinct area of low ground. The more resistant Roseburg Granite occupies the hills to the south.

Type locality. The type locality is here defined as tor outcrops less than 50cm across beside a farm track at GR 909592.

Lithology, petrography and chemistry. The rock is typically a biotite granodiorite with colour index of around 8, though some more felsic parts are present in the east, and the rock may grade to the east into the Little Forest Granite, with which it is obviously related. It is slightly finer grained than the Garland Granodiorite, and readily distinguished from it by having almost no hornblende. Typically a thin section will have only one or two small grains associated with biotite. The biotite is the same reddish brown colour of the Garland and Streamville plutons. Allanite is prominent in one thin section, but two chemical analyses of the pluton do not show elevated abundances of light rare earth elements. The pluton has typically around 72% SiO2 and fits on Wyangala Batholith I-type geochemical trends. The degree of deformation and recrystallisation is slightly greater than that of the adjacent Garland Granodiorite, with quartz grains dominantly recrystallised into multi-domainal aggregates.

Boundary relationships. The unit intrudes the Adaminaby Group. It is also in contact with the more mafic Garland Granodiorite and the more felsic Little Forest Granite, and probably forms a compositional series with these adjacent plutons.

SWAN PONDS TONALITE (Sst)

The Swan Ponds Tonalite crops out extensively in COWRA. The name was introduced by Close (1978). It occurs in a small area in BLAYNEY west of Garland. At GR 857674 dykes of hornblende granodiorite intrude the Weemalla Formation near the contact with the tonalite. The adjacent fine grained volcaniclastics are hornfelsed, and cleavage is absent.

OTHER INTRUSIONS

CARCOAR GRANODIORITE (Scg)

Derivation of name. The name is derived from the village of Carcoar (GR 985787).

Nomenclature. The unit is shown as the 'Carcoar Granite' by Packham (1968a). Two subunits, the 'Longhill Diorite', near Browns Creek, and the 'Stokefield Diorite' at Carcoar have been used by Paterson et al. (1977), and informally by exploration geologists in the area. The 'Longhill Diorite' is a slightly more mafic phase of the Carcoar Granodiorite and should not be used. The Stokefield Metagabbro is Ordovician and described elsewhere in this report.

Distribution. The unit is roughly equant and 9-10km across between Blayney and Carcoar. Its western margin is faulted against the Forest Reefs Volcanics on the Carcoar Fault.

Type locality. The type locality is here given as the tors exposed on the Carcoar-Barry Road at GR 046790. Although this is within 400m of the southern contact with Coombing Formation, it is considered representative, as there appears to be very little variation within the unit as a whole, except for part of the pluton near Browns Creek, which is informally known as the 'Longhill Diorite'.

Lithology, petrography and chemistry. The granodiorite crops out sparsely over most of its distribution in an area that was part of the pre-Tertiary planated surface. Exposures are normally low rounded tors. In the more dissected areas close to the Carcoar Fault, which has controlled the excavation by Cowriga Creek, exposure is more common. The rock is typically a fine (1mm) to medium (2mm) grained hornblende biotite granodiorite to tonalite, similar to other I-type granites of the district, which are all here given the name Carcoar Suite. The hornblende is primary with green to greenish-brown pleochroism, but some grains contain cores of clinopyroxene and actinolite after clinopyroxene. Biotite has the reddish brown colour of that in other plutons from the Carcoar Suite. Quartz exhibits undulose extinction, but the degree of deformation is much less than in plutons further south. Colour index is similar to the Streamville Granodiorite at around 20, but the tonalitic phase near Browns Creek is more like 25. Magnetic susceptibility is low at around 20×10^{-5} SI units, in keeping with other Carcoar Suite plutons.

Typically the SiO2 content of the granodiorite is 65-66% as at the type locality. At Browns Creek area SiO2 is around 60-63%, and other more mafic marginal areas probably also exist, but have not been sampled. On Harker Diagrams the Carcoar Granodiorite plots almost identically to the Streamville Granodiorite and the Barry Granodiorite, but at slightly lower SiO2 levels.

Boundary relationships. The unit intrudes The Coombing Formation, the Blayney Volcanics, the Cowriga Limestone Member and the Stokefield Metagabbro. It is overlain by Tertiary basalts as probable outliers from the Canobolas volcano.

Age. The Carcoar Granodiorite has been dated by Perkins et al. (1995) at 416.2±1.1 Ma, and the 'Long Hill Diorite' phase at 418.9±1.4 Ma using the Ar/Ar method. These two numbers are in close agreement and are interpreted as giving a Late Silurian age.

BARRY GRANODIORITE (Sbg)

Derivation of name. The name is derived from the village of Barry (GR 103743).

Nomenclature. The Barry Granodiorite and the Sunset Hills Granite are shown together as the 'Barry Granite' by Packham (1968a).

Distribution. The unit crops out between Blayney and Neville in a 3-km-wide belt, and extends about 4 km north of Barry.

Type locality. The type locality is here given as boulders and tors on the east side of the Blayney to Barry road about 1.8km north of Barry at GR 096760. The rock here is a hornblende-rich granodiorite, low in K-feldspar, and almost of tonalitic composition. The magnetic susceptibility is low at around 30×10^{-5} SI units, and the colour index is around 20.

Lithology, petrography and chemistry. The Barry Granodiorite is typical of the more mafic Carcoar Suite I-type granites. Hornblende is more abundant than biotite and opaques are rare. Colour index is 20-25. The composition overlaps with that of the Carcoar, Garland, and Streamville plutons, and is virtually indistinguishable from these bodies in thin section and geochemistry. Grainsize is around 1mm, but hornblende prisms are commonly up to 5mm long. Quartz forms late irregularly shaped interstitial grains enclosing plagioclase and hornblende and can be up to 4mm across.

The degree of deformation is similar to that in the Carcoar Granodiorite.

A study of the composition and significance of deformation in the Barry Granodiorite and adjacent Sunset Hills Granite was carried out by Lennox et al. (in press). According to these authors, the location of the two plutons is controlled by oblique opening of adjacent faults, such as the Copperhannia Fault, to accommodate emplacement.

At GR 099774 on the margin of the Barry Granite, an outcrop of magnetite ?skarn is exposed in a road-cut. An aeromagnetic anomaly is associated with the body. The relationship with the granite is unknown. A geochemical sample, which has magnetic susceptibility of $60{,}000\times10^{-5}$ SI units, contains 85% iron oxide minor silica and water and very little else. Slightly elevated Cu and As suggests a skarn origin.

Boundary relationships. The unit intrudes the Adaminaby Group, the Coombing Formation and the Blayney Volcanics. It is also in contact with the Sunset Hills Granite at its southern end.

SUNSET HILLS GRANITE (Seg)

Derivation of name. The name is derived from the 'Sunset Hills' property at GR 062651 about 2km south of the township of Neville.

Nomenclature. The unit is shown as part of the 'Barry Granite' by Packham (1968a). It has been informally referred to as the Neville Granite, but this name is invalid.

Distribution. The unit extends south from Neville for about 13 km along a belt about 4 km wide.

Type locality. The type locality is here given as exposures at GR 034583 in Reedy Creek west of the Pennsylvania Road near a small gravel quarry. The rock here is a moderately foliated felsic biotite granite with 73.5% SiO2.

Lithology, petrography and chemistry. The Sunset Hills Granite is a biotite granite with a colour index around 10. It is well exposed in the dissected southern part (see image 29 of outcrops in Rocky Bridge Creek at GR 053574), but sparsely exposed in the north. Magnetic susceptibilities are low at around 10-20×10^{-5} SI units. Aplitic and leucocratic bodies are common, such as one approximately 800m by 400m, centred on GR 061565, and surrounded by biotite granite. Muscovite-bearing leucogranite within this body, such as at GR 063567, has a magnetic susceptibility of only 2×10^{-5} SI units. The granite is mostly free of hornblende, but at GR 072582 a sample with magnetic susceptibility of 25×10^{-5} SI units has widely scattered hornblende crystals of around 1mm partly replaced by biotite as a result of deformation. In samples from other localities irregular patches of recrystallised biotite and chlorite are probably after original hornblende.

Geochemically the granite is clearly an I-type, though its aluminium saturation index is as high as the S-type Wyangala Granite, probably because of plagioclase sericitisation associated with deformation. In terms of elements which set the S-types of the Wyangala Batholith apart from the I-types, such as higher K2O, TiO2, P2O5, Rb and Nb, and lower Na2O, Sr and Fe2O3 in the S-types, the Sunset Hills Granite plots with the Carcoar Suite I-types. It also plots with felsic I-types by virtue of lower Cr and Ni than the S-types.

Strong deformation is common within the granite, and Lennox et al (in press) have described mylonitic zones trending NNE. The SE margin of the body is truncated by a splay of the Copperhannia Fault, and the granite has been mylonitised along the fault to the extent that it is difficult in hand specimen to recognise the granitic composition. However parts of the body have been shielded from the strong deformation. This is particularly noticeable at the southern end of the pluton where deformation is concentrated at the eastern and western margins, and the core is relatively undeformed. At GR 058550 an undeformed intrusive contact into Adaminaby Group rocks is exposed in the gutter of a forestry road.

Boundary relationships The granite intrudes the Adaminaby Group, Coombing Formation, and the Kangaloolah Volcanics. It is overlain by Tertiary basalts along Rocky Bridge Creek.

KEMPFIELD GRANODIORITE (Skg)

Derivation of name. The name is derived from the 'Kempfield' property at GR 085582.

Nomenclature. The granite was included as part of the Barry Granite in the first edition of the Bathurst 1:250 000 geological Sheet, but the granite east of Trunkey is now known to be a separate intrusion, here called the Kempfield Granodiorite. The intrusion was first shown to be separate by Taylor (1983a), but given the invalid name of 'Butlers Granite'.

Distribution. The unit is roughly circular and about 3km across. Much of it is drained by Meadow Paddock Creek. The unit is cut by the Copperhannia Fault which has down-faulted a slice of Campbells Group siltstone into the granodiorite, but the granodiorite itself appears to have only undergone a small amount of movement along the fault.

Type locality. The type locality is here given as low tors at GR 083562 on the south side of Meadow Paddock Creek.

Lithology, petrography and chemistry. The granodiorite is highly deformed and metamorphosed to upper greenschist facies, and only sparsely exposed as rubble on hill slopes, as rare low tors, such as at the type locality, and as weathered pavements within creek beds. Foliation is strongest on the eastern and western margins and adjacent to the Copperhannia Fault which cuts through the centre of the unit.

The granodiorite is similarly recrystallised to the more mafic parts of the Sunset Hills Granite, except that any traces of original hornblende have been completely removed, and turned into a mosaic of biotite, chlorite and epidote. Original igneous biotite is also totally recrystallised into mosaics, and, where more highly deformed, strung out along the foliation. Plagioclase is now a mass of sericite, albite and epidote. Quartz forms irregular interstitial undulose patches of 1-2mm that possess strongly undulose extinction, but are not polygonised into a mosaic as would be required before the rock becomes mylonitic. K-feldspar is virtually absent in places, giving a tonalite composition, but at those localities it has most likely broken down to contribute to the replacement of hornblende by biotite, and was probably abundant enough for the rock to be a granodiorite prior to metamorphism. Clearly the Kempfield Granodiorite has been much more permeable than most granites during metamorphism, as a result of the deformation, and metamorphic reactions have been enhanced accordingly. Magnetic susceptibilities are in the same range as other I-type granodiorites in the region, being around $20\text{-}30\times10^{-5}$ SI units.

Two samples were analysed with SiO2 averaging about 64%. The analyses plot reasonably well on Carcoar Suite Harker trends, except there has clearly been alkali mobility during metamorphism, with one sample having high K2O/Na2O, and the other having the opposite.

Boundary relationships. The Granodiorite intrudes the Coombing Formation west of the Copperhannia Fault and the Triangle and Campbells Formations east of the fault. The relationship with the fault is puzzling, suggesting that movements on the fault during the upper greenschist facies metamorphism were mainly vertical. If there has been much overall displacement on the fault, then the pluton must have continued at depth over this displacement distance at approximately the same size.

ROCKY BRIDGE GRANODIORITE (Szg)

Derivation of name. The name is derived from Rocky Bridge (GR 022579).

Distribution. The main outcrop is along a narrow 4-km-long north-south belt immediately west of Rocky Bridge. Two other small granitic bodies farther to the north and south are also included in the unit.

Type locality. The type locality is here given as the assemblage of tors up to 2m high on the northern side of the Carrollina Forestry Road at GR 019582. Here a mafic hornblende-biotite granodiorite with colour index of 25 and magnetic susceptibility of 25×10^{-5} SI units has a moderate secondary foliation dipping 60° towards 290°.

Lithology, petrography and chemistry. The Rocky Bridge Granodiorite is a small body, typical of a relatively mafic Carcoar Suite I-type composition. Owing to its small size and the degree of post-granite deformation and metamorphism, the granodiorite is quite altered, particularly the feldspars (1-2mm) which are replaced mainly by sericite and epidote. K-feldspar is rare, giving a tonalitic composition, but, like the Kempfield Granodiorite, this may be due to alteration. Hornblende (1-2mm) is about equally as abundant as biotite, and the hornblende shows the typical green to greenish brown pleochroism of the Carcoar Suite. Quartz forms partly polygonised, undulose, interstitial grains up to 3mm.

Geochemically a sample from the type locality plots on the trends defined by the Carcoar Suite with SiO2 at 64.44%.

Boundary relationships. The unit intrudes the Adaminaby Group and is overlain by Tertiary basalt.

MINOR INTRUSIONS (Sd, Sf)

Minor, small Siluro-Devonian intrusions shown in the map area include gabbro (Sd) in the northeast corner of the Garland Granodiorite, 7 km south of Mandurama, and leucogranite (Sf) on the northwestern outskirts of Blayney.

The gabbro is an even grained (1-2mm) hornblende gabbro with no potassic minerals and very calcic plagioclase. A sample from GR 926677 has plagioclase of An_{80} composition and a colour index of 45. A hornblende quartz diorite within the gabbro body with some relict clinopyroxene and orthopyroxene was sampled from GR 928686. The plagioclase in this rock has An_{80} cores and distinct less calcic rims. Both these rocks were analysed. They have quite different mantle normalised multi-element patterns to the Ordovician mafic rocks, with no large ion lithophyle element enrichment, and no negative high field strength element anomalies - a typical flat tholeiitic pattern. The sample from GR 926677 has a positive strontium anomaly indicating it has accumulated plagioclase. The relative age of intrusion to the adjacent Garland Granodiorite could not be established. This tholeiitic gabbro is typical of the mafic intrusions of Silurian age that are scattered throughout the Lachlan Fold Belt (Wyborn, 1988).

GENERAL COMMENT ABOUT THE CHEMISTRY OF SILURIAN GRANITES ON BLAYNEY

The S-type granites are higher in aluminium saturation index, K2O, TiO2, P2O5, Rb and Nb, and lower Na2O, Sr and Fe2O3, than the adjacent I-types, and are more reduced. They are also higher in Cr and Ni than comparable felsic I-types. Some signs of fractional crystallisation is evident in the most felsic S-type pluton, the Bugs Ridge Granite, which gives it some prospectivity for Sn mineralisation.

With the exception of the Mount Misery and Little Forest plutons, the I-type granites of the Wyangala Batholith, and those separated from it such as the Carcoar, Barry and Sunset Hills form a coherent suite, here called the Carcoar Suite. They are reduced I-types, and probably produced their coherent compositional variation by restite unmixing. They are therefore poor sources of mineralising fluids. The Little Forest Granite appears to have diverged from this suite by fractional crystallisation, as it is higher in Rb, Th , U, Ga, and lower in Sr, Ba, and light rare earth elements, but plots on curved extensions of the linear variations on Harker diagrams of the rest of the Carcoar Suite. The Mount Misery Granite is a separate suite unlike other I-types from BLAYNEY. It is the only pluton to show magma mixing and mingling features, and high accessory mineral content. It, like the Little Forest Granite is high in Rb, Th, U, Ga, and low in Sr and Ba, indicating some fractional crystallisation. It is, however, high in K2O,

TiO2, Zr, Nb, Y and light rare earth elements and does not plot on a curved extension of the Carcoar Suite on Harker diagrams.
The Carcoar Suite, like almost all I-type granites from the Lachlan Fold Belt, are strontium-depleted and yttrium-undepleted (Tarney et al., 1988) when plotted on mantle normalised multi-element diagrams (Wood et al., 1979), so were derived from partial melting of mafic to intermediate sources above the gabbro to eclogite transition.

MIDDLE CARBONIFEROUS PLUTONS

BATHURST BATHOLITH

The Bathurst Batholith is a large multiple intrusion of Middle Carboniferous age (Facer, 1979) that stretches from west of Bathurst to Hartley. Only a small area of the batholith in the southwest crops out in BLAYNEY, the bulk of which forms a pluton here called the Gresham Granite.

GRESHAM GRANITE (Cgg, Cgge)

Derivation of name. The name is derived from Gresham railway siding (GR 232827) east of Moorilda.

Distribution. The unit occurs in the northeast corner of the Blayney Sheet.

Type locality. The type locality is here given as GR 299817, where a coarsely porphyritic white granite is exposed in the road-cut on the Athol-Newbridge Road. Pale pink K-feldspar phenocrysts are up to 30×10mm, but plagioclase, quartz, hornblende and biotite also occur as phenocrysts around 5mm across. The groundmass is mostly less than 1mm grainsize.

Lithology, petrography and chemistry. The Gresham granite is, for the most part, poorly exposed and deeply weathered like other plutons of the Bathurst Batholith. Rare 'whaleback' exposures are present is some places, and a few pavements occur in creeks, but most of the undulating country is devoid of outcrop. The exception to this character is in two areas around GR 240820 and GR 255835, where the granite is made up of enclave-rich rocks. Here the enclave material is intruded by veins of porphyritic granite, and tor and pavement outcrops are common (image 30).

The Gresham Granite is an oxidised I-type granite which exhibits concentric zoning of crystallisation from rim to core as indicated by the aeromagnetic image. The absence of extensive outcrop precludes an assessment of this zoning, but it would be normally expected that compositions close to the margin are more mafic unless late stage fractions have escaped up the walls of the crystallising pluton. At the type locality the granite has a colour index of around 10, and magnetic susceptibility of 1500×10^{-5} SI units. Biotite is more abundant than green hornblende, and sphene is common forming euhedral lozenge-shaped crystals less than 1mm long. Accessory euhedral apatite and zircon form quite large crystal of around 0.2mm grainsize.

Further north, around Wimbledon, the granite is more equigranular (1-2mm) and more felsic, with relatively common accessory muscovite and no hornblende. Sphene, as elsewhere, is a common accessory.

In the area of enclave-rich material (image 31) it is common to find veins of porphyritic granite intruding rafts of enclaves (image 32). The enclaves are abundant in an area towards the centre of the pluton, and appear to correlate with an area of low radiometric response on the gamma-ray image. This zone of low response is over 2km across where outcrop is common, but the low extends northward for several kilometres to the edge of the Sheet area as a corridor about 400m wide. No outcrops have been found in this area, where it corresponds to sides of a prominent valley.

The enclaves in the Gresham Granite have a range of mineralogy, but all are plagioclase-hornblende-biotite rocks with colour indices above 20, and up to 50. They have a great range of magnetic susceptibilities from 50 to 5000 times 10^{-5} SI units, which do not appear to relate to any macroscopic differences. In thin section a common type is plagioclase-rich with biotite more abundant than hornblende. Others are hornblende and K-feldspar rich, with lesser plagioclase and biotite. It appears that hornblende + K-feldspar in some rocks give way to plagioclase + biotite in others. In the hornblende-rich samples clinopyroxene is present in the cores of some of the larger hornblende grains. Pink sphene is visible in hand specimen, and very common in thin section. The sphene is up to several millimetres across forming late interstitial grains in contrast to the euhedral sphene in the host granite. The abundance of opaques is proportional to the magnetic susceptibility. In most samples quartz is an abundant interstitial mineral, but in one hornblende-rich sample, K-feldspar (microcline) is the abundant interstitial mineral and quartz is uncommon. The K-feldspar forms pools up to 5mm across with inclusions of plagioclase, hornblende and biotite. Apatite is an abundant accessory, mostly as needles, but large prisms up to 2×1mm in one rock replace the needles so common in others. In another, both needles and smaller prisms are present.

Four enclaves have been analysed, two with high magnetic susceptibilities, and two with low magnetic susceptibilities. All are basaltic in composition in terms of SiO2, but have trace element contents unlike basalts, in that they have high abundances of large ion lithophyle elements and high field strength elements. All four samples have this character, and it is suspected that metasomatic processes introduced these elements into the enclave from the melt. The enclaves are almost as high in Rb, Ba, Th, U, and K2O as the host granite, and higher than the host granite in TiO2, P2O5, Sr, Nb, La, Ce, Nd, Zr and Y. The high rare earth element abundances are attributed to metasomatic sphene. The low magnetic susceptibility rocks have high mg numbers and high Cr and Ni, while the more magnetic rocks are the opposite, even though the total abundances of iron and magnesium are much the same. The difference is in the abundance of ferric iron only. The correlation of low ferric iron with high Cr and Ni could be a primary characteristic of the enclave that has survived through possible partial melting and metasomatic processes. It is suggested that these enclaves are parts of the source of the Gresham Granite that were dragged up from the zone of partial melting. The enclaves can therefore be regarded as restite, despite the fact that most of the Bathurst Batholith is probably free of restite, and developed compositional zoning by fractional crystallisation at relatively high temperatures.

Boundary relationships and contact metamorphic effects. The unit intrudes the Crudine Group and the Cunningham Formation. It is also in contact with the Bathurst Granite, and, judging by the shape of the boundary around GR 300867, near the country-rock re-entrant between the two plutons, appears to be cut by the Bathurst Granite. The granite is also cut by a less magnetic granite (Cl) to the north, based on an assessment of the aeromagnetic image. No outcrops of this granite are known, but it is inferred to be a fine grained leucogranite.

The Gresham Granite has imposed quite strong contact metamorphic effects on its surroundings, with hornfelsing up to 1km from the contact including the recrystallisation of all minerals into polygonal assemblages. This is in strong contrast to the relatively weak hornfelsing caused by granites from the Wyangala Batholith, where it is suspected that the magmas were restite-rich. These differences between restite-free and restite-rich granites have been pointed out elsewhere (Chappell et al., 1987).

BATHURST GRANITE (Cgba, Cgb)

The unit is defined in BATHURST.

Distribution. The unit crops out mainly in BATHURST and OBERON. In BLAYNEY it is confined to the extreme northeast corner of the Sheet area.

Lithology, petrography and chemistry. There are very few exposures of the Bathurst Granite, but those that do occur are mostly within a few hundred metres of the margin and are likely to be more mafic than the bulk of the central part of the intrusion. In BLAYNEY a coarse even grained granodiorite with colour index of 20 and magnetic susceptibility of 2500×10^{-5} SI units, from GR 299843, about 300m from the contact was sampled for geochemistry. Average grain-size is 2-4mm. Brownish green hornblende and chocolate brown biotite are about equal in abundance, and subhedral to euhedral sphene is common. The plagioclase is around An_{30} to An_{45}, and commonly shows intricate rhythmic zoning. The K-feldspar is weakly perthitic microcline, and myrmekite is common. Quartz has very weak undulose extinction. The granodiorite sample has 63.76% SiO2, and on multi-element mantle normalised plots it is very similar to the Gresham Granite, except slightly less fractionated. Slightly elevated strontium abundances and relatively low Y suggest that the Bathurst and Gresham Granites were derived by partial melting from the depth of the gabbro to eclogite transition, and thus from greater depths than the Silurian I-type granites.

Further north weathered granite in roadcuts contains K-feldspar phenocrysts, and the rock here is probably a biotite granite with little or no hornblende. A boundary between this biotite granite (mapped as Cbg) and the granodiorite (Cbga) to the south has been estimated based on the aeromagnetic image.

Boundary relationships. The unit intrudes the Bells Creek Volcanics and the Crudine Group. It is also in contact with the Gresham Granite, which it appears to intrude based on the shape of the boundary between the two intrusions near GR 300867.

MINOR INTRUSIONS (Cgo, Cg)

A body of hornblende gabbro about 300m across intrudes the Bells Creek Volcanics around GR 302820, adjacent to a major fault. It is thought to be related to the Bathurst Batholith. The gabbro was worked for dimension stone, and, according to a local farmer, quarrying occurred around 1917. A geochemical sample from the quarry at GR 304822 consists mostly of subhedral brown hornblende crystals around 5mm across with interstitial plagioclase and minor quartz and prismatic apatite. Opaques are rare, and the magnetic susceptibility is only 200×10^{-5} SI units. The sample has 47.14% SiO2, and is very similar in chemical composition to the Ben Bullen gabbro (Knutson & Flood, 1988).

A narrow elongate body of fine to medium grained granite (Cg) intrudes the Cunningham Formation immediately east of Newbridge. It strikes northwest and is about 1.5 km long. The granite is a biotite granite containing minor muscovite with colour index around 7. A sample from GR 202817 was analysed. It contains 70.98% SiO2 and is an I-type with high Na2O and Sr and low P2O5. The rock is virtually undeformed, and thought to be Carboniferous rather than Siluro-Devonian.

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SITEID	EASTING	NORTHIN	DLAT	DLONG	ORIG	ROCK	LITHNAME	STRAT	UNITNAME	DESCRIPTION	OTHERINFO	INFORMAL	AGE
					NO	TYPE		NO					
91844097	690200	6269500	33.69733	149.0522	49	14	quartzite	98	Adaminaby Group	foliated quartzite	cleav. postdates hornfels		Ordovician
91844098	690200	6269500	33.69733	149.0522	49	10	pelite	98	Adaminaby Group	meta-pelite	strike 045 dip 85NW		Ordovician
91844105	691700	6269800	33.69435	149.0683	49	10	psammite	98	Adaminaby Group	psammite	schist. strk 040dip75W		Ordovician
91844106	691700	6269800	33.69435	149.0683	49	10	pelite	98	Adaminaby Group	pelite	same loc. as 4105		Ordovician
91844109	692200	6269100	33.70057	149.0738	49	14	quartzite	98	Adaminaby Group	foliated quartzite	folds,plunge 60 to 010		Ordovician
91844117	694500	6267800	33.71187	149.0989	49	10	quartzite	98	Adaminaby Group	coarse orthoquartzite			Ordovician
91844122	694700	6270700	33.68569	149.1004	49	10	quartzite	98	Adaminaby Group	coarse orthoquartzite			Ordovician
91844152	700300	6266500	33.72251	149.1618	49	10	mudstone	98	Adaminaby Group	siliceous mudstone	sample for conodonts		Ordovician
91844155	712000	6261100	33.7689	149.2892	49	10	sandstone	98	Adaminaby Group	coarse? feldspathic sandstone	could be Silurian		Ordovician
92844394	699200	6258500	33.79482	149.1517	49	10	siltstone	98	Adaminaby Group				Ordovician
92844397	705600	6253600	33.83775	149.2219	49	10	siltstone	98	Adaminaby Group				Ordovician
92844398	704000	6250500	33.866	149.2054	49	10	siltstone	98	Adaminaby Group				Ordovician
92844399	700700	6246400	33.90359	149.1707	49	10	psammite	98	Adaminaby Group				Ordovician
92844420	698700	6260300	33.77869	149.1459	49	14	quartzite	98	Adaminaby Group				Ordovician
92840107	727000	6235900	33.99286	149.4576	115	10	greywacke	98	Adaminaby Group				Ordovician
92840123	726800	6246700	33.89559	149.4526	115	10	sandstone	98	Adaminaby Group				Ordovician
92844400	698600	6246000	33.90759	149.148	49	10	psammite	98	Adaminaby Group				Early Ordovician
92844481	706200	6244600	33.91875	149.2305	49	10	greywacke	98	Adaminaby Group				Early Ordovician
94844584a	697100	6254400	33.83216	149.1299	49	10	sandstone	98	Adaminaby Group				Early Ordovician
91844153	709400	6264200	33.74148	149.2605	49	2	granite	27704	Barry Granite	biotite granite			Silurian
91844266	705800	6256900	33.80797	149.2233	49	2	granite	27704	Barry Granite		mag sus 10		Silurian
92844395	706300	6256700	33.80968	149.2288	49	2	granite	27704	Barry Granite				Silurian
92844396	705800	6256900	33.80797	149.2233	49	2	granite	27704	Barry Granite				Silurian
92844419	705900	6255500	33.82057	149.2247	49	2	granite	27704	Barry Granite				Silurian
92844430	707200	6258200	33.79598	149.2381	49	2	granite	27704	Barry Granite				Silurian
90840020	706200	6269300	33.69614	149.2247	115	2	granodiorite	1218	Barry Granodiorite	medium grained granodiorite			Silurian
92844499	709600	6276000	33.63509	149.2598	49	16	gossan	1218	Barry Granodiorite				Silurian
LFB2183	711164	6274400	33.6492	149.2771	120	1		1218	Barry Granodiorite	7	I-type		
LFB2500	709800	6275800	33.63686	149.262	120	1		1218	Barry Granodiorite	15	I-type		
LFB483	707800	6276900	33.62733	149.2402	120	2	granite	1218	Barry Granodiorite		I-type		
LFB484	709800	6275800	33.63686	149.262	120	2	granite	1218	Barry Granodiorite		I-type		
LFB485	707298	6268300	33.70494	149.2368	120	2	granite	1218	Barry Granodiorite		I-type		
LFB486	708300	6276300	33.63264	149.2457	120	2	granite	1218	Barry Granodiorite		I-type		
92844471	696800	6242900	33.93587	149.1293	49	2	granite	29526	Bartletts Creek Granite				Silurian
91844237	729600	6283800	33.56068	149.4733	49	2	granodiorite	1244	Bathurst Granite	hornblende granodiorite	mag sus 1000		Carboniferous
91844258	729900	6284300	33.55611	149.4764	49	2	granodiorite	1244	Bathurst Granite	mafic hornblende granodiorite	ms 2500,chem		Carboniferous
79620326	729800	6281400	33.5814	149.4762	76	5	ignimbrite	24709	Bells Creek Volcanics		Photomicrograph		Silurian
92844467	690300	6236200	33.99745	149.0605	49	2	granite	1608	Bigga Granite				
LFB514	697200	6237000	33.98897	149.1349	120	2	granite	1608	Bigga Granite		S-type		
LFB516	693300	6239600	33.96626	149.0922	120	2	granite	1608	Bigga Granite		S-type		
LFB517	689000	6246700	33.90305	149.0441	120	2	granite	1608	Bigga Granite		S-type		
LFB522	691600	6251600	33.85841	149.0712	120	2	granite	1608	Bigga Granite		S-type		
LFB525	689400	6247500	33.89576	149.0483	120	2	granite	1608	Bigga Granite		S-type		
LFB527	688700	6238500	33.97701	149.0426	120	2	granite	1608	Bigga Granite		S-type		
79620310	716000	6283000	33.56997	149.3281	76	7	basalt	29501	Blayney Volcanics	pyroxene basalt			Ordovician
89840023	703100	6290000	33.51017	149.1866	115	7	basalt	29501	Blayney Volcanics		geochemistry		Late Ordovician
89840024	707600	6286200	33.54356	149.2359	115	7	basalt	29501	Blayney Volcanics				Late Ordovician
89840025	706900	6284600	33.55811	149.2287	115	7	basalt	29501	Blayney Volcanics				Late Ordovician
89840026	707100	6287900	33.52833	149.2301	115	7	basalt	29501	Blayney Volcanics				Late Ordovician
89840027	711200	6284300	33.55997	149.2751	115	7	basalt	29501	Blayney Volcanics				Late Ordovician
89840032	717300	6286900	33.53532	149.3401	115	7	basalt	29501	Blayney Volcanics				Late Ordovician
89840035	704500	6274000	33.65411	149.2053	115	7	basalt	29501	Blayney Volcanics				Late Ordovician

89840036	711300	6275900	33.63566	149.2782	115	7	basalt	29501	Blayney Volcanics				Late Ordovician
89840037	715800	6280200	33.596	149.3256	115	7	basalt	29501	Blayney Volcanics				Late Ordovician
90840001	706400	6288900	33.51945	149.2224	115	7	basalt	29501	Blayney Volcanics		geochemistry		Late Ordovician
90840003	706000	6276200	33.63399	149.221	115	7	basalt	29501	Blayney Volcanics		geochemistry		Late Ordovician
90840004	713000	6272403	33.66683	149.2973	115	7	basalt	29501	Blayney Volcanics		geochemistry		Late Ordovician
90840009	712100	6279700	33.60125	149.2859	115	7	basalt	29501	Blayney Volcanics				Late Ordovician
90844002	700100	6288200	33.52696	149.1547	49	7	basalt	29501	Blayney Volcanics	metabasalt	20m N of 90844001		Ordovician
90844003	700200	6288200	33.52694	149.1558	49	4	basalt	29501	Blayney Volcanics	metabasalt	dyke intrudes lmstone		Ordovician
91844230	715900	6281000	33.58877	149.3265	49	7	basalt	29501	Blayney Volcanics	fragmental basalt	mag sus 50		Ordovician
91844231	718000	6281200	33.58654	149.3491	49	7	basalt	29501	Blayney Volcanics	pale sheared basalt	mag sus 50		Ordovician
91844234	717800	6284000	33.56135	149.3462	49	7	basalt	29501	Blayney Volcanics	pyroxene basalt	mag sus 40		Ordovician
91844243	712700	6286000	33.54435	149.2908	49	7	basalt	29501	Blayney Volcanics	amygdaloidal basalt	mag sus 80		Ordovician
91844244	712700	6286000	33.54435	149.2908	49	7	basalt	29501	Blayney Volcanics	pyroxene basalt	ms 100 - chem		Ordovician
91844245	715900	6285900	33.54461	149.3253	49	7	basalt	29501	Blayney Volcanics	pyroxene basalt	mag sus 60		Ordovician
91844246	717400	6286700	33.5371	149.3413	49	7	basalt	29501	Blayney Volcanics	pyroxene basalt	ms 60		Ordovician
91844307	717400	6278200	33.6137	149.3433	49	7	basalt	29501	Blayney Volcanics	pyroxene basalt	mag sus 50		Ordovician
92844492	715300	6271600	33.67361	149.3223	49	7	basalt	29501	Blayney Volcanics				
92844495	714500	6272600	33.66476	149.3134	49	7	basalt	29501	Blayney Volcanics				
92840014	717900	6242500	33.93531	149.3575	115	7	spilite	29583	Box Ridge Volcanics				Silurian
92840108	718300	6239100	33.96587	149.3627	115	7	spilite	29583	Box Ridge Volcanics				Silurian
92840109	712400	6239200	33.96618	149.2989	115	7	spilite	29583	Box Ridge Volcanics				Silurian
92840110	712500	6239200	33.96616	149.2999	115	7	spilite	29583	Box Ridge Volcanics	keratophyre			Silurian
92840111	710700	6238800	33.97012	149.2806	115	7	spilite	29583	Box Ridge Volcanics				Silurian
92840114	711100	6239200	33.96644	149.2848	115	7	breccia	29583	Box Ridge Volcanics	keratophyre breccia			Silurian
92844380	712427	6242876	33.93304	149.2982	49	7	basalt	29583	Box Ridge Volcanics				Silurian
92844381	712300	6242800	33.93375	149.2969	49	4	dolerite	29583	Box Ridge Volcanics				Silurian
92844408	712800	6261100	33.76874	149.2979	49	7	basalt	29583	Box Ridge Volcanics				Silurian
92844411	713900	6263800	33.74418	149.3091	49	14	schist	29583	Box Ridge Volcanics				Silurian
92844437	712800	6248400	33.88319	149.3009	49	7	basalt	29583	Box Ridge Volcanics				Silurian
91844124	698400	6263700	33.7481	149.1419	49	2	granite	2835	Bugs Ridge Granite	foliated leucogranite	slight foliation		Ordovician
92844390	697300	6259200	33.78886	149.131	49	2	leucogranite	2835	Bugs Ridge Granite				
92844391	696462	6258997	33.79085	149.122	49	2	granite	2835	Bugs Ridge Granite				
92844422	698000	6261000	33.77251	149.1382	49	2	granite	2835	Bugs Ridge Granite				
92840006	715200	6241600	33.75162	149.4831	115	7	andesite	29507	Bushranger Volcanics				Early Devonian
92840007	719400	6262300	33.75658	149.3688	115	10	sandstone	29507	Bushranger Volcanics	dacitic sandstone			Late Silurian
92840008	713200	6249300	33.875	149.3051	115	7	andesite	29507	Bushranger Volcanics				Early Devonian
92844382	714723	6245399	33.90984	149.3225	49	4	dolerite	29507	Bushranger Volcanics				
91844154	712000	6261100	33.7689	149.2892	49	10	sandstone	3425	Campbells Formation	feldspathic sandstone	chem		Late Silurian
92840105	729000	6239400	33.96089	149.4783	115	10	sandstone	3425	Campbells Formation				Late Silurian
92840113	709900	6238800	33.97028	149.2719	115	14	slate	3425	Campbells Formation				Late Silurian
92840138	726700	6255500	33.81631	149.4493	115	10	sandstone	3425	Campbells Formation	feldspathic sandstone			Late Silurian
92840139	726200	6254300	33.82723	149.4442	115	10	siltstone	3425	Campbells Formation				Late Silurian
92840140	718500	6243700	33.92437	149.3637	115	14	marble	3425	Campbells Formation				Late Silurian
92840146	724700	6255300	33.81854	149.4278	115	11	limestone	3425	Campbells Formation	nodular limestone			Late Silurian
90844059	700200	6285800	33.54857	149.1563	49	2	granite	3588	Carcoar Granodiorite	hornblende biotite granite	mag sus 20		Silurian
79620311	701800	6286400	33.54212	149.1737	76	2	tonalite	3588	Carcoar Granodiorite				Silurian
90844001	700100	6288200	33.52696	149.1547	49	3	quartz diorite	3588	Carcoar Granodiorite		Brown's Ck open cut	Longhill Diorite	Ordovician
92844514	707600	6289400	33.51472	149.2352	49	15		3588	Carcoar Granodiorite	quartz-tourmaline vein			Silurian
LFB2499	704600	6279000	33.60903	149.2053	120	1		3588	Carcoar Granodiorite	15	I-type		Silurian
LFB481	707800	6279400	33.6048	149.2396	120	2	granite	3588	Carcoar Granodiorite		I-type		Silurian
LFB482	704600	6279000	33.60903	149.2053	120	2	granite	3588	Carcoar Granodiorite		I-type		Silurian
87840094	702300	6277700	33.62118	149.1808	49	7	rock	4594	Coombing Formation				Ordovician
89840010	702400	6277600	33.62207	149.1819	115	7	basalt	4594	Coombing Formation	metabasalt			Ordovician
89840011	703200	6278200	33.61651	149.1904	115	7	basalt	4594	Coombing Formation	metabasalt			Ordovician

89840015	698000	6274100	33.65444	149.1353	115	7	basalt	4594	Coombing Formation				Ordovician
89840016	701600	6273800	33.65647	149.1741	115	11	chert	4594	Coombing Formation				Ordovician
89840017	700800	6274700	33.64851	149.1653	115	7	basalt	4594	Coombing Formation				Ordovician
90844004	702300	6277600	33.62208	149.1808	49	10	greywacke	4594	Coombing Formation		Carcoar Dam, E side		Ordovician
90844005	702300	6277600	33.62208	149.1808	49	7	basalt	4594	Coombing Formation		Carcoar Dam, E sidel		Ordovician
91844091	688900	6271100	33.68314	149.0378	49	10	mudstone	4594	Coombing Formation	fine tuffaceous mudstone	strike 060 dip 28NW		Ordovician
91844096	690400	6270400	33.68918	149.0541	49	10	sandstone	4594	Coombing Formation	fine feldspathic sandstone			Ordovician
91844099	689600	6269900	33.69383	149.0456	49	10	sandstone	4594	Coombing Formation	feldspathic sandstone			Ordovician
91844100	689300	6270000	33.69298	149.0424	49	14	hornfels	4594	Coombing Formation	hornfelsed volcaniclastic	spotted,strk110dip17N		Ordovician
91844101	687800	6273100	33.6653	149.0255	49	10	rock	4594	Coombing Formation	mafic volcaniclastic	mudstone clasts to 2cm		Ordovician
91844107	693200	6271300	33.68056	149.0841	49	10	turbidite	4594	Coombing Formation	thin feldspathic turbidite	PHOTOS		Ordovician
91844108	693200	6271300	33.68056	149.0841	49	10	turbidite	4594	Coombing Formation	feldspathic turbidite	strk020,dip85WyoungW		Ordovician
91844138	697600	6271600	33.67705	149.1315	49	10	sandstone	4594	Coombing Formation	silicified feldspathic sandstone			Ordovician
91844139	697600	6271700	33.67614	149.1315	49	7	basalt	4594	Coombing Formation	pyroxene basalt	a sill		Ordovician
91844146	694700	6266900	33.71994	149.1013	49	10	rock	4594	Coombing Formation	sheared volcaniclastic	close to Gallimont Fault		Ordovician
92840141	706800	6247300	33.89429	149.2364	115	10	siltstone	4594	Coombing Formation				Ordovician
92840142	707900	6247700	33.89047	149.2482	115	10	chert	4594	Coombing Formation	carbonaceous chert			Ordovician
92840143	708000	6247700	33.89045	149.2492	115	7	basalt	4594	Coombing Formation				Ordovician
92840149	711800	6257900	33.79778	149.2879	115	7	basalt	4594	Coombing Formation	altered basalt			Ordovician
92844425	710800	6257900	33.79798	149.2771	49	14	quartzite	4594	Coombing Formation				
92844426	708500	6258400	33.79393	149.2521	49	14	schist	4594	Coombing Formation				
92844427	708200	6259400	33.78497	149.2486	49	5	rhyolite	4594	Coombing Formation				
92844428	707100	6259300	33.78609	149.2368	49	14	schist	4594	Coombing Formation				
92840011	717500	6249900	33.86871	149.3514	115	10	sandstone	4970	Crudine Group	feldspathic sandstone			Late Silurian
92840015	721400	6259600	33.78049	149.3911	115	10	sandstone	4970	Crudine Group	feldspathic sandstone			Late Silurian
92840120	716100	6241500	33.9447	149.3383	115	10	sandstone	4970	Crudine Group	feldspathic sandstone			Late Silurian
92840145	716200	6252800	33.84284	149.3366	115	10	sandstone	4970	Crudine Group	feldspathic sandstone			Late Silurian
92840148	727300	6256200	33.80988	149.4556	115	10	sandstone	4970	Crudine Group	feldspathic sandstone			Late Silurian
92840150	726800	6261200	33.76493	149.4489	115	10	sandstone	4970	Crudine Group	feldspathic sandstone			Late Silurian
79620309	721200	6283100	33.56837	149.3836	76	14	quartzite		Cunningham Formation	micaceous garnet quartzite			Middle Silurian
91844232	719800	6283300	33.56725	149.3679	49	10	greywacke		Cunningham Formation	quartz greywacke	mag sus 10		Silurian
91844233	719800	6283300	33.56725	149.3679	49	10	siltstone		Cunningham Formation				Silurian
92840103	730100	6237900	33.97416	149.4906	115	10	sandstone	5806	Dunchurch Formation	dacitic sandstone			Late Silurian
92840104	730800	6239400	33.96049	149.4978	115	10	sandstone	5806	Dunchurch Formation	dacitic sandstone			Late Silurian
91844149	691800	6285000	33.55733	149.0661	49	3	monzonite	29585	Errowan Monzonite	micromonzonite	ms 3000,chem		Ordovician
91844215	688300	6288200	33.52911	149.0277	49	3	monzonite	29585	Errowan Monzonite	hornblende monzonite	ms 6000,chem		Ordovician
92844466	691200	6285800	33.55022	149.0595	49	2	monzonite	29585	Errowan Monzonite				
90840008	707700	6277800	33.61924	149.2389	115	3	monzonite	29586	Fernside Monzodiorite				Ordovician
90840018	706700	6276200	33.65891	149.1375	115	3	monzonite	29586	Fernside Monzodiorite				Ordovician
92844510	707900	6278100	33.6165	149.241	49	3	monzonite	29586	Fernside Monzodiorite				Ordovician
79620312	696700	6283800	33.56718	149.1196	76	6	andesite	6819	Forest Reefs Volcanics				Ordovician
87840010	685800	6280100	33.60256	149.0025	49	7	rock	6819	Forest Reefs Volcanics			Burnt Yard Basalt	Ordovician
89840031	689900	6285600	33.55226	149.0455	115	6	andesite	6819	Forest Reefs Volcanics	hornblende andesite			Late Ordovician
89840034	689400	6285000	33.55776	149.0403	115	3	andesite	6819	Forest Reefs Volcanics	hornblende andesite	geochemistry		Ordovician
90844072	696848	6282600	33.57804	149.121	49	7	basalt	6819	Forest Reefs Volcanics	aphyric basalt	ms 2000 - chem		Ordovician
90844078	696900	6283200	33.57262	149.1214	49	10	rock	6819	Forest Reefs Volcanics	volcaniclastic	ms 2000		Ordovician
90844079	696600	6283600	33.56907	149.1181	49	7	basalt	6819	Forest Reefs Volcanics	amygdaloidal basalt	weak feldspar phyric		Ordovician
90844080	695900	6283300	33.57191	149.1106	49	10	rock	6819	Forest Reefs Volcanics	cherty volcaniclastic	strike080dip40NfacesN		Ordovician
91844150	691800	6285000	33.55733	149.0661	49	7	basalt	6819	Forest Reefs Volcanics	pyroxene basalt	mag sus 5000		Ordovician
91844151	685700	6280100	33.60258	149.0014	49	7	basalt	6819	Forest Reefs Volcanics	plag-pyroxene basalt	ms 4000 - chem		Ordovician
91844157	691900	6284900	33.55821	149.0672	49	7	basalt	6819	Forest Reefs Volcanics	pyroxene basalt	mag sus 60 - breccia		Ordovician
91844167	692400	6284708	33.55985	149.0726	49	6	trachyte	6819	Forest Reefs Volcanics	trachyte	ms 6000 - chem	Nullawonga Trachyte	Ordovician
91844169	692900	6284600	33.56073	149.078	49	6	trachyte	6819	Forest Reefs Volcanics	trachyte	ms 5000 - chem	Nullawonga Trachyte	Ordovician
91844175	693400	6282300	33.58138	149.0839	49	7	basalt	6819	Forest Reefs Volcanics	pyroxene basalt	mag sus 5000		Ordovician

91844178	692800	6283100	33.57427	149.0773	49	7	basalt	6819	Forest Reefs Volcanics	hornblende basalt	mag sus 4000		Ordovician
91844180	695300	6284900	33.55759	149.1038	49	6	trachyte	6819	Forest Reefs Volcanics	trachyte	ms 4500 - chem	Nullawonga Trachyte	Ordovician
91844182	696000	6285100	33.55566	149.1113	49	10	sandstone	6819	Forest Reefs Volcanics	coarse volcanic sandstone			Ordovician
91844192	687000	6285200	33.55638	149.0144	49	7	basalt	6819	Forest Reefs Volcanics	pyroxene basalt	ms 60 chem	Burnt Yard Basalt	Ordovician
91844194	686300	6285400	33.5547	149.0068	49	7	basalt	6819	Forest Reefs Volcanics	pyroxene basalt	ms 6000 chem	Burnt Yard Basalt	Ordovician
91844197	686500	6281700	33.58801	149.0097	49	7	basalt	6819	Forest Reefs Volcanics	plagioclase basalt	ms 15000 chem	Burnt Yard Basalt	Ordovician
91844216	686100	6285000	33.55834	149.0047	49	7	basalt	6819	Forest Reefs Volcanics	pyroxene hornblende basalt	ms 5000 chem		Ordovician
91844219	687600	6289600	33.51661	149.0199	49	7	basalt	6819	Forest Reefs Volcanics	plagioclase basalt	ms 3500 chem		Ordovician
91844341	690086	6288967	33.52188	149.0468	49	7	basalt	6819	Forest Reefs Volcanics	plagioclase phyric basalt	ms 3000 - chem		Ordovician
91844342	690300	6288800	33.52334	149.0491	49	7	basalt	6819	Forest Reefs Volcanics	plagioclase phyric basalt	mag sus 1500		Ordovician
91844343	690500	6288800	33.52331	149.0513	49	7	basalt	6819	Forest Reefs Volcanics		mag sus 3000		Ordovician
91844344	690700	6288500	33.52598	149.0535	49	7	basalt	6819	Forest Reefs Volcanics	albitized basalt	mag sus 250		Ordovician
91844345	691600	6288600	33.52491	149.0632	49	7	basalt	6819	Forest Reefs Volcanics	epidotized basalt	mag sus 20		Ordovician
91844346	692200	6288400	33.52661	149.0697	49	6	trachyte	6819	Forest Reefs Volcanics	trachyte?	ms 5000 - chem	Nullawonga Trachyte	Ordovician
91844348	690200	6287200	33.53778	149.0484	49	7	basalt	6819	Forest Reefs Volcanics	altered basalt?	mag sus 4000		Ordovician
91844361	695200	6281800	33.58555	149.1034	49	7	basalt	6819	Forest Reefs Volcanics	basaltic breccia	ms 40 - chem		Ordovician
91844362	696100	6281600	33.58719	149.1131	49	10	basalt	6819	Forest Reefs Volcanics	polymict basaltic breccia	mag sus 600		Ordovician
91844363	691200	6290400	33.50876	149.0585	49	7	basalt	6819	Forest Reefs Volcanics	epidotized basaltic breccia	mag sus 20		Ordovician
92844442	693700	6287800	33.53175	149.0859	49	6	trachyte	6819	Forest Reefs Volcanics	epidotized trachyte		Nullawonga Trachyte	Ordovician
92844508	694200	6283300	33.57222	149.0923	49	15	greisen	6819	Forest Reefs Volcanics	greisen			Ordovician
93844546	690100	6290600	33.50715	149.0466	49	6	latite	6819	Forest Reefs Volcanics		mag sus 20		
93844547	690100	6290650	33.5067	149.0466	49	6	latite	6819	Forest Reefs Volcanics	porphyritic latite	mag sus 40		Ordovician
93844548	690100	6290700	33.50625	149.0466	49	6	latite	6819	Forest Reefs Volcanics	pink porphyritic latite	mag sus 200		Ordovician
93844549	690150	6290750	33.50579	149.0471	49	10	sandstone	6819	Forest Reefs Volcanics	volcaniclastic sandstone	mag sus 20		
93844550	689600	6290650	33.50679	149.0412	49	7	breccia	6819	Forest Reefs Volcanics	mafic volcanic breccia	mag sus 40		Ordovician
93844551	689500	6290850	33.50501	149.0401	49	7	breccia	6819	Forest Reefs Volcanics	basaltic breccia	mag sus 2000		Ordovician
93844552	689550	6291100	33.50275	149.0406	49	7	basalt	6819	Forest Reefs Volcanics	epidotised basalt	mag sus 120		Ordovician
91844313	729800	6269600	33.68859	149.4791	49	10	rock	23600	Fosters Creek Conglomerate	volcaniclastic	ms 1500 - congl.		Silurian
92840131	722800	6254000	33.83066	149.4076	115	10	sandstone	23600	Fosters Creek Conglomerate				Late Silurian
92840132	722800	6254200	33.82886	149.4075	115	10	sandstone	23600	Fosters Creek Conglomerate				Late Silurian
92840134	722600	6255100	33.82079	149.4051	115	14	quartzite	23600	Fosters Creek Conglomerate				Late Silurian
92840137	731000	6258300	33.79015	149.495	115	10	sandstone	23600	Fosters Creek Conglomerate	quartz sandstone			Late Silurian
BLMS0001	709300	6270700	33.68292	149.2578	234	1		23600	Fosters Creek Conglomerate	albite tremolite rock	clasts in congl.		
91844110	692000	6267400	33.71593	149.072	49	2	granodiorite	21833	Garland Granodiorite	hornblende granodiorite	enclaves str105dip45S		Silurian
91844229	688400	6261900	33.76615	149.0344	49	2	granodiorite	21833	Garland Granodiorite		mag sus 15		Silurian
LFB558	692200	6263600	33.75014	149.075	120	2	granite	21833	Garland Granodiorite		I-type		
LFB559	687400	6265800	33.73117	149.0228	120	2	granite	21833	Garland Granodiorite		I-type		
LFB562	687100	6261000	33.77449	149.0205	120	2	granite	21833	Garland Granodiorite		I-type		
91844177	693100	6282000	33.58413	149.0807	49	3	syenite	21854	Glen Ayr Syenite	syenite	ms1500,chem		Ordovician
91844353	694300	6280200	33.60014	149.0941	49	3	monzonite	21854	Glen Ayr Syenite		ms 4500 - chem		Ordovician
91844354	694300	6280100	33.60104	149.0941	49	3	monzonite	21854	Glen Ayr Syenite	coarse biotite monzonite	ms 3000		Ordovician
91844357	696100	6278600	33.61423	149.1138	49	3	monzonite	21854	Glen Ayr Syenite		mag sus 1000		Ordovician
91844360	694900	6280600	33.59642	149.1004	49	9	syenite	21854	Glen Ayr Syenite	monzosyenite	ms 3000 -chem		Ordovician
87840009	685700	6281600	33.58905	149.0011	49	3	rock	29584	Glendale Quartz Monzonite				Ordovician
91844242	722900	6281700	33.58102	149.4017	49	2	granite	21911	Gresham Granite	porphyritic granite	ms 1500,chem		Carboniferous
91844252	725900	6283600	33.56327	149.4335	49	3		21911	Gresham Granite	mafic schlieren	mag sus 600		Carboniferous
91844253	725500	6283700	33.56245	149.4292	49	3		21911	Gresham Granite	mafic schlieren	ms 60 - chem		Carboniferous
91844254	725000	6283200	33.56707	149.4239	49	4	gabbro	21911	Gresham Granite	hornblende gabbro	mag sus 40		Carboniferous
91844255	725300	6284800	33.55258	149.4267	49	2	granite	21911	Gresham Granite	leucogranite	ms 600 - chem		Carboniferous
91844272	724100	6282000	33.57807	149.4145	49	3	diorite	21911	Gresham Granite	dioritic schlieren	ms 3500 - chem		Carboniferous
91844273	724500	6282000	33.57798	149.4188	49	3	diorite	21911	Gresham Granite	biotite dioritic enclave	ms 60,chem,PHOTO		Carboniferous
91844274	723500	6282100	33.57729	149.408	49	4		21911	Gresham Granite	enclave	ms 4000,chem,PHOTO		Carboniferous
LFB25	723000	6281900	33.5792	149.4027	120	2	granite	21911	Gresham Granite		I-type		Carboniferous
92840009	719500	6251600	33.85298	149.3725	115	5	dacite	9206	Kangaloolah Volcanics				Silurian

92840010	707700	6244300	33.92115	149.2468	115	5	rhyolite	9206	Kangaloolah Volcanics				Silurian
92840012	708900	6246400	33.90199	149.2593	115	5	dacite	9206	Kangaloolah Volcanics				Silurian
92840013	719900	6245200	33.91057	149.3785	115	5	rhyolite	9206	Kangaloolah Volcanics				Silurian
92840100	723800	6236200	33.99084	149.4229	115	5	dacite	9206	Kangaloolah Volcanics		geochemistry		Silurian
92840101	723500	6235800	33.99451	149.4198	115	5	dacite	9206	Kangaloolah Volcanics		geochemistry		Silurian
92840102	722900	6236500	33.98833	149.4131	115	11	limestone	9206	Kangaloolah Volcanics				Silurian
92840106	728500	6237500	33.97812	149.4734	115	5	dacite	9206	Kangaloolah Volcanics				Silurian
92840119	722600	6242500	33.93433	149.4083	115	11	limestone	9206	Kangaloolah Volcanics				Silurian
92840122	721000	6244700	33.91484	149.3905	115	5	dacite	9206	Kangaloolah Volcanics				Silurian
92840129	710500	6250200	33.86743	149.2757	115	10	siltstone	9206	Kangaloolah Volcanics	tuffaceous siltstone			Silurian
92840130	711400	6249200	33.87626	149.2856	115	10	sandstone	9206	Kangaloolah Volcanics	dacitic sandstone			Silurian
92840136	723600	6254600	33.82508	149.4161	115	5	dacite	9206	Kangaloolah Volcanics	metadacite			Silurian
92840151	711800	6252500	33.84644	149.2892	115	5	porphyry	9206	Kangaloolah Volcanics	feldspar porphyry			Silurian
92840152	710300	6254800	33.82601	149.2724	115	5	porphyry	9206	Kangaloolah Volcanics				Silurian
92844385	711900	6248300	33.88427	149.2912	49	5	dacite	9206	Kangaloolah Volcanics				Silurian
91844264	708200	6256100	33.81471	149.2494	49	2	granodiorite	29941	Kempfield Granodiorite	fine granodiorite	mag sus 25 - geochem		Silurian
91844265	708300	6256200	33.81379	149.2505	49	2	granodiorite	29941	Kempfield Granodiorite	fine granodiorite	mag sus 25 - geochem		Silurian
LFB2098	694400	6260600	33.77678	149.0994	120	1		29591	Little Forest Granite				
LFB2099	695000	6261600	33.76766	149.1057	120	1		29591	Little Forest Granite				
91844315	716100	6279300	33.60405	149.3291	49	3	diorite	22380	Moorilda Monzonite	fine grained diorite	mag sus 60 - geochem		Ordovician
92844416	715200	6278300	33.61325	149.3196	49	3	monzonite	22380	Moorilda Monzonite				
92844417	715200	6278000	33.61595	149.3197	49	3	monzonite	22380	Moorilda Monzonite	altered monzonite			Ordovician
92844418	716200	6278600	33.61034	149.3303	49	4	monzonite	22380	Moorilda Monzonite	meta monzonite			Ordovician
92844446	686400	6250200	33.87196	149.0153	49	2	granite	12933	Mount Misery Granite				
92844447	686400	6250100	33.87286	149.0153	49	2	granite	12933	Mount Misery Granite				
92844448	686400	6250100	33.87286	149.0153	49	2	granite	12933	Mount Misery Granite				
92844449	686300	6250000	33.87378	149.0142	49	2	granite	12933	Mount Misery Granite				
92844450	686200	6249800	33.8756	149.0132	49	2	granite	12933	Mount Misery Granite				
92844451	686300	6249900	33.87468	149.0143	49	2	granite	12933	Mount Misery Granite				
LFB568	685100	6250200	33.87219	149.0012	120	2	granite	12933	Mount Misery Granite		S-type		
LFB569	686300	6251800	33.85756	149.0139	120	2	granite	12933	Mount Misery Granite		S-type		
LFB570	685500	6254200	33.83607	149.0047	120	2	granite	12933	Mount Misery Granite		S-type		
87840101	690300	6277200	33.6279	149.0516	49	7	rock	13034	Mount Pleasant Basalt				
87840102	690800	6278500	33.6161	149.0567	49	7	rock	13034	Mount Pleasant Basalt				
90844063	698300	6284300	33.56245	149.1362	49	7	basalt	13034	Mount Pleasant Basalt	pyroxene basalt	mag sus 100		Ordovician
90844064	698300	6284600	33.55974	149.1362	49	7	basalt	13034	Mount Pleasant Basalt	feldspar-phyric basalt	mag sus 100		Ordovician
90844065	698100	6283800	33.56699	149.1342	49	7	basalt	13034	Mount Pleasant Basalt	altered feldspar-phyric basalt			Ordovician
90844066	698300	6285100	33.55524	149.136	49	7	basalt	13034	Mount Pleasant Basalt	hornblende-feldspar basalt	chem,photo of phenos		Ordovician
90844071	696800	6278300	33.61681	149.1214	49	7	basalt	13034	Mount Pleasant Basalt	sheared basalt			Ordovician
90844076	698000	6283500	33.56972	149.1332	49	7	basalt	13034	Mount Pleasant Basalt	feldspar-phyric basalt	mag sus 60 - geochem		Ordovician
91844104	686300	6273700	33.66016	149.0092	49	7	basalt	13034	Mount Pleasant Basalt	crystal-rich basalt	pillow lava,photo,chem		Ordovician
91844226	688500	6274400	33.65346	149.0328	49	7	basalt	13034	Mount Pleasant Basalt	hornblende? basalt?	mag sus 80		Ordovician
91844277	687900	6277600	33.62472	149.0257	49	7	basalt	13034	Mount Pleasant Basalt	basalt breccia	mag sus 100		Ordovician
91844278	688800	6277800	33.62276	149.0353	49	7	basalt	13034	Mount Pleasant Basalt	plagioclase-pyroxene basalt	mag sus 700 - chem		Ordovician
91844284	688900	6276800	33.63176	149.0366	49	7	basalt	13034	Mount Pleasant Basalt	plagioclase-pyroxene basalt	ms600,chem,type loc		Ordovician
91844285	687900	6276300	33.63644	149.0259	49	7	basalt	13034	Mount Pleasant Basalt	plagioclase-pyroxene basalt	mag sus 800		Ordovician
91844286	687400	6275800	33.64104	149.0207	49	7	basalt	13034	Mount Pleasant Basalt	plagioclase-pyroxene basalt	mag sus 1000,chem		Ordovician
91844356	693700	6278500	33.61557	149.088	49	7	basalt	13034	Mount Pleasant Basalt		mag sus 400, chem		Ordovician
91844358	695100	6278600	33.61442	149.103	49	7	basalt	13034	Mount Pleasant Basalt		mag sus 60		Ordovician
91844359	696600	6280300	33.59882	149.1188	49	7	basalt	13034	Mount Pleasant Basalt		mag sus 4000		Ordovician
79620329	731400	6268500	33.69808	149.4971	76	7	basalt	16213	Rockley Volcanics	altered basalt			Ordovician
91844271	729600	6277300	33.61925	149.475	49	7	porphyry	16213	Rockley Volcanics	pyroxene porphyry breccia	mag sus 50 - PHOTOS		Ordovician
91844309	729900	6270500	33.68046	149.4799	49	12	schist	16213	Rockley Volcanics	actinolite schist	mag sus 3000 - chem		Ordovician
91844310	730500	6263500	33.74341	149.4882	49	8		16213	Rockley Volcanics	ultramafic breccia	ms 3000,photos		Ordovician

91844311	730500	6263500	33.74341	149.4882	49	8		16213	Rockley Volcanics	ultramafic breccia	mag sus 10000		Ordovician
91844312	730400	6269600	33.68846	149.4856	49	8		16213	Rockley Volcanics	sheared ultramafic?	ms variable 3000-6000		Ordovician
91844316	731200	6270400	33.68108	149.494	49	17		16213	Rockley Volcanics	weathered ultramafic	mag sus 8000	Dunns Plain Ultramafic	Ordovician
91844317	731400	6269600	33.68824	149.4963	49	12	rock	16213	Rockley Volcanics		mag sus 4000 - chem		Ordovician
91844318	731200	6269700	33.68739	149.4942	49	12	rock	16213	Rockley Volcanics		mag sus 3000		Ordovician
91844319	731100	6269700	33.68741	149.4931	49	12	rock	16213	Rockley Volcanics		mag sus 70 - chem		Ordovician
91844320	731000	6270100	33.68383	149.4919	49	8	rock	16213	Rockley Volcanics	slightly weathered ultramafic	mag sus 8000 - chem	Dunns Plain Ultramafic	Ordovician
91844323	730000	6268000	33.70297	149.4817	49	7		16213	Rockley Volcanics	mafic breccia	mag sus 1200 - photo		Ordovician
91844324	729900	6267800	33.70479	149.4806	49	7		16213	Rockley Volcanics	mafic breccia	mag sus 4000		Ordovician
91844325	731400	6268600	33.69725	149.4966	49	12	schist	16213	Rockley Volcanics	mafic/ultramafic schist	mag sus 4000 - chem		Ordovician
91844328	731700	6268100	33.70169	149.5	49	12	schist	16213	Rockley Volcanics	mafic schist	mag sus 40		Ordovician
91844330	731100	6272100	33.66578	149.4925	49	7	basalt	16213	Rockley Volcanics	clinopyroxene basalt	mag sus 40 - chem		Ordovician
91844331	730100	6272300	33.6642	149.4816	49	3	monzonite	16213	Rockley Volcanics	hornblende monzonite	mag sus 2000 - chem	Dunns Plain Ultramafic	Ordovician
91844332	729900	6272700	33.66064	149.4794	49	8	wehrlite	16213	Rockley Volcanics	weathered wehrlite?	mag sus 20	Dunns Plain Ultramafic	Ordovician
91844333	729900	6272700	33.66064	149.4794	49	8	wehrlite	16213	Rockley Volcanics	weathered wehrlite?	mag sus 800	Dunns Plain Ultramafic	Ordovician
91844335	730300	6274100	33.64793	149.4833	49	12	schist	16213	Rockley Volcanics	tremolite schist	mag sus 40		Ordovician
91844336	731500	6273600	33.65218	149.4964	49	8	rock	16213	Rockley Volcanics		mag sus 400 - chem		Ordovician
91844337	731600	6272800	33.65937	149.4977	49	12	schist	16213	Rockley Volcanics	actinolite schist	mag sus 30		Ordovician
91844338	731400	6271500	33.67112	149.4959	49	7	basalt	16213	Rockley Volcanics	clinopyroxene basalt	ms 40,like 4330,chem		Ordovician
91844339	730600	6271500	33.6713	149.4872	49	8	dunite	16213	Rockley Volcanics	serpentinized dunite	ms 15000 - chem	Dunns Plain Ultramafic	Ordovician
91844340	730100	6270800	33.67771	149.482	49	17		16213	Rockley Volcanics	weathered ultramafic	mag sus 200	Dunns Plain Ultramafic	Ordovician
92840005	730000	6262600	33.75162	149.4831	115	7	basalt	16213	Rockley Volcanics	metabasalt			Ordovician
92844370	728600	6247600	33.88709	149.4719	49	14	schist	16213	Rockley Volcanics				Ordovician
92844371	728500	6247800	33.88531	149.4707	49	14	schist	16213	Rockley Volcanics				Ordovician
92844482	729600	6262300			49	7	amphibolite	16213	Rockley Volcanics				
92844483	729600	6262600	33.75171	149.4788	49	14	schist	16213	Rockley Volcanics				Ordovician
92844484	730100	6263200	33.7462	149.484	49	10	conglomerate	16213	Rockley Volcanics				Ordovician
92844485	729900	6264200	33.73723	149.4816	49	3	wehrlite	16213	Rockley Volcanics				Ordovician
92844486	728800	6258800	33.78612	149.4711	49	10	sandstone	16213	Rockley Volcanics				Ordovician
92844487	729000	6258400	33.78969	149.4734	49	10	sandstone	16213	Rockley Volcanics				Ordovician
92844488	730700	6260300	33.7722	149.4912	49	7	basalt	16213	Rockley Volcanics				Ordovician
92844489	730100	6260400	33.77143	149.4847	49	14	schist	16213	Rockley Volcanics				Ordovician
92844500	730900	6265900	33.72169	149.4919	49	10	sandstone	16213	Rockley Volcanics				Ordovician
92844500	730900	6265900	33.72169	149.4919	49	10	sandstone	16213	Rockley Volcanics				Ordovician
92844501	730400	6266600	33.71549	149.4863	49	7	basalt	16213	Rockley Volcanics				Ordovician
92844387	701900	6258200	33.79701	149.1809	49	2	granodiorite	29588	Rocky Bridge Granodiorite				
92844443	691100	6256400	33.81524	149.0647	49	2	granite	23946	Roseburg Granite				
92844444	689800	6252800	33.84792	149.0514	49	2	granite	23946	Roseburg Granite				
92844445	687700	6250400	33.86993	149.0293	49	2	granite	23946	Roseburg Granite				
LFB526	688100	6247000	33.9005	149.0343	120	2	granite	23946	Roseburg Granite		S-type		Silurian
LFB567	688600	6257200	33.80848	149.0375	120	2	granite	23946	Roseburg Granite		S-type		
87840096	698100	6278700	33.61296	149.1353	49	4	rock	17356	Stokefield Metagabbro				Ordovician
87840099	698100	6277900	33.62017	149.1355	49	4	rock	17356	Stokefield Metagabbro				Ordovician
90844069	697200	6277800	33.62124	149.1258	49	4	gabbro	17356	Stokefield Metagabbro		mag sus 600		Ordovician
90844070	697300	6277700	33.62212	149.1269	49	4	gabbro	17356	Stokefield Metagabbro		mag sus 600		Ordovician
92844468	686600	6240100	33.96296	149.0196	49	2	granodiorite	22906	Streamville Granodiorite				
91844148	693500	6260900	33.77424	149.0896	49	2	granite	26919	Sunnyside Granite	biotite-rich granite	fine grained - ms 20		Silurian
91844228	690900	6259200	33.79004	149.0619	49	2	granodiorite	26919	Sunnyside Granite	biotite granodiorite	mag sus 20		Silurian
LFB563	691500	6259000	33.79173	149.0685	120	2	granite	26919	Sunnyside Granite		I-type		
LFB564	693160	6259620	33.78584	149.0863	120	2	granite	26919	Sunnyside Granite		I-type		
LFB565	691700	6260200	33.78088	149.0704	120	2	granite	26919	Sunnyside Granite		I-type		
79620325	705186	6256180	33.81458	149.2169	76	2	granodiorite	29827	Sunset Hills Granite				Silurian
LFB2184	705900	6265600	33.72955	149.2224	120	1		29827	Sunset Hills Granite	7	I-type		
LFB487	705700	6257100	33.80619	149.2222	120	2	granite	29827	Sunset Hills Granite		I-type		

LFB488	707100	6263300	33.75004	149.2359	120	2	granite	29827	Sunset Hills Granite		I-type		
LFB489	707213	6266502	33.72116	149.2363	120	2	granite	29827	Sunset Hills Granite		I-type		
LFB490	703400	6258300	33.79582	149.1971	120	2	granite	29827	Sunset Hills Granite		I-type		
89840012	685700	6279200	33.61069	149.0016	115	4	gabbro	29916	Tettenhall Monzodiorite				Late Ordovician
89840013	685700	6279200	33.61069	149.0016	115	3	diorite	29916	Tettenhall Monzodiorite				Late Ordovician
91844200	685700	6282400	33.58184	149.001	49	3	monzodiorite	29916	Tettenhall Monzodiorite		mag sus 5000		Ordovician
92840116	723800	6242000	33.93858	149.4214	115	12	schist	29502	Triangle Formation	actinolite schist			Ordovician
92840117	723800	6242000	33.93858	149.4214	115	12	schist	29502	Triangle Formation	actinolite schist			Ordovician
92840118	722700	6242900	33.9307	149.4093	115	14	quartzite	29502	Triangle Formation				Ordovician
92840125	728600	6249400	33.87087	149.4714	115	10	siltstone	29502	Triangle Formation				Ordovician
92840126	725400	6251100	33.85624	149.4364	115	10	quartzite	29502	Triangle Formation				Ordovician
92840127	725000	6251700	33.85092	149.4319	115	12	schist	29502	Triangle Formation	actinolite schist			Ordovician
92840128	725500	6251300	33.85442	149.4374	115	12	schist	29502	Triangle Formation	actinolite schist			Ordovician
92840133	721900	6255200	33.82003	149.3976	115	14	schist	29502	Triangle Formation				Ordovician
92840135	723500	6253100	33.83862	149.4154	115	14	schist	29502	Triangle Formation	actinolite schist			Ordovician
92840144	727300	6249200	33.87295	149.4574	115	14	hornfels	29502	Triangle Formation				Ordovician
92840147	724600	6254300	33.82757	149.4269	115	14	schist	29502	Triangle Formation				Ordovician
91844326	731600	6267900	33.70352	149.4989	49	11	chert	18587	Triangle Group	bedded chert	ms 10,strike075dip70N		Ordovician
91844327	731700	6268000	33.7026	149.5	49	10	sandstone	18587	Triangle Group		mag sus 20		Ordovician
89840033	689000	6284700	33.56053	149.036	115	10	sandstone	29503	Weemalla Formation	basaltic sandstone			Ordovician
90840011	692700	6280200	33.60043	149.0768	115	10	sandstone	29503	Weemalla Formation	basaltic sandstone			Ordovician
90840012	688900	6274300	33.60043	149.0768	115	10	sandstone	29503	Weemalla Formation	basaltic sandstone			Ordovician
90840013	693800	6276000	33.63809	149.0896	115	10	sandstone	29503	Weemalla Formation	basaltic sandstone			Ordovician
90844073	696900	6282600	33.57803	149.1215	49	7	basalt	29503	Weemalla Formation	aphyric basalt	5m from 4072		Ordovician
90844074	697400	6282900	33.57523	149.1268	49	10	sandstone	29503	Weemalla Formation	volcaniclastic	ms 3000,youngs W		Ordovician
90844075	698200	6283100	33.57328	149.1354	49	10	rock	29503	Weemalla Formation	mylonitic fine volcaniclastic	cleav. strk 205dip70E		Ordovician
91844092	685700	6267800	33.71345	149.004	49	7	basalt	29503	Weemalla Formation	PYRX-rich basalt	ms 50 -chem		Ordovician
91844093	685700	6267600	33.71525	149.004	49	14	hornfels	29503	Weemalla Formation	bedded hornfels			Ordovician
91844095	685400	6268100	33.71079	149.0007	49	14	tuff	29503	Weemalla Formation	tuffaceous mudstone			Ordovician
91844102	686400	6272300	33.67276	149.0106	49	10	rock	29503	Weemalla Formation	mafic volcaniclastic			Ordovician
91844103	686300	6272400	33.67188	149.0095	49	10	rock	29503	Weemalla Formation	mafic volcaniclastic	strike 055 dip 70NW		Ordovician
91844160	691400	6283300	33.57272	149.0621	49	10	sandstone	29503	Weemalla Formation	volcaniclastic	mag sus 200 - chem		Ordovician
91844161	690700	6283400	33.57195	149.0546	49	10	sandstone	29503	Weemalla Formation	volcaniclastic	ms 100,px rich,chem		Ordovician
91844164	690200	6282900	33.57654	149.0493	49	10	sandstone	29503	Weemalla Formation	volcaniclastic	strike 130 dip 33N		Ordovician
91844173	692200	6282000	33.5843	149.071	49	10	sandstone	29503	Weemalla Formation	volcaniclastic	mag sus 60 - chem		Ordovician
93844543	688450	6274400	33.65347	149.0323	49	10	sandstone	29503	Weemalla Formation	hornblende-rich sandstone	mag sus 90		
93844544	688500	6274300	33.65436	149.0328	49	10	sandstone	29503	Weemalla Formation	fine volcanic sandstone	mag sus 80		
K92-118	685600	6275600	33.64316	149.0013	234	1		29503	Weemalla Formation	Siltstone	thin bedded		Late Ordovician
92844393	687300	6257400	33.80691	149.0235	49	2	granite	20699	Wyangala Granite				
LFB513	687100	6258700	33.79522	149.021	120	2	granite	20699	Wyangala Granite		S-type		
LFB566	687675	6257817	33.80308	149.0274	120	2	granite	20699	Wyangala Granite	granite	I-type		Silurian
79620313	686200	6279400	33.6082	149.0077	76	7	basalt						Middle Devonian
89840009	702300	6277600	33.62208	149.1808	115	4	diorite						Ordovician
89840028	710800	6284500	33.55825	149.2707	115	4	diorite			mica diorite			Silurian
89840029	691700	6285100	33.55644	149.065	115	3	diorite						Late Ordovician
89840030	691900	6285000	33.55731	149.0672	115	4	gabbro				geochemistry		Late Ordovician
90840002	694200	6275700	33.64072	149.094	115	3	diorite			leucodiorite	geochemistry		Ordovician
90840005	711200	6276300	33.63207	149.277	115	3	diorite				geochemistry		Ordovician
90840006	715200	6276000	33.63397	149.3202	115	3	andesite			hornblende andesite	geochemistry		Ordovician
90840007	707700	6289500	33.51379	149.2362	115	2	granodiorite			leucogranodiorite			Late Silurian
90840010	702300	6277600	33.62208	149.1808	115	3	diorite						Ordovician
90840014	694300	6276400	33.63439	149.0949	115	4	gabbro						Ordovician
90840015	694200	6277700	33.63439	149.0949	115	3	diorite			hornblende diorite			Ordovician
90840016	697900	6270800	33.6842	149.1349	115	3	diorite						Ordovician

90840017	698200	6273600	33.65891	149.1375	115	3	diorite			quartz-mica diorite			Silurian
90840019	701500	6267300	33.71507	149.1745	115	3	diorite						Ordovician
90844055	696300	6279200	33.60879	149.1158	49	3	monzonite				mag sus 8000	unnamed monzonite	Ordovician
90844056	696300	6279400	33.60698	149.1158	49	3	monzodiorite			biotite-bearing monzodiorite	mag sus 8000	unnamed monzonite	Ordovician
90844061	698300	6285600	33.55073	149.1359	49	3	monzonite			altered monzonite	ms 5000,cleaved	unnamed monzonite	Ordovician
90844062	698400	6285400	33.55252	149.1371	49	3	monzonite			altered micromonzonite	mag sus 2000	unnamed monzonite	Ordovician
90844067	697400	6286500	33.54279	149.126	49	3	monzonite			micromonzonite	mag sus 6000	unnamed monzonite	Ordovician
90844068	697500	6286400	33.54367	149.1271	49	3	monzonite			micromonzonite	mag sus 4000	unnamed monzonite	Ordovician
90844077	697700	6283600	33.56887	149.1299	49	3	monzonite			micromonzonite sill	ms 6000,chem	unnamed monzonite sill	Ordovician
91844094	685700	6267400	33.71705	149.0041	49	2	granite			fine grained granite	granite vein	unnamed granite	Ordovician
91844111	692600	6267700	33.71312	149.0784	49	4	gabbro			hornblende gabbro	geochem	unnamed gabbro	Silurian
91844112	692800	6268600	33.70497	149.0804	49	4	gabbro			hornblende gabbro	ms 70 - chem	unnamed gabbro	Silurian
91844115	695600	6268000	33.70986	149.1107	49	7	basalt			pyroxene basalt	could be a dyke	Eagle Hawk sill	Ordovician
91844116	695200	6268100	33.70904	149.1064	49	10	sandstone			feldspathic sandstone	stik215dip85SEyoungsSE		Ordovician
91844118	696200	6270500	33.68722	149.1167	49	4	porphyry			pyroxene porphyry	very pyroxene rich	unnamed intrusive	Ordovician
91844119	696200	6270400	33.68812	149.1167	49	4	porphyry			pyroxene porphyry	very pyroxene rich,chem	unnamed intrusive	Ordovician
91844120	695700	6269600	33.69542	149.1115	49	4	porphyry			pyroxene porphyry	very pyroxene rich,chem	unnamed intrusive	Ordovician
91844121	695500	6269700	33.69456	149.1093	49	5	porphyry			feldspar porphyry		unnamed dyke?	Ordovician
91844123	694300	6271000	33.68306	149.0961	49	10	greywacke			volcaniclastic	strike 115 dip 80N	Rockville Formation?	Ordovician
91844125	698100	6265300	33.73374	149.1383	49	2	granite			granite porphyry		Buggs Ridge Granite	Ordovician
91844126	697400	6265400	33.73296	149.1307	49	7	tuff			pyroxene crystal tuff?		Eagle Hawk Sill	Ordovician
91844127	697400	6265400	33.73296	149.1307	49	7	tuff			pyroxene crystal tuff?		Eagle Hawk Sill	Ordovician
91844128	697500	6265700	33.73024	149.1317	49	7	tuff			pyroxene crystal tuff?		Eagle Hawk Sill	Ordovician
91844129	697200	6264900	33.73751	149.1287	49	10	rock			silicified fine volcaniclastic	good outcrops	Coombing Formation	Ordovician
91844130	697100	6269300	33.69787	149.1266	49	7	basalt			pyroxene basalt	probably a sill	Eagle Hawk Sill	Ordovician
91844131	697300	6269300	33.69783	149.1288	49	7	basalt			pyroxene basalt	geochem - mag sus 60	Eagle Hawk sill	Ordovician
91844132	697400	6268700	33.70322	149.13	49	7	basalt			pyroxene basalt	geochem - mag sus 50	Eagle Hawk Sill	Ordovician
91844133	697400	6268700	33.70322	149.13	49	10	rock			volcaniclastic	mag sus 60	Eagle Hawk Sill	Ordovician
91844134	697500	6268200	33.70771	149.1312	49	7	basalt			pyroxene basalt	mag sus 60	Eagle Hawk Sill	Ordovician
91844135	697300	6268100	33.70865	149.129	49	7	basalt			pyroxene basalt	sill trending 050 - chem	Eagle Hawk Sill	Ordovician
91844136	697300	6268100	33.70865	149.129	49	10	rock			volcaniclastic	stik055,dip80NWfaceNW	Eagle Hawk Sill	Ordovician
91844137	697900	6270800	33.6842	149.1349	49	4	monzogabbro			fine grained monzogabbro	mag sus 200-300	unnamed intrusion	Ordovician
91844140	697300	6266700	33.72127	149.1294	49	4	porphyry			pyroxene porphyry	very px rich,chem,ms 65	unnamed intrusion	Ordovician
91844141	697200	6266800	33.72038	149.1283	49	4	porphyry			pyroxene porphyry	geochem - mag sus 70	unnamed intrusion	Ordovician
91844142	697300	6266400	33.72397	149.1294	49	7	basalt			pyroxene basalt	sill 30m thick	Eagle Hawk Sill	Ordovician
91844143	697400	6266400	33.72395	149.1305	49	10	rock			fine volcaniclastic		Eagle Hawk Sill	Ordovician
91844144	697400	6266400	33.72395	149.1305	49	10	rock			coarse volcaniclastic		Eagle Hawk Sill	Ordovician
91844145	697300	6266500	33.72307	149.1294	49	7	basalt			feldspar-phyric basalt		Eagle Hawk Sill	Ordovician
91844147	695600	6263700	33.74862	149.1117	49	7	basalt			sheared pyroxene basalt	mag sus 50	Eagle Hawk Sill	Ordovician
91844156	713000	6272500	33.66596	149.2973	49	7	basalt			pyroxene basalt	mag sus 70	Eagle Hawk Sill	Ordovician
91844158	692000	6283500	33.57081	149.0686	49	7	basalt			hornblende? basalt clast	clast in congl, - ms 70	Erowanbang Conglomerate	Ordovician
91844159	691500	6283600	33.57	149.0632	49	10	sandstone			volcaniclastic	matrix of congl.,ms 80	Erowanbang Conglomerate	Ordovician
91844162	690400	6283500	33.5711	149.0513	49	10	sandstone			volcaniclastic	mag sus 80	unnamed sediments	Ordovician
91844163	690400	6284200	33.56479	149.0512	49	7	basalt			pyroxene basalt	mag sus 5000	Erowanbang Conglomerate	Ordovician
91844165	689800	6282500	33.58022	149.0451	49	7	basalt			pyroxene basalt	mag sus 100		Ordovician
91844166	692300	6284400	33.56265	149.0716	49	10	sandstone			coarse volcanic sandstone	mag sus 5000	unnamed sediments	Ordovician
91844168	692500	6285200	33.5554	149.0736	49	10	sandstone			coarse volcanic sandstone	mag sus 5000	unnamed sediments	Ordovician
91844170	693300	6284500	33.56156	149.0823	49	6	trachyte			trachyte	mag sus 5000	Nullawonga Trachyte	Ordovician
91844171	692200	6282200	33.58249	149.071	49	7	basalt			plagioclase basalt	ms60,intrudes4172,chem		Ordovician
91844172	692200	6282200	33.58249	149.071	49	7	basalt			pyroxene basalt	mag sus 100 - geochem		Ordovician
91844174	693000	6282400	33.58055	149.0796	49	3	monzonite			monzosyenite	mag sus 6000	unnamed intrusion	Ordovician
91844176	688700	6283700	33.5696	149.033	49	7	basalt			pyroxene-rich basalt	ms 0,like Eagle Hawk sills		Ordovician
91844179	694200	6284800	33.5587	149.092	49	6	trachyte			trachyte	mag sus 5000	Nullawonga Trachyte	Ordovician
91844181	695500	6285800	33.54945	149.1057	49	6	trachyte			altered trachyte	mag sus 100	Nullawonga Trachyte	Ordovician

91844191	687400	6282400	33.58155	149.0193	49	7	basalt			pyroxene basalt	mag sus 5000	Burnt Yard Basalt	Ordovician
91844193	686500	6285200	33.55646	149.009	49	7	basalt			pyroxene basalt	mag sus 5000	Burnt Yard Basalt	Ordovician
91844195	686400	6284700	33.56099	149.008	49	7	basalt			pyroxene basalt	mag sus 500	Burnt Yard Basalt	Ordovician
91844196	687300	6284300	33.56444	149.0178	49	7	basalt			pyroxene basalt	mag sus 2000	Burnt Yard Basalt	Ordovician
91844198	685700	6282700	33.57914	149.0009	49	10	sandstone			volcanic sandstone	mag sus 60		Ordovician
91844199	685700	6282700	33.57914	149.0009	49	7	basalt			hornfelsed basalt	mag sus 5000		Ordovician
91844201	685700	6282500	33.58094	149.0009	49	7	basalt			hornfelsed basalt	mag sus 6000	Burnt Yard Basalt?	Ordovician
91844202	685700	6282900	33.57734	149.0009	49	10	sandstone			hornblende sandstone	mag sus 70		Ordovician
91844204	686500	6283500	33.57179	149.0093	49	7	basalt			pyroxene basalt?	mag sus 1000	Burnt Yard Basalt?	Ordovician
91844205	686600	6283200	33.57447	149.0105	49	7	basalt			pyroxene basalt	mag sus 5000	Burnt Yard Basalt	Ordovician
91844206	686900	6284200	33.56541	149.0135	49	7	basalt			pyroxene basalt	mag sus 4000	Burnt Yard Basalt	Ordovician
91844207	686360	6283843	33.56872	149.0078	49	3	monzonite			pyroxene monzonite	mag sus 6000 geochem		Ordovician
91844208	687700	6282900	33.57699	149.0224	49	7	basalt			pyroxene? porphyry basalt	mag sus 7000	Burnt Yard Basalt?	Ordovician
91844209	688200	6289700	33.5156	149.0263	49	7	basalt			plagioclase basalt	mag sus 1000		Tertiary
91844210	688200	6290900	33.50479	149.0261	49	7	basalt			plagioclase basalt	mag sus 1000 geochem	Tertiary basalt	Tertiary
91844211	689600	6286200	33.5469	149.0422	49	7	basalt			pyroxene basalt	mag sus 7000	Burnt Yard Basalt	Ordovician
91844212	689400	6286300	33.54604	149.04	49	7	basalt			aphyric basalt	mag sus 900 geochem	Tertiary basalt	Tertiary
91844213	688700	6285800	33.55067	149.0325	49	7	porphyry			pyroxene porphyry	mag sus 5500 geochem		Ordovician
91844214	689200	6287600	33.53436	149.0375	49	3	monzonite			hornblende monzonite	mag sus 3500		Ordovician
91844217	685700	6284300	33.56472	149.0006	49	10	sandstone			volcanic sandstone	mag sus 100		Ordovician
91844218	687200	6289000	33.52209	149.0157	49	10	sandstone			volcanic sandstone?	mag sus 4500		Ordovician
91844221	687300	6290200	33.51125	149.0166	49	10	sandstone			volcanic sandstone	mag sus 1500		Ordovician
91844222	687100	6290300	33.51039	149.0144	49	10	sandstone			volcanic sandstone	mag sus 3500		Ordovician
91844223	685600	6280200	33.60169	149.0003	49	7	basalt			altered basalt	mag sus 6000	Burnt Yard Basalt	Ordovician
91844224	685700	6280100	33.60258	149.0014	49	7	basalt			recrystallised basalt	mag sus 4000	Burnt Yard Basalt	Ordovician
91844227	689600	6260600	33.77765	149.0476	49	2	granodiorite			foliated granodiorite	mag sus 20		Silurian
91844235	722700	6279000	33.6054	149.4002	49	5	porphyry			porphyritic volcaniclastic	mag sus 20		Silurian
91844236	728600	6280900	33.58703	149.4633	49	5	rock			hornfelsed volcaniclastic	mag sus 10		Silurian
91844238	731900	6282700	33.57009	149.4983	49	14	siltstone			hornfelsed siltstone			Silurian
91844239	730700	6282700	33.57035	149.4854	49	14	hornfels				ms variable 40 to 1000		Silurian
91844240	730400	6282200	33.57492	149.4823	49	4	gabbro			mela hornblende gabbro	ms 200 - old quarry site	unnamed gabbro	Carboniferous
91844241	730400	6282000	33.57673	149.4824	49	14	hornfels				mag sus 20		Silurian
91844247	718600	6286500	33.53866	149.3542	49	10	sandstone			cleaved fine sandstone			Silurian
91844248	719800	6285300	33.54922	149.3674	49	4	dolerite			sheared dolerite	mag sus 30		Silurian
91844249	718900	6287200	33.53229	149.3573	49	10	sandstone			volcaniclastic sandstone	mag sus 40		Silurian
91844250	721400	6290700	33.50023	149.3833	49	14	slate			hornfelsed slate			Silurian
91844256	726900	6286800	33.53422	149.4435	49	2	granite			aplitic granite	mag sus 2000		Carboniferous
91844257	729800	6285600	33.54442	149.475	49	14	hornfels				mag sus 1000		Silurian
91844259	727800	6279000	33.60432	149.4551	49	10	sandstone			volcaniclastic sandstone	mag sus 10		Silurian
91844260	727800	6279000	33.60432	149.4551	49	10	sandstone			volcaniclastic sandstone	same loc as 4259		Silurian
91844261	713400	6258500	33.79205	149.305	49	5	dacite			sheared dacite	mag sus 25		Silurian
91844262	707900	6258000	33.79765	149.2457	49	3	andesite			andesitic dyke?	mag sus 45		Silurian
91844263	707900	6258000	33.79765	149.2457	49	10	quartzite			orthoquartzite	mag sus 5		Silurian
91844267	724900	6278700	33.60764	149.424	49	10	sandstone			volcaniclastic sandstone	mag sus 30		Silurian
91844268	727900	6280300	33.59258	149.4559	49	5	dacite			dacite porphyry	ms 130 - hornfelsed		Silurian
91844269	728600	6277800	33.61496	149.4641	49	2	porphyry			sheared porphyry	ms 20 - blue quartz	unnamed granite porphyry	Silurian
91844270	728800	6277400	33.61852	149.4663	49	2	porphyry			mylonitized porphyry	mag sus <5	unnamed granite porphyry	Silurian
91844275	689200	6279700	33.60556	149.0392	49	10	sandstone			volcaniclastic sandstone	mag sus 80		Ordovician
91844276	687900	6278000	33.62112	149.0256	49	4	basalt			hornblende basalt dyke	mag sus 100 - chem		Ordovician
91844279	687400	6277300	33.62752	149.0203	49	4	basalt			pyroxene basalt dyke	ms 800,PHOTO		Ordovician
91844280	690200	6275500	33.64324	149.0509	49	4	gabbro			coarse pyroxene gabbro	mag sus 1300	Sunny Downs Gabbro	Ordovician
91844281	689700	6275600	33.64243	149.0455	49	3	monzonite			hornblende monzonite	mag sus 2500	Sunny Downs Gabbro	Ordovician
91844282	688500	6274700	33.65076	149.0327	49	10	sandstone			volcaniclastic sandstone	mag sus 40		Ordovician
91844283	690700	6279100	33.61071	149.0555	49	10	sandstone			volcaniclastic sandstone	mag sus 70		Ordovician

91844287	686500	6275600	33.643	149.011	49	4				altered intrusive	mag sus 20		Ordovician
91844288	686200	6275800	33.64125	149.0077	49	3	monzonite			pyritic hornblende monzonite	mag sus 200 - chem	unnamed monzonite	Ordovician
91844289	686500	6276400	33.63579	149.0108	49	3	monzonite			hornblende monzonite	ms 2000 - chem	unnamed monzonite	Ordovician
91844290	686600	6277300	33.62766	149.0117	49	4	basalt			pyroxene basalt dyke	mag sus 60		Ordovician
91844291	691600	6276900	33.63037	149.0657	49	4	gabbro			coarse pyroxene gabbro	ms 2000,chem,type loc.	Sunny Downs Gabbro	Ordovician
91844295	689800	6285600	33.55228	149.0444	49	10	sediment			coarse volcanic grit	ms 50,hbl volc. frags	Errowanbang Conglomerate	Ordovician
91844306	694200	6275700	33.64072	149.094	49	3	syenite			white syenite	mag sus 5 - geochem	unnamed diorite	Ordovician
91844308	727500	6272000	33.66746	149.4537	49	10	greywacke				mag sus 20		Silurian
91844314	729600	6268400	33.69945	149.4773	49	10	sediment			volcanic grit	ms20strike350dip45w		Silurian
91844321	729100	6269000	33.69415	149.4717	49	10	sandstone			fine sandstone	mag sus 25		Silurian
91844322	729500	6268300	33.70037	149.4762	49	10	sandstone			volcaniclastic sandstone	mag sus 600		Silurian
91844329	721400	6259700	33.77959	149.391	49	10	sandstone			weakly feldspathic sandstone	ms20,strike040dip15SE		Silurian
91844334	730500	6274200	33.64699	149.4855	49	5	rhyolite			meta rhyolite	ms5,top Ben Lomond Hill	unnamed rhyolitic intrusion	Ordovician
91844347	692000	6288500	33.52574	149.0675	49	6	trachyte			pyritized trachyte	mag sus 1500	Nullawonga Trachyte	Ordovician
91844349	689300	6280700	33.59653	149.0401	49	3	monzonite			hornblende monzonite dyke	mag sus 80 - geochem	unnamed intrusion	Ordovician
91844355	693500	6278800	33.6129	149.0857	49	10	sandstone			volcanic sandstone	mag sus 60		Ordovician
92840000	722500	6263300	33.74692	149.402	115	7	basalt						Tertiary
92840001	722600	6258500	33.79015	149.4043	115	7	basalt						Tertiary
92840002	722600	6258550	33.7897	149.4043	115	7	basalt						Tertiary
92840003	726700	6251900	33.84875	149.4502	115	7	basalt						Tertiary
92840112	710300	6238800	33.9702	149.2762	115	4	dolerite			coarse dolerite			Silurian
92840121	710900	6241900	33.94215	149.282	115	4	dolerite			coarse dolerite			Silurian
92840124	729400	6247000	33.89232	149.4807	115	7	basalt						Tertiary
92844369	728600	6245900	33.90241	149.4723	49	2	porphyry						
92844372	726200	6247900	33.8849	149.4458	49	7	basalt			basalt			Tertiary
92844373	726100	6247800	33.88583	149.4448	49	7	basalt						
92844374	726000	6247900	33.88495	149.4437	49	7	basalt						Tertiary
92844375	725900	6247100	33.89218	149.4428	49	7	basalt						Tertiary
92844376	692200	6286300	33.54554	149.0701	49	3	monzonite						
92844377	692200	6286400	33.54464	149.0701	49	3	trachyte						
92844378	693400	6286400	33.54442	149.083	49	3	monzonite						
92844379	712500	6242600	33.93552	149.2991	49	5	dacite						
92844380	712427	6242876	33.93304	149.2982	49	5	dacite						
92844383	712900	6247300	33.89308	149.3023	49	6	andesite						
92844384	712700	6247700	33.88952	149.3	49	5	dacite						
92844386	709200	6243800	33.92536	149.2631	49	10	sandstone						
92844388	701600	6257300	33.80518	149.1779	49	14	phyllite						
92844389	701500	6257400	33.80429	149.1768	49	10	sandstone						
92844392	685400	6254200	33.83608	149.0036	49	2	granite						
92844401	698700	6246200	33.90577	149.1491	49	4	dolerite			dolerite			
92844402	700300	6242500	33.93881	149.1672	49	7	basalt						
92844403	701900	6240800	33.95383	149.1849	49	4	dolerite			dolerite			
92844404	711000	6258600	33.79163	149.2791	49	14	schist						
92844405	710300	6258300	33.79447	149.2716	49	14	slate						
92844406	709500	6261000	33.7703	149.2623	49	5	dacite						
92844407	708200	6260200	33.77776	149.2485	49	5	rhyolite						
92844409	713500	6261000	33.7695	149.3055	49	5	dacite						
92844410	713700	6263600	33.74603	149.307	49	14	schist						
92844412	715400	6270100	33.6871	149.3237	49	7	basalt						
92844413	715800	6270000	33.68792	149.3281	49	7	basalt						
92844415	720200	6275900	33.63385	149.3741	49	7	basalt						
92844421	697800	6260700	33.77525	149.1361	49	4	dolerite			dolerite			
92844423	711200	6259200	33.78618	149.2811	49	14	schist						
92844424	711200	6259200	33.78618	149.2811	49	14	schist						

92844429	707200	6259000	33.78877	149.2379	49	14	schist						
92844431	710100	6255600	33.81884	149.2701	49	2	granite						
92844432	708700	6256300	33.81281	149.2548	49	2	granite						
92844433	708700	6252500	33.84706	149.2557	49	14	quartzite						
92844434	708600	6252200	33.84978	149.2547	49	14	schist						
92844435	708200	6252000	33.85166	149.2504	49	14	schist						
92844436	709100	6251000	33.8605	149.2603	49	14	phyllite						
92844439	690200	6288300	33.52787	149.0482	49	6	shoshonite						
92844440	694500	6287600	33.5334	149.0946	49	3	trachyte						
92844441	694200	6287800	33.53166	149.0913	49	3	trachyte						
92844452	719000	6261500	33.76387	149.3647	49	10	sandstone						
92844453	696400	6287000	33.53846	149.1152	49	3	trachyte						
92844454	693600	6290200	33.51013	149.0843	49	10	sandstone						
92844455	693400	6289800	33.51377	149.0823	49	1							
92844456	693300	6289600	33.51559	149.0812	49	10	sandstone						
92844457	693300	6289900	33.51289	149.0812	49	10	sandstone						
92844459	693400	6289200	33.51918	149.0824	49	2	quartz tourmaline			quartz tourmaline rock			
92844460	694000	6288800	33.52268	149.089	49	2	micromonzonite						
92844461	693500	6288700	33.52367	149.0836	49	3	trachyte						
92844462	694500	6290500	33.50726	149.094	49	2	quartz tourmaline			quartz tourmaline rock			
92844463	693100	6290500	33.50752	149.0789	49	10	sandstone						
92844464	692300	6290700	33.50586	149.0702	49	14	trachyte						
92844465	692400	6290600	33.50674	149.0713	49	15	sandstone				geochem mag sus 7		Ordovician
92844469	689100	6241800	33.94719	149.0463	49	4	dolerite						
92844470	695500	6240100	33.96134	149.1158	49	4	dolerite			dolerite			
92844472	708200	6247300	33.89402	149.2515	49	10	mudstone						
92844473	707800	6247600	33.89139	149.2471	49	10	mudstone						
92844474	707700	6247700	33.89051	149.246	49	10	mudstone						
92844475	707200	6247200	33.89512	149.2407	49	14	quartzite						
92844476	706500	6247200	33.89525	149.2332	49	10	siltstone						
92844477	706900	6248100	33.88707	149.2373	49	14	schist						
92844478	707700	6244400			49	2	porphyry						
92844479	707300	6244800	33.91673	149.2424	49	14	phyllite						
92844480	706900	6245400	33.9114	149.2379	49	14	quartzite						
92844490	725300	6267400	33.70938	149.4311	49	9	porphyry						
92844491	715600	6275200	33.6411	149.3247	49	11	chert						
92844493	713400	6271100	33.6785	149.3019	49	2	monzogranite						
92844494	712400	6272700	33.66428	149.2908	49	2	monzogranite						
92844496	714300	6272800	33.66299	149.3112	49	10	sandstone						
92844497	711700	6273300	33.65901	149.2831	49	10	sandstone						
92844498	711200	6275800	33.63658	149.2771	49	7	basalt						
92844502	702200	6257800	33.80056	149.1842	49	7	basalt						Tertiary
92844507	697900	6274400	33.65175	149.1341	49	4	dolerite					Eagle Hawk Sill	Ordovician
92844509	694200	6283200	33.57312	149.0923	49	3	quartz syenite			quartz syenite			Ordovician
93844553	689350	6291050	33.50323	149.0384	49	4	monzonite			mela monzonite	mag sus 3000		
93844554	685900	6290700	33.50699	149.0014	49	4	basalt			basaltic dyke?	mag sus 1500		
93844555	688850	6288050	33.53036	149.0337	49	6	latite				mag sus 3500	Nullawonga Trachyte?	Ordovician
93844584	697100	6254400	33.83216	149.1299	49	1							
94840412	720243	6281667	33.58187	149.3731	115	2	granite			Medium grained granite	Dyke-like intrusion		Carboniferous
92844499a	709900	6277400	33.62242	149.2627	49	15	gossan						
K91-105	700800	6288400	33.52503	149.1622	234	1				Skarn			
K91-105C	700800	6288400	33.52503	149.1622	234	1				Skarn			
LFB2102	692500	6251700	33.85735	149.0809	120	2	aplite			aplite dyke	aplite		Silurian

SITEID	ORIG NO	HMAPNO	EASTING	NORTHING	DESCRIPTION	TYPE	SUB TYPE	AZI- MUTH	INCLI- NATION	PLOT RANK
90844061	49	8730	698300	6285600	altered monzonite	2	1	85	75	1
90844074	49	8730	697400	6282900	volcaniclastic	1	1	310	75	1
90844074	49	8730	697400	6282900	volcaniclastic	2	1	90	70	2
90844075	49	8730	698200	6283100	mylonitic fine volcaniclastic	2	1	115	70	1
90844080	49	8730	695900	6283300	cherty volcaniclastic	1	1	350	40	1
91844091	49	8730	688900	6271100	fine tuffaceous mudstone	1	1	330	28	1
91844097	49	8730	690200	6269500	foliated quartzite	1	1	315	85	1
91844097	49	8730	690200	6269500	foliated quartzite	2	1	315	85	2
91844100	49	8730	689300	6270000	hornfelsed volcaniclastic	1	1	20	17	1
91844103	49	8730	686300	6272400	mafic volcaniclastic	1	1	325	70	1
91844105	49	8730	691700	6269800	psammite	2	1	310	75	1
91844107	49	8730	693200	6271300	thin feldspathic turbidite	1	1	290	85	1
91844107	49	8730	693200	6271300	thin feldspathic turbidite	2	1	275	85	2
91844116	49	8730	695200	6268100	feldspathic sandstone	1	1	125	85	1
91844116	49	8730	695200	6268100	feldspathic sandstone	2	1	270	85	2
91844121	49	8730	695500	6269700	feldspar porphyry	1	1	140	85	1
91844121	49	8730	695500	6269700	feldspar porphyry	2	1	260	80	2
91844131	49	8730	697300	6269300	pyroxene basalt	1	21	320	60	1
91844135	49	8730	697300	6268100	pyroxene basalt	1	1	325	80	1
91844164	49	8730	690200	6282900	volcaniclastic	1	1	40	33	1
91844165	49	8730	689800	6282500	pyroxene basalt	1	1	25	35	1
91844232	49	8730	719800	6283300	quartz greywacke	2	1	65	85	1
91844247	49	8730	718600	6286500	cleaved fine sandstone	2	1	70	80	1
91844250	49	8730	721400	6290700	hornfelsed slate	2	1	270	85	1
91844252	49	8730	725900	6283600	mafic schlieren	3	1	120	50	1
91844259	49	8730	727800	6279000	volcaniclastic sandstone	2	1	70	80	1
91844269	49	8730	728600	6277800	sheared porphyry	2	1	260	85	1
91844275	49	8730	689200	6279700	volcaniclastic sandstone	1	1	50	35	1
91844279	49	8730	687400	6277300	pyroxene basalt dyke unnamed dyke	1	1	330	25	1
91844314	49	8730	729600	6268400	volcanic grit	1	1	260	45	1
91844326	49	8730	731600	6267900	bedded chert	1	1	345	70	1
91844350	49	8730	730400	6278100	quartz porphyry	2	1	60	55	1
91844351	49	8730	731700	6280600	biotite phyllite	2	1	300	60	1
91844352	49	8730	730400	6280200	meta porphyry	2	2	105	90	1
92844380	49	8730	712427	6242876	dacite	1	1	240	30	1

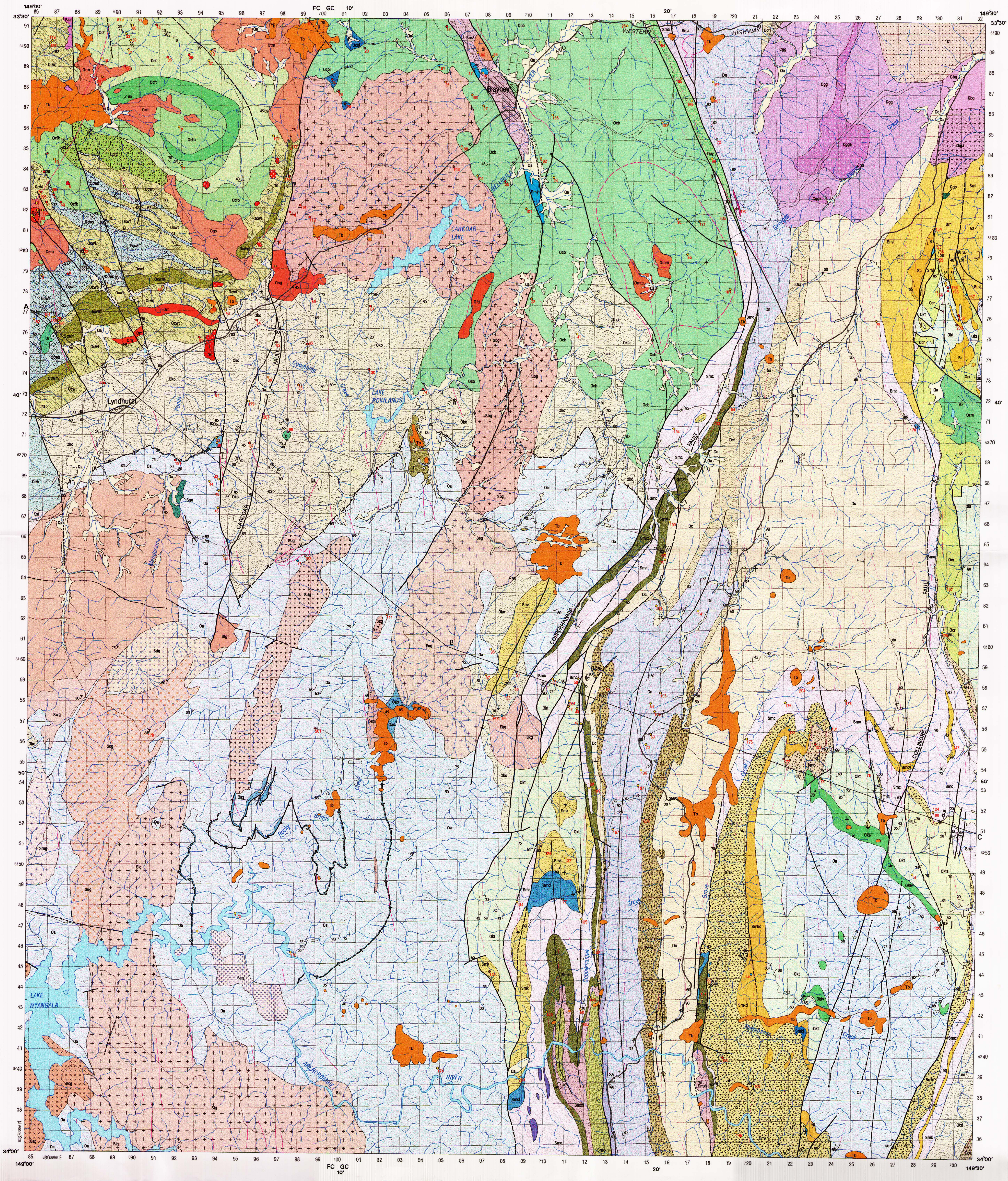
92844380	49	8730	712427	6242876	basalt	1	1	240	30	1
92844387	49	8730	701900	6258200	granodiorite	3	1	290	60	1
92844394	49	8730	699200	6258500	siltstone	2	1	295	85	1
92844397	49	8730	705600	6253600	granite	2	1	245	50	1
92844397	49	8730	705600	6253600	granite	2	1	245	50	1
92844398	49	8730	704000	6250500	granite	2	1	275	65	1
92844398	49	8730	704000	6250500	granite	2	1	275	65	1
92844399	49	8730	700700	6246400	psammite	2	1	280	75	1
92844400	49	8730	698600	6246000	psammite	2	1	290	55	1
92844404	49	8730	711000	6258600	schist	2	1	120	80	1
92844406	49	8730	709500	6261000	dacite	2	2	110	90	1
92844407	49	8730	708200	6260200	rhyolite	2	2	110	90	1
92844429	49	8730	707200	6259000	schist	2	1	245	50	1
92844465	49	8730	692400	6290600	sandstone	1	1	355	13	1
92844480	49	8730	706900	6245400	quartzite	2	1	275	65	1
92844491	49	8730	715600	6275200	chert	1	1	125	85	1
92844496	49	8730	714300	6272800	sandstone	1	1	225	25	1
92844497	49	8730	711700	6273300	sandstone	1	1	140	80	1
93844549	49	8730	690150	6290750	volcaniclastic sandstone	1	1	25	25	1
93844549	49	8730	690150	6290750	volcaniclastic sandstone	1	1	25	25	1
92840007	115	8730	719400	6262300	dacitic sandstone	1	1	305	60	1
92840009	115	8730	719500	6251600	dacite	3	1	300	77	1
92840011	115	8730	717500	6249900	feldspathic sandstone	1	1	265	58	1
92840012	115	8730	708900	6246400	dacite	3	2	90	90	1
92840013	115	8730	719900	6245200	rhyolite	3	1	285	75	1
92840101	115	8730	723500	6235800	dacite	3	1	290	80	1
92840107	115	8730	727000	6235900	greywacke	2	1	285	80	1
92840111	115	8730	710700	6238800	spilite	3	2	80	90	1
92840118	115	8730	722700	6242900	quartzite	1	1	70	85	1
92840125	115	8730	728600	6249400	siltstone	1	1	300	75	1
92840127	115	8730	725000	6251700	actinolite schist	3	2	85	90	1
92840131	115	8730	722800	6254000	sandstone	1	1	285	65	1
92840135	115	8730	723500	6253100	actinolite schist	3	1	270	70	1
92840137	115	8730	731000	6258300	quartz sandstone	1	1	245	85	1
92840145	115	8730	716200	6252800	feldspathic sandstone	1	1	120	20	1
92840146	115	8730	724700	6255300	nodular limestone	1	1	270	66	1

AUSTRALIA 1:100 000 GEOLOGICAL SERIES

BLAYNEY

NEW SOUTH WALES

SHEET 8730



CAINOZOIC UNITS

	Qa	Alluvium: gravel, sand, silt, clay
	Tb	Pyroxene olivine basalt, plagioclase basalt, alkali basalt, trachybasalt, trachyandesite
	Ti	Silcrete, silicified gravel

Q

Tertiary

Cainozoic

BATHURST BATHOLITH

Bathurst Granite	Cbg	Coarse grained, porphyritic biotite granite
	Cbga	Porphyritic granite and granodiorite, aplite
	Cl	Leucogranite
Gresham Granite	Cgg	Graphic biotite granite, porphyritic granite, dioritic enclaves, aplite
	Cgge	Enclave-rich granite

OTHER CARBONIFEROUS INTRUSIONS

	Cg	Medium-grained, equigranular granite
	Cgo	Hornblende gabbro

Carboniferous

UNGROUPED DEVONIAN FORMATIONS

Cunningham Formation	Dn	Slate, laminated siltstone, lithic sandstone
Copperhannia Member	Dnc	Calcarenite, slate, limestone, marble, conglomerate

CRUDINE GROUP

Turondale & Waterbeach Formations undiff.	Dc	Feldspathic volcaniclastics, greywacke, slate
Dunchurch Formation	Dcd	Feldspathic quartz sandstone; minor slate, ashstone and dacite
Bushranger Volcanics	Dcr	Dacite, dacitic volcaniclastics
	Dcra	Andesite
Buckburraga Slate	Dcu	Laminated silty slate
Waterbeach Formation	Dcw	Siltstone, shale, minor lithic sandstone

Devonian

WYANGALA BATHOLITH

Bartletts Creek Granite	Sag	Biotite granite
Mandurama Ponds Granodiorite	Sdg	Hornblende allanite biotite granodiorite
Little Forest Granite	Sfg	Biotite granite, leucogranite
Bigga Granite	Sig	Coarse foliated cordierite biotite granite
Mount Misery Granite	Smg	Biotite granite, contaminated tonalite, microdiorite
Roseburg Granite	Sog	Foliated porphyritic biotite cordierite granite
Streamville Granodiorite	Ssg	Hornblende biotite granodiorite, felsic granodiorite, fine grained granite
Swan Ponds Tonalite	Sst	Xenolith-rich porphyritic hornblende tonalite
Wyangala Granite	Swg	Foliated porphyritic biotite granite
Garland Granodiorite	Sxg	Leucocratic, foliated, porphyritic to granophyric, hornblende biotite granodiorite

OTHER SILURIAN INTRUSIONS

Barry Granodiorite	Sbg	Hornblende biotite granodiorite
Carcoar Granodiorite	Scg	Hornblende biotite granodiorite and tonalite
	Sdo	Dolerite
Sunset Hills Granite	Seg	Biotite granodiorite, hornblende biotite granodiorite, biotite granite, leucogranite
	Sgo	Gabbro
Kempfield Granodiorite	Skg	Recrystallised biotite granodiorite
	Sl	Leucogranite
	Sp	Quartz porphyry
	Sr	Rhyolite
Bugs Ridge Granite	Sug	Foliated biotite granite, leucogranite
Rocky Bridge Granodiorite	Szg	Hornblende biotite granodiorite

MUMBIL GROUP (NORTHWEST)

Anson Formation	Sma	Carbonaceous pyritic siltstone, felsic volcanics, volcanic sandstone, limestone
Wombiana Formation	Smz	Siltstone, limestone
	Smzl	Limestone, marble

MUMBIL GROUP (EAST)

Campbells Formation	Smc	Slate, phyllite, siltstone, feldspathic and quartz sandstone, limestone
	Smcl	Fossiliferous limestone
	Smcv	Feldspathic volcaniclastics
Kangaloolah Volcanics undiff.	Smk	Rhyolite; minor siltstone
	Smkr	Foliated rhyolite and dacite
	Smkl	Limestone, sandstone
	Smkd	Quartz-poor dacite
Bells Creek Volcanics	Sml	Rhyolitic tuff and lava, quartz feldspar porphyry, tuffaceous sandstone, breccia
Alton Limestone Member	Smll	Thickly bedded, white, coarse-grained fossiliferous marble; minor talc schist
Fosters Creek Conglomerate	Smr	Oligomictic boulder conglomerate, feldspathic quartz sandstone, siltstone
Box Ridge Volcanics	Smx	Does not appear on map face
	Smxk	Spilite, keratophyre, chert, mafic volcaniclastics
	Smxs	Slate, minor mafic volcaniclastics
	Smxt	Spilite

UNGROUPED SILURIAN FORMATION

Chesleigh Formation	Ss	Quartz lithic sandstone, slate, tuff, mudstone

ASHBURNIA GROUP

Cadia Coach Shale	Sac	Feldspathic siltstone, mudstone, poorly sorted sandstone, limestone, conglomerate

Silurian

ORDOVICIAN INTRUSIONS

Tettenhall Monzodiorite	Oem	Porphyritic and aphyric monzonite and diorite
Fernside Monzodiorite	Ofd	Clinopyroxene monzonite and diorite
	Ofi	Diorite, monzonite, syenite
Glendale Quartz Monzonite	Ogm	Quartz monzonite
Glen Ayr Syenite	Ogs	Biotite syenite, biotite clinopyroxene monzonite
	Oi	Diorite, leucodiorite
	Om	Monzonite, monzogabbro, quartz monzonite
Moorilda Monzonite	Omm	Clinopyroxene monzonite, altered monzonite
Errowan Monzonite	Orm	Biotite clinopyroxene monzonite, altered quartz syenite, pyritized monzonite
Stokefield Metagabbro	Osg	Foliated plagioclase-phyric metagabbro
Swallow Creek Porphyry	Osp	Hornblende andesite
Tallwood Monzonite	Otm	Porphyritic clinopyroxene monzonite and monzodiorite

CABONNE GROUP

Blayney Volcanics	Ocb	Clinopyroxene basalt, agglomeratic in places; volcanic sandstone
Cowriga Limestone Member	Ocbl	Foliated, recrystallised, grey limestone
Forest Reefs Volcanics	Ocf	Mafic volcaniclastics, volcanic conglomerate, siltstone
	Ocfb	Clinopyroxene basalt, agglomeratic in places, basaltic subvolcanic intrusives
	Ocfp	Volcanic conglomerate
	Ocft	Latite
Rockley Volcanics	Ocr	Volcanic sandstone, minor breccia and conglomerate
	Ocru	Metabasalt, peridotite and pyroxenite
Weemalla Formation	Ocw	Feldspathic siltstones, sandstone; minor conglomerate, calcareous mudstone, lavas and sills
Mount Pleasant Basalt Member	Ocwm	Porphyritic trachybasalt, pillow lava
	Ocws	Siltstone, sandstone, mudstone, chert
	Ocwt	Mafic volcaniclastics, sandstone, conglomerate
Byng Volcanics	Ocy	Basalt, volcaniclastic sandstone

KENILWORTH GROUP

Coombing Formation	Oko	Feldspathic siltstone and sandstone, chert
Triangle Formation	Okt	Volcanic and quartz sandstone, phyllite, metabasalt, chert, slate
	Okts	Siltstone
	Oktv	Actinolite schist

ADAMINABY GROUP

	Oa	Quartz sandstone, siltstone, slate, phyllite, black carbonaceous slate, chert
	Oas	Carbonaceous slate, shale

Ordovician

Palaeozoic

Geological boundary

Fault

Fault displacement, dextral movement

Fault displacement, sinistral movement

Thrust fault. Triangle on older rocks

Dyke or Vein: **Ddr** -felsic to intermediate; Unlabelled dykes are Carboniferous dolerite

Anticline showing plunge

Syncline showing plunge

Overturned anticline

Overturned syncline

Where location of boundaries, faults, and folds is approximate, line is broken; where inferred, queried; where concealed, boundaries and folds are dotted, faults are shown by short dashes

Trend-line

Trend line. Geophysical interpretation

Lineament. Airphoto interpretation

Lineament. Geophysical interpretation

Sub-surface magnetic anomaly

Limestone marker horizon

Joint pattern. Airphoto interpretation

25 Strike and dip of strata

Vertical strata

Horizontal strata

78 Strike and dip of inverted strata

60 Strike and dip of strata. Dot indicates proved direction of facing

Strike and dip of joint

45 Strike and dip of foliation

57 Vertical foliation

80 Strike and dip of cleavage

Vertical cleavage

Igneous layering

Kink fold showing plunge

Sample locality for isotopic age determination

Watercourse

Lake

Main road

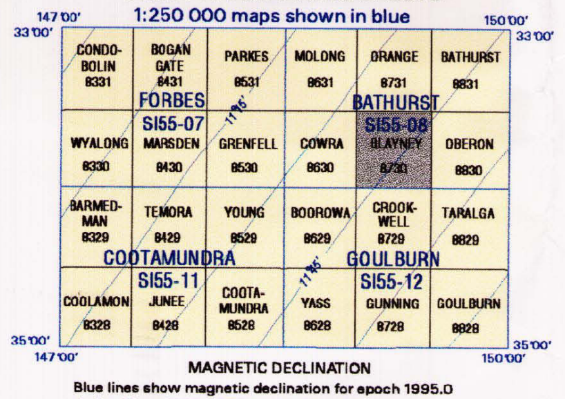
Minor road

Railway

Built-up area

INDEX TO ADJOINING SHEETS

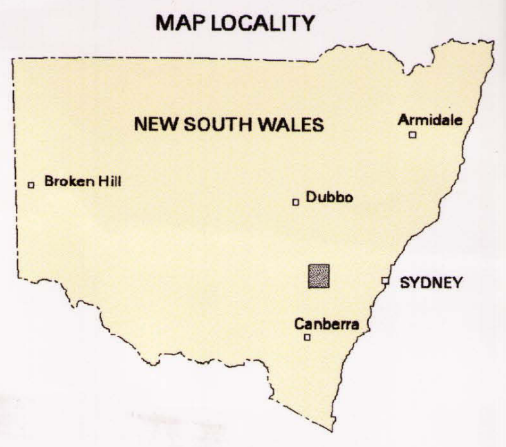
1:250 000 maps shown in blue



MAGNETIC DECLINATION

Blue lines show magnetic declination for epoch 1995.0 derived from 1990 AGRF model. Annual change is 2'4" per year easterly at the centre of the map. Information is current to 1995

MAP LOCALITY



SCALE 1:100 000

1 0 1 2 3 4 5 6 7 8 9 10 Kilometres

UNIVERSAL TRANSVERSE MERCATOR PROJECTION
LATITUDE OF ORIGIN: 0°. LONGITUDE OF ORIGIN: 129°
HORIZONTAL DATUM: AUSTRALIAN GEODETIC DATUM 1966

UNIVERSAL GRID REFERENCE

GRID ZONE DESIGNATION
55H
100 000 METRE SQUARE IDENTIFICATION
FC GC
$^{7}00$

IGNORE the SMALLER figures of any grid number; these are for finding the full co ordinates. Use ONLY the LARGER figures of the grid number; example: $^{6}86^{000}$

TO GIVE A STANDARD REFERENCE ON THIS SHEET TO NEAREST 100 METRES

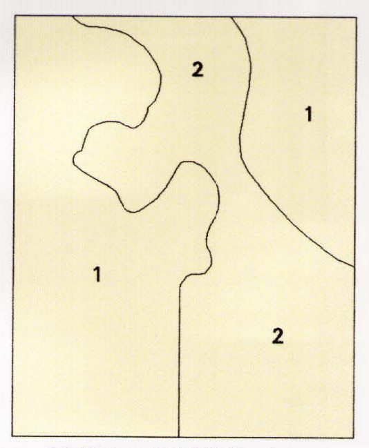
SAMPLE POINT: MOUNT RYAN

1 Read letters identifying 100 000 metre square in which the point lies:	GC		
2 Locate first VERTICAL grid line to LEFT of point and read LARGE figures labelling the line either in the top or bottom margin, or on the line itself:		25	
3 Estimate tenths from grid line to point:		7	
4 Locate first HORIZONTAL grid line BELOW point and read LARGE figures labelling the line in either the left or right margin, or on the line itself:			51
5 Estimate tenths from grid line to point:			8
SAMPLE REFERENCE :	GC257518		

If reporting beyond 18 Degrees in any direction, prefix Grid Zone Designation, as: 55HGC257518

Grey numbered lines are 1000 metre intervals of the Australian Map Grid, Zone 55. Grid values are shown in full only at the southwest corner of the map

RESPONSIBILITY DIAGRAM

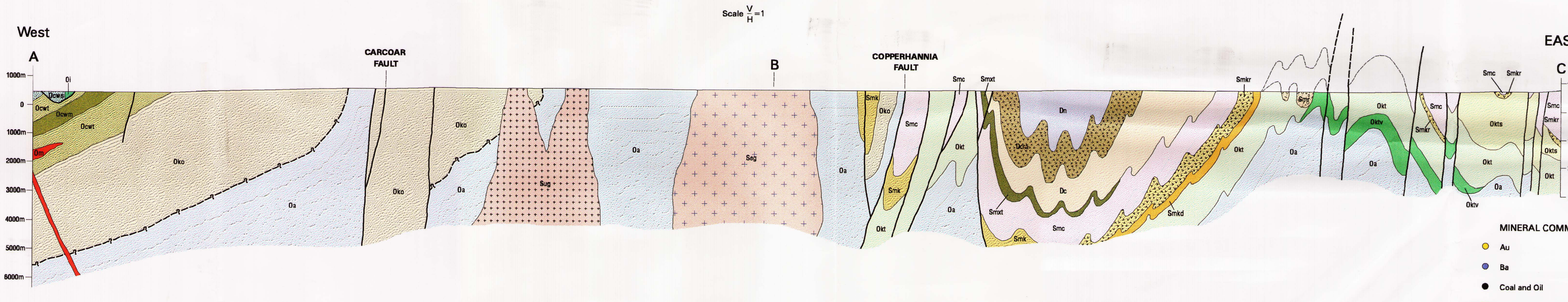


1 D. Wyborn, 2 G.A.M. Henderson

SECTION

Cainozoic units omitted

Scale $\frac{V}{H}=1$



MINERAL COMMODITY

● Au
● Ba
● Coal and Oil
● Cu
● Cu and Au
● Fe and Mn
● Gems
● Industrial (incl Lst,Mar,Road Gvl)
● Miscellaneous (incl As,Ni,Co,Cu,Au)
● Polymetallic (mainly Pb,Zn,Cu)
● Pyrite
● Sn, W, Mo

MINERAL DEPOSITS

Deposit numbers refer to Bathurst Mineral Occurrence Database, Department of Mineral Resources, NSW

No.	Name	Size	Grid Ref.
1	Glendale Deposit	Medium	857817
2	Glendale North Deposit	Small	859820
3	Prince of Wales Alluvials	Occurrence	859823
4	Prince of Wales Mine	Small	864824
5	Gold Hill Workings	Occurrence	867827
6	Hillview Workings	Occurrence	875832
7	Westhill Shaft	Occurrence	861829
8	Bakers Shaft	Occurrence	861788
9	Sunnyridge Hills Prospect	Occurrence	873788
10	Braeburn Workings	Occurrence	868845
11	Cheesmans Prospect	Occurrence	930841
12		Occurrence	929860
13		Occurrence	945896
14	Mt Crockwell Mine	Occurrence	281489
15	Browns Creek Gold Mine	Large	004882
16	Browns Creek South Area	Occurrence	007876
17		Occurrence	073886
18	BY Deposit	Small	077884
19	Westbrook North Prospect?	Occurrence	060907
20		Occurrence	020897
21		Occurrence	992911
22		Occurrence	882801
23	Osborneville Copper Mine	Occurrence	099773
24	Blue Bird Mine	Occurrence	111832
25	Sugarloaf Prospect	Occurrence	087831
26	Kareela Woolshed Prospect	Occurrence	148906
27	Blayney Copper Deposit	Small	077868
28		Occurrence	059880
29	Infirtaris Mine	Occurrence	892885
30	O'D Mine	Occurrence	903890
31	Colemans Mine	Occurrence	905898
32	Wallaby South Prospect	Occurrence	906902
33	Triangle Flat Alluvials	Occurrence	904906
34	Wallaby Prospect	Occurrence	918910
35	Crows Hill Mine	Occurrence	924894
36	Gooleys Prospect	Occurrence	934895
37		Occurrence	944892
38	Discovery Ridge Deposit	Medium	945707
39	Bald Hills Prospect	Occurrence	970737
40	Golden Gully Prospect	Occurrence	950770
41	Greenbrook Workings	Occurrence	121756
42		Occurrence	946682
43		Occurrence	946687
44		Occurrence	941686
45		Occurrence	945673
46		Occurrence	945705
47	Scabben Flat Mines	Small	115574
48	Mt. Dudley Mine	Small	119573
49	Mt. Dudley West Mine	Occurrence	121565
50	Golden Wattle Mine	Small	120587
51	Kempfield Barytes Mine	Small	089591
52	Davis Reef	Occurrence	133583
53	Gallymont Mines	Small	948650
54	Somers Prospect	Occurrence	945730
55	Caloola Creek Mine	Small	297790
56	Caloola North Prospect	Occurrence	298795
57		Occurrence	297797
58	Wilson Group of Mines	Small	155575
59	Carcoar Mine	Small	992775
60	Gold Hills East Workings	Occurrence	871824
61	Golden Gully Alluvial Workings	Occurrence	942760
62		Occurrence	937757
63	Golden Gully Deep Lead Workings	Occurrence	944772
64		Occurrence	021771
65		Occurrence	990753
66		Occurrence	891735
67	Three Mile Diggings?	Occurrence	920782
68	Pine Ridge Gold Mine	Small	119426
69	American Star Group of Mines	Occurrence	155560
70	Chard & Arthur Group of Mines	Small	152555
71	Somers Trig Prospect	Occurrence	984647
72	Newbridge Slate	Large	191850
73		Occurrence	237537
74	Shaw Prospect	Occurrence	046730
75	Rosedale Workings	Occurrence	267760
76	Byrnes Creek Prospect	Occurrence	260540
77	Copperhannia Marble Deposit	Unknown	111480
78	Jarvis East Prospect	Occurrence	913913
79	Mandurama Ponds Alluvials	Occurrence	867768
80	Fish East Prospect	Occurrence	907910
81	Fish West Prospect	Occurrence	902912
82	Coombing Park Iron Mine	Medium	975754
83	Stokehill Prospect	Occurrence	975791
84	Coombing Copper Mine	Occurrence	965765
85	Summers Copper Mine	Occurrence	985733
86	Molloys Arsenic Prospect	Occurrence	980710
87		Occurrence	961705
88	Haddon Park Prospect	Occurrence	176794
89	Bright Star Mine	Occurrence	188840
90	Davis Mine	Occurrence	171811
91	Pullens Mine	Small	199795
92	Shell Zone	Medium	089584
93	INCO Zone	Occurrence	085580
94	Sugarloaf Zone	Occurrence	082570
95	Patience of Womans Reef	Occurrence	107587
96	Mastodon Mine	Occurrence	077602
97	Colossal Reef	Occurrence	075590
98	Portion 74 Prospect	Occurrence	082892
99	Mount Grey Mine	Occurrence	182437
100	Coodah Creek	Occurrence	202387
101	Quigley's Hill Copper Mine	Occurrence	097817
102	Athole Blayney Mine	Occurrence	105842
103	Blayney Iron Mine	Occurrence	062838
104	Mt Errol Mine	Occurrence	074834
105	Number Seven Group of Mines	Occurrence	157571
106	Golden Point Mines	Occurrence	150542
107	Young Australian Group of Mines	Occurrence	148535
108	Wrights Group of Mines	Occurrence	160580
109	Podgers Reef	Occurrence	163648
110	Yellow Streak Mine	Small	163645
111		Occurrence	027620
112		Occurrence	994806
113		Occurrence	992815
114		Occurrence	982817
115		Occurrence	987821
116	Stoke Hill West	Occurrence	975804
117	Location 'C'	Occurrence	983848
118	Flyers Creek Alluvial Workings	Occurrence	892894
119	Wire Gully Diggings	Small	868903
120	Newbridge Iron Quarry	Occurrence	200816
121	Lowe and Duffields Shaft	Occurrence	182810
122	Area 16 Prospect	Occurrence	235554
123	Area 15 Prospect	Occurrence	250575
124	Area 10 Prospect	Occurrence	292520
125	Triangle Flat Workings	Occurrence	297607
126	Mount Crocker Deep Lead	Occurrence	295465
127	Area 7 Prospect	Occurrence	300630
128	McKenzie Grid	Occurrence	888884
129	Millners Prospect	Occurrence	010870
130	Little Mt Macquarie Mine	Occurrence	020740
131	Pembroke Prospect	Occurrence	242562
132	Diamond Creek Prospect	Occurrence	222561
133	Hobby Yards Prospect	Occurrence	190713
134		Occurrence	168709
135	Mount Nicholl Mine	Occurrence	120470
136	Betsys Flat Mine	Occurrence	104502
137		Occurrence	112500
138	Mountain Run Mine	Occurrence	124534
139	Craiglea Mine	Occurrence	165663
140	The Reeds Iron Mine	Occurrence	075445
141	Barratts Reef	Occurrence	178619
142		Occurrence	126455
143		Occurrence	102425
144	South Vanderbilt Mine	Occurrence	088478
145		Occurrence?	123431
146	Scrubby Rush Mines	Occurrence	194365
147		Occurrence	302552
148		Occurrence?	158622
149	Bald Ridge Prospect	Occurrence	202442
150	Thompsons Creek Prospect	Occurrence	188401
151		Occurrence	178430
152	Mt Somers Talc Mine	Occurrence	987649
153	Gully Swamp Mine	Occurrence	078570
154	Caloola Marble Quarry	Occurrence	296803
155	Rise and Shine Mine	Occurrence	302774
156		Occurrence	297774
157	Caloola South Prospect	Occurrence	311772
158		Occurrence	307762
159	King Workings	Occurrence	866767
160	East Ridge Workings	Occurrence	869766
161	Caravan Workings	Occurrence	863768
162	House Workings	Occurrence	857767
163	Browns Creek Mine	Occurrence	302776
164	Last Chance Mine	Small	164897
165		Occurrence	174880
166	Hodsons Mine	Occurrence	179868
167	Mt. Willis Mine	Small	189878
168	Sugarloaf Hill Mines	Occurrence	190870
169	Craig Lea Mine	Occurrence	196776
170	Bringellet Marble Quarry	Unknown	286708
171		Occurrence	932466
172		Occurrence	951475
173	Minkey Reef	Occurrence	978455
174	Boltrells Tunnel	Occurrence	049398
175	Paddys Hill Mine	Occurrence	201556
176		Occurrence	220574
177	Grove Creek Iron Deposit	Occurrence	219547
178	Garland Quarry	Unknown	910564
179	Mandurama Prospect	Occurrence	961725
180	BY North-West	Occurrence	075894
181	Gays Lane Prospect	Occurrence	056888
182	Trendon Grange Prospect	Occurrence	164858
183	Gully Prospect	Occurrence	982835
184	Hobbys Yards Prospect Extended	Occurrence	195720
185	Stirling Downs Prospect	Occurrence	111863
186	Wood Gully Gossan	Occurrence	120420
187	Rose of Australia Mine	Occurrence	135513
188		Occurrence	066848
190		Occurrence	072873
191	Cadia Fault Extension	Occurrence	925697
192	Weston South Prospect	Occurrence	975855
193	Glendale Alluvials	Occurrence	856817
194	Glendale North Alluvials	Occurrence	862820
195	Gold Hill Alluvials	Occurrence	867829
196	Westhill Alluvials	Occurrence	861828
197	Wire Gully Diggings	Occurrence	867902
198	Area 10 Alluvials	Occurrence	292520
199	Mountain Run Creek Alluvials	Occurrence	127534
200		Unknown	306757
201		Unknown	991565
202		Occurrence	151519
203	Sounder Flat	Occurrence	088393
204	Spring Gully diamond locality	Occurrence	227581
205		Occurrence	194813
206		Occurrence	115576
207		Occurrence	968719

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