A brief statement outlining the official response of the Land Council will be prepared after they have discussed the matter and will be forwarded when it becomes available. The Land Council is concerned about the preservation of Aboriginal heritage within their district and wishes to be kept informed of any future proposed developments that might impact on Aboriginal archaeological sites.

A copy of the final report will be sent to the Land Council for their records.

3. ENVIRONMENTAL SETTING

3.1 Regional Environment

The study area is situated near the northern extent of the Sydney Basin, towards the south-western edge of the Lower Hunter Plain physiographic region of the Hunter Valley.

The study area lies in the Beresfield Soil Landscape System (Matthei, 1995: pp30-33). This landscape system is generally characterised by low, rounded ridges and knolls, with gentle to moderate slopes (3-15%); local relief is up to 50m and elevation ranges between 20m and 50m. The landscape’s geology is based on Permian age sediments, primarily Torrington Coal Measures consisting of shale, sandstone, mudstone, coal, tuff and clay, overlying Mulbring Siltstone sediments of siltstone, claystone, thin sandstone and limestone.

The typical native vegetation in this landscape consists primarily of dry sclerophyll forest, dominated by spotted gum (E. maculata), broad-leafed ironbark (E. fibrosa), grey ironbark (E. paniculata), grey gum (E. punctata) narrow-leafed stringybark (E. oblonga) and thin-leaved stringybark (E. eugenioides). A variably dense understorey consists of a variety of native shrubs, herbs and grasses, including blackthorn (Bursaria spinosa), various paperbarks (including Melaleuca nodosa) and various wattles (including sickle wattle -Acacia falcata).

The study area lies at the end of a southward extension of Woodberry Swamp, part of an extensive system of wetlands dominated by Hexham Swamp, which fall within the Hexham Swamp Soil Landscape System (Matthei, 1995: pp220-222). These wetlands occupy a broad floodplain consisting of Quaternary estuarine/lacustrine sediments, silts and clays, extending between 2 km and 8 km west of the Hunter River. The topography has a surface gradient of <1% and local relief is <2m. The dominant soil type consists of an acid A horizon of black, pedal silty clay loam overlying an alkaline B horizon of saturated, grey, sticky plastic clay. The soil parent material also includes large amounts of decayed organic matter. A permanent watertable lies within 60cm of the surface, rising to the surface during wet seasons and producing waterlogging. A variety of depositional environments have been identified, with most of the recent sediments derived from the catchment of Ironbark Creek and from overflow from the Hunter River during floods.

The Hexham Swamp area is classified as a 7(b) wetland, which now functions as a flood storage for overbank Hunter River floods (Lawson & Trelor Pty Ltd ,1993). In recent

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years, a number of drainage control measures have modified the water supply to the wetland zone. As part of the Public Works Department flood mitigation works program, levee banks were built along the Hunter River in the 1960-1970's, and floodgates were installed at the mouth of Ironbark Creek to control the rate at which the swamp drains after flooding.

Hexham Swamp forms the western extent of a variable ecological continuum across the lower Hunter River which includes Kooragang Island and Fullerton Cove, as well as Woodberry Swamp and Tarro Swamp to the north. This area provides an extensive and diverse area of wetlands and estuarine environments with a spectrum of watery habitats ranging from freshwater to various degrees of salinity, and a wide variety of vegetation communities and associated biomass. The current study area lies in close proximity to both Hexham and Woodberry Swamps, with ready access to the water and food resources that these swamps are likely to have provided for the prehistoric Aboriginal population around their margins.

In the past, the swamps probably contained much more open water than is currently present, but they have subsequently been subject to gradual infilling by sediments carried by inflowing streams. Following the stabilisation of the present sea level at 6,000 YBP, and the formation of the coastal barrier system, it is likely that saline water extended up the Hunter River further than at present, probably beyond Maitland (Dean-Jones, 1992). The eastern part of the swamps was probably estuarine until the inundation and drainage patterns of the swamps were altered by European activities, including the construction of floodgates at the entrance to the swamps and other, linear, structures such as the Chichester Pipeline, which impede water flow to the northern and western edges of Hexham Swamp (Matthei, 1993: 23). The swamps are currently fed by numerous low order creeks and gullies from the hilly bedrock landscape around the western and southern margins of the swamp. The southern section of Hexham Swamp drains into the Hunter River through the tidal channel of Ironbark Creek and its catchment system, while the northern section is drained by several channels feeding into the Purgatory Creek system. Woodberry Swamp is drained by the Greenways Creek system.

The modification of the supply of tidal water to the swamp environment and the consequent impact on the degree of salinity has affected the complex vegetation pattern present. At least sixteen vegetation associations have been identified across the swamp, with the distribution of species varying according to salinity, water level and duration of inundation. Mangrove species prefer the highly saline tidal reaches; reeds and rushes prefer moderately saline conditions; Melaleuca and Casuarina tree species prefer less saline areas. Ground inundated by fresher water can support communities of water ribbons, hyacinth and cumbungi.

3.2 Local Environment
The current study area consists mainly of a section of undulating floodplain bordering Weakleys Flat Creek. Elevation of the study area ranges from 2m ASL on the creek up to 7m ASL at the highest point on the plain. The area has been extensively cleared of its original forest vegetation, leaving scattered Eucalypts with a ground cover of introduced pasture grass.

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Weakleys Flat Creek is an ephemeral stream which originates from an extensive catchment in hill country to the south-west and flows to the north-east along the northern boundary of the study area to empty into the south-west corner of Woodberry Swamp. This creek normally follows a diffuse, swampy drainage line along the base of a low, broad spur ridge which forms a watershed between the creek and Scotch Dairy Creek to the north. To the east of Weakleys Drive, the creek has been modified by the excavation of a straight, open channel which carries the creek flow to the north-east. After passing under the New England Highway, it empties into the wetlands to the east of the highway. A variably dense belt of *Melaleuca* is spread along the creekline.

To the south and east of the study area, the landscape consists of low, forested ridges and lower slopes which are currently being cleared and landscaped for the continuing development of a recently established industrial estate ('Holmwood Business Park'). An ephemeral creekline (Viney Creek), now extensively modified, runs across the south-eastern corner of the study area and between the 'Holmwood' residence and the low ridges to the east.

3.3 Current Landuse

The study area is part of a pastoral property, 'Holmwood', which is gradually being converted to manufacturing and light industrial subdivisions. The study area has been divided into a number of fenced paddocks and is currently used for grazing cattle.

On the eastern edge of the study area, two large metal machinery sheds are situated on opposite sides of an open, cleared space on a low rise. A narrow access track runs north-east along the rise from Weakleys Drive to the sheds and on to the 'Holmwood' residence. This track has been surfaced by a mixture of soil and fragments of porous rock.

An irregular dam had been excavated in a low-lying area to the south of the sheds, on the western side of the Viney Creek drainage line. This location was probably part of the original diffuse drainage depression followed by the creek. At the time of the survey, this dam was full, due to recent rain.

It is understood that in parts of the study area, the ground has been infilled and built up to improve drainage by the dumping of gypsum. However, the exact location and extent of this fill in relation to the existing topography is not known and would become apparent only through sub-surface investigation.

4. ARCHAEOLOGICAL BACKGROUND

4.1 Introduction

Open campsites form the majority of sites found throughout the Hunter Valley. The definition of the amount of material which constitutes a site can vary according to the rationale behind the classification, eg for CRM purposes, an arbitrary limit of at least two artefacts occurring within 50m of each other is classed as a site, ostensibly to distinguish a deliberate activity area from incidental discard or loss while people were moving about the countryside. It is considered that single artefacts are more likely to be the result of

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accidental loss while moving about the landscape and do not necessarily indicate locations where Aboriginals camped or engaged in stoneworking or subsistence activities. Such artefacts are classed as 'isolated finds' (IF).

Extensive research in the central and upper Hunter Valley has resulted in a considerable body of information and analytical methodology for open campsites in this area, but to what degree this is relevant to sites in the lower Hunter Valley is not yet established. Most of the detailed archaeological research carried out in the Hunter Valley has tended to be associated with large scale developments (eg coal mines, power stations) or residential subdivisions.

Where few artefacts are found, the reason may involve one or more factors, such as limited ground surface visibility due to the often dense forest and ground cover, a lack of erosion, coverage of previous surfaces by the downslope movement of sediment, or the integration of artefactual material into the soil away from the surface through bioturbation, rather than a true reflection of the actual size and contents of sites and the intensity and patterning of Aboriginal settlement. The detection of sites and the establishment of a site distribution model depends largely on the degree of visibility present and the placement and extent of commercial developments requiring archaeological studies.

At most open campsites in the Central Lowlands region (eg Bulga and Camberwell; Koettig, 1992) it was found, by excavation, that archaeological material tended to form a continuous 'site' along the flats bordering larger, more reliable watercourses, although archaeological investigations have been mostly confined to the flats and therefore the apparent distribution of material may not reflect the wider settlement pattern. Whether particular sections of the creek flats were preferentially occupied has also not been explored, although the frequency of occupation of particular locations will generally depend on the availability of various resources, especially those of seasonal sensitivity.

As Dean-Jones & Mitchell (1993; 67) point out, the lack of information on the distribution of sites means that it is still not possible to be able to accurately predict where sites are likely to occur, although it is probable that sites will be found in all environmental zones and on the full range of physiographic units. The present apparent distribution of archaeological material is often a function of the degree and extent of visibility resulting from exposure caused by erosion, and the high concentrations of sites along creek lines reflects the greater amount of exposure within this landscape which tends to expose archaeological deposit and leads in turn to more intensive investigation.

The second most common site type in the region are axe grinding groove sites, usually found in groups on suitable bedrock outcrops in watercourses. Examples of other site types such as scarred trees, quarries, fish traps, stone arrangements and rockshelters containing art can also be found. Shell middens tend to be concentrated around the wetlands and in dune systems nearer the coast. A variety of ceremonial sites, mythological sites and burial sites have also been reported, although it is not always possible to confirm their existence or precise location.
4.2 Description of Main Site Types

Open campsites constitute over 70% of all sites found in the lower Hunter Valley (Brayshaw, 1994). This site type consists predominantly of scatters of stone artefacts at locations where groups of Aboriginal people have camped for a period of time and have been working stone. The detection of this site type and the estimation of site size and contents is dependent on the degree of archaeological visibility (a combination of vegetation cover and the extent of erosion) present at the time of the survey. They can occur on a range of topographic locations but are found mostly on low gradient, better drained surfaces such as terraces, low rises and lower slopes, near fresh water sources such as rivers, creeks and swamps. They have also been recorded on more elevated locations such as ridgetops and saddles. They may range in size from the NP&WS minimum of only 2 artefacts within 50m to several thousand artefacts scattered in a variable density over several hundred square metres. At larger sites, it may be possible to identify activity areas where concentrations of artefacts have been produced by localised stoneworking events.

In the Lower Hunter region, many of these sites have been described as 'small', ranging in size up to 25-30 artefacts (although most contain fewer than 10 artefacts), but it is often apparent that they are probably larger in area and artefact numbers than is indicated by the visible surface evidence alone.

At suitable site locations, sub-surface deposits of stratified in situ archaeological material may be present. This deposit has accumulated during one or more periods of occupation and may have potential for scientific research, providing information on such issues such as changes in stoneworking technology over time. The evidence usually consists of a sub-surface scatter of artefacts, occasionally in association with hearths and/or stone features where raw stone materials were heat treated for easier working. In very rare cases, other occupation debris such as animal bones, wooden implements, and, usually in softer sediments, human burials may have survived. A range of raw materials may occur in the site’s stone assemblage, including indurated mudstone, silex, chert, quartz, quartzite, acid volcanic or petrified wood. A variety of artefact forms may be present, reflecting a range of subsistence activities or stoneworking techniques.

A fuller assessment of the nature and significance of the deposit at these sites or potential site locations requires some degree of excavation. The absence or low density of archaeological evidence found on the surface at apparently suitable campsite locations does not necessarily accurately represent the amount and extent of archaeological material present below the surface.

Grinding Grooves, produced by abrasion during the formation of edge-ground artefacts, tend to occur on horizontal exposures of suitable rock. They are usually found in watercourses or near a water source, but are sometimes found near holes on rock outcrops below seepage areas, or beneath driplines in rock shelters, wherever an exposure of suitable rock occurs. The type of rock preferred was usually a fine-grained sedimentary rock, such as Hawkesbury Sandstone and, less commonly, Narrabeen Sandstone.

Grooves can vary in length up to 50cm, in width up to 15cm and in depth up to 8cm. Most

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grooves have an open, shallow concave cross-section, produced by the sharpening of axes, but narrow, deep, U-shaped grooves also occur; these were apparently produced by sharpening wooden spears. Other abraded grooves or channels may be found in association with axe grinding grooves; their purpose appears to have been to direct the flow of water to specific areas of the exposure. Ovoid hollows, probably used for grinding seeds, are much less common. The number of grooves at a site may vary from one groove to several hundreds.

**Scarred trees** are larger, mature trees which have had a patch of bark removed from their trunks by Aboriginals. The bark was used for a wide variety of purposes, including the making of coolamons or containers, shields, boomerangs, bark shelters and canoes. Trees may also have been scarred by the chopping of toe-holds for climbing to obtain honey or possums. Scars have been found on a number of tree species. They were probably once common in the region, but due to the widespread clearing of native vegetation, as well as various natural causes such as bushfires, are now relatively rare.

Most of the scars seen on tree trunks are of natural origin, most commonly caused by branches or secondary trunks falling off the main trunk and tearing the bark, usually leaving an irregular scar, pointed at the top, which may become more regular when the edges heal. Other natural causes include lightning strikes, insect or bird damage, fire marks, and glancing blows from other falling trees or branches. Modern cultural causes include glancing blows from machinery or surveyor’s blazes.

Because so many scars can be the result of natural events, a number of criteria have been established to determine whether scars are natural or are likely to have been produced by Aboriginal activity. Unless a combination of these factors are present, the scar is usually considered to be of natural origins.

The main criteria for identifying Aboriginal scarred trees are:

1. the shape and location of the scar - it should be of a rounded, symmetrical shape, elongate or rectangular in outline, and with a reasonably even regrowth around the edge of the scar, suggesting deliberate removal of the bark. It should occur some distance above the base of the tree, at a height consistent with an adult person working at removing the bark.

2. the presence of marks made by stone axes, which produce bruised, blunt-edged lines, on the trunk surface around the edge of the scar. However, steel axes were quickly adopted when they became available through direct European settlement or trade, and were probably also used in the historic period. These produce a much sharper cut-line.

3. the age of the tree - it must be old enough to have had an adequate girth at the latest period when scars would have been likely to have been removed, ie usually considered to be over 150 years ago. The estimation of the age of trees is complicated by variability in growth rates which depend on such factors as soil type, topographic location, tree species, climatic conditions. In areas where European settlement has been intensive, there tend to be few trees of a suitable age left, due to clearing for agriculture/pasture, logging or fire.
Rock shelters usually occur on moderate to steep slopes on the sides of ridges, where sandstone clifflines or boulders are high enough for cavernous weathering to have produced protective overhangs which can shelter people and/or art from the elements. Prolonged human habitation can result in the accumulation of occupation deposit which usually contains stone artefacts and possibly a range of other items associated with subsistence activities such as charcoal, bones from animals or birds, and fireplaces. The deposit is often in a stratified form and may provide evidence on technological and subsistence change during the period of occupation, as well as material for dating the beginning and duration of the occupation. Art work may be in the form of charcoal drawings, coloured drawings or stencils (red, white, yellow or bichrome), located on the walls or ceilings. The art can often be damaged or destroyed by a number of natural processes, especially through exfoliation of the rock surface.

Quarries are sites where outcrops of bedrock occur and have been mined by Aboriginals as a source of raw material for the production of artefacts. It is likely that while the variety and availability of raw material may have some affect on the technological strategies that were employed at archaeological sites, these factors do not necessarily dictate their configuration (Baker, 1992:12). The source of raw materials is determined by the type and distribution of bedrock exposures across the landscape, and by the deposition of gravels by fluvial activity. A wide variety of stone materials were used for flaked stone artefacts - some such as silcrete and indurated mudstone were widely spread over the Hunter Valley, while others such as petrified wood appear to be much more limited in their distribution. Silcrete can be obtained from a variety of topographic locations - quarrying from outcrops or collected in gravel beds on terraces or in rivers. One clue to the immediate source of raw materials is the form and size of slightly reduced cores; cobble size core bodies with cortex suggests a water-rolled environment and a gravel source. Indurated mudstone is most likely to have come from the valley of the nearby Hunter River, where it occurs as cobbles, often tabular in shape. Large artefacts with ground surfaces (eg axes) tend to be made of fine grained basic material such as basalt.

The problem of determining the particular source of raw materials found on Hunter Valley sites is not yet fully resolved. The present exposure of outcrops or gravel beds may not reflect the prehistoric distribution of such exposures. It may also be difficult to accurately identify raw materials and thus determine possible origins of the stone. Thus, volcanic tuff may be confused with sedimentary mudstone, or the distinction between chert and fine grained mudstone may be blurred.

4.3 Previous Investigations

A number of archaeological investigations have been carried out in the Lower Hunter region, around Hexham Swamp and in the adjacent hinterland. These studies have resulted in the discovery of a number of sites, mostly open campsites. Most were recorded as small sites containing few artefacts, often occurring in disturbed contexts and providing little useful information, although, as has been discussed previously, the detection and assessment of sites is probably often hindered by poor visibility and may not be an accurate reflection of the pattern of occupation.
In the immediate vicinity of the current study area, a survey on the industrial estate immediately to the east had been carried out by Curran (1995). This survey recorded a total of 6 small open campsites on the lower slopes and creek flats. The survey had apparently inadvertently included the south-east corner of the current study area and one site (NP&WS Site #36-4-388) was found in this area. This site had been recorded as an extensive scatter of artefacts occurring at several locations over an area of 400m x 300m, mainly on the northern side of the dam and along the western edge of the then Viney Creek channel. The artefacts had been exposed by excavation of the dam and the creek channel.

However, although this site was originally described as containing c.200 artefacts, all made on silcrete and including cores, flaked pieces and a backed blade, it was also stated that much of the raw material present was in the form of 'amorphous pieces and blocks' ie non-artefactual items, possibly imported from elsewhere. Natural silcrete gravel deposits are known to occur in the Beresfield area and have been found during excavations at Woodberry Swamp (Kuskie, 1995). These locations were probably used as quarry/manufacturing sites, resulting in a mixture of artefactual and non-artefactual pieces of rock.

During the current survey, the area along the western side of the creek was densely grassed and, due to recent heavy rain, the dam was full to the grassy edge. Conditions of visibility were very poor, compared to the conditions at the time of the original survey 2.5 years ago, when, it is assumed, the excavations were comparatively recent and the exposure was much greater.

The indicated locations of the artefact concentrations were relocated during the current survey but poor visibility prevented any meaningful assessment of their archaeological significance. The main exposure currently present was along the partly turfed shoulders and sloping wall of the landscaped and altered creek channel. A number of silcrete fragments were noted on the wall, but all fragments appeared to be natural origin and no definite archaeological evidence was seen. The evaluation of the location was complicated by the extensive landscaping activity which has disturbed the area, and the potential for heavy machinery to impact on the rock fragments.

In short, the degree of visibility existing during the current survey was not sufficient to allow an adequate assessment of the archaeological values of the site location, ie whether this scatter of artefacts was a 'real' site formed by aboriginal occupation adjoining the Vineys Creek channel, or whether the scatter consisted of a mixture of natural fragments and artefacts introduced as fill from elsewhere around Beresfield, or whether they might be a combination of the two sources. A more accurate assessment of the archaeological significance of the location and recommendations for its future management would require a more intensive investigation of the subsurface context at an undisturbed part of the potential site area (see Section 7 for discussion on further research at this location). The existence of a number of archaeological sites recorded by Curran (1995) on the nearby landscape would tend to confirm that aboriginal occupation was widespread in this area, but detailed information on the contents and context of these sites is not available.
Immediately north of Weakleys Flat Creek, a recent survey by Effenberger (n.d.) recorded an extensive scatter of artefacts on a ridgetop. This site was located in a 132KV transmission line easement, on the western edge of a cutting on Weakleys Drive.

Other archaeological evidence found in the Lower Hunter region is summarised below. Surveys by personnel from Resource Planning Pty Ltd (1993,1994) of the location proposed for the Glenwood Industrial Estate revealed only one Aboriginal site, consisting of two artefacts in a disturbed context (on an eroding vehicle track), near Four Mile Creek. A number of structures and relics of potential historical significance were also identified in this area. A subsequent survey by Stuart (HLA-Envirosciences, 1995) identified a single location where there was a concentration of stone fragments of 'possible' archaeological significance. A survey by Silcox (1995) of a proposed rural residential subdivision on the New England Highway at Thornton did not find any evidence of Aboriginal occupation, although visibility was greatly limited by dense vegetation. No evidence of Aboriginal occupation was found during a survey by Silcox (1997a) of a proposed sewer line route at Somerset Park, Thornton. A small open site (#38-4-325) consisting of 3 artefacts was recorded by Dean-Jones (1992) on the northern edge of Hexham Swamp, in a disturbed context on a low spur near the junction of Anderson Drive and the New England Highway.

Four small open artefact scatters (#38-4-121,123, 124 and 125) all containing fewer than 11 artefacts, have been recorded on the slopes bordering the north-western margins of Woodberry Swamp. A subsequent survey by Kuskie (1993) in this area revealed the presence of 9 small artefact scatters, spread across two low, broad ridges bordering the western side of the swamp.

Three small open sites have been found on the western side of Black Hill, while a cluster of 4 small open sites have been recorded at Shamrock Hill. Other sites in the vicinity of Black Hill included a scarred tree (#38-4-15), an axe grinding groove site (#38-4-158) and a rock shelter with art and axe grinding grooves (#38-4-160).

Recent surveys by Silcox (1997b) of a proposed subdivision of c.73ha at Weston (1997a) and of c.40ha at Ellalong (1998a) did not find any evidence of Aboriginal occupation, although at both areas visibility was very low due to dense forest and/or leaf/bark litter. A survey for a proposed quarry extension immediately west of Ellalong Colliery had also failed to find any sites (Resource Planning Pty Ltd, 1990).

Sub-surface investigations have been carried out at three locations on the north-western edge of Hexham Swamp, with extensive scatters of stone artefacts found at each place. One location was on the western margins of Woodberry Swamp, at Thornton (Kuskie, 1994). The excavation program at this location revealed an additional 3 open campsites to the 9 sites already recorded in this area. A total of 1,234 artefacts was recovered from the entire program - 208 from the surface collection and 1,026 from the excavated deposit of 21.57m³. The range of artefact types and raw materials recovered appeared comparable to other sites from the Central Lowlands. One site (No 9) displayed

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evidence of lithic procurement/reduction strategies. Silcrete was the predominant raw material present, apparently due to the proximity of local gravel sources. Based on the presence of a number of microblades and the general small size of the artefacts in the assemblages, the sites were identified as being of Late Holocene age i.e less than 4-5,000 years old.

Test excavations were carried out at several locations on a low gradient bedrock ridge at the western edge of Hexham Swamp, near Black Hill (Silcox & Ruig, 1996: #38-4-375). This work revealed that artefacts were distributed widely across the ridgetop, and that the range of artefact types and raw materials recovered appeared comparable to the Woodberry Swamp assemblages and to other open campsites from the Central Lowlands. Silcrete and indurated mudstone were the predominant raw materials present. On the basis of the artefact forms present, which included a range of microblade technology, it was considered that this site was also less than 4-5,000 years old.

Baker (1996) has also undertaken a program of test excavations in the vicinity of Black Hill, at two locations on the route of the F3 Freeway connection (#38-4-410, #38-4-376). High densities of flaked stone artefacts were recovered at both locations. The principal raw material used was silcrete, some of which showed evidence of heat treatment. A range of other raw materials (including indurated mudstone, quartz, quartzite) were also represented. Evidence of a 'backed blade' industry, including backed blades, blade cores and associated debris was widespread. Bipolar technology was also present. In general, the flaked stone industry indicated that the age of the assemblage was relatively recent i.e less than 4,500 BP, although several large 'chopper' type artefacts, possible indicators of an earlier occupation period, were also found.

Subsequent salvage excavations in the area (Kuskie & Kamminga, 1997) have also recovered a large amount of archaeological material, including evidence of a number of specific activity areas and a hearth. A range of artefact types was found, mostly associated with microblade technology. The predominant raw materials were silicified volcanic tuff and silcrete.

On the southern edge of Hexham Swamp, a survey was recently undertaken by Silcox (1998b) immediately east of the village of Minmi. The survey covered an area of c.27ha, on a ridge side and an adjacent wide valley, at the mouth of a creek on the edge of Hexham Swamp. The survey found only a single artefact, but two potential site locations were identified, on extensive elevated and level surfaces overlooking the creek valley. A subsequent survey by Silcox (1998c) of a small area of c.6ha at Styles Grove, on the western edge of Maryland, found one small site of 3 artefacts, plus a single artefact. A potential site location was also identified.

A sparse scatter of artefacts (#38-4-70) has been recorded at the junction of Minmi Road and Stockington Road, on the eroding surface of a ridge.

A program of test excavations has recently been carried out at the location of a proposed subdivision 'Nikkinba Ridge' (Mills, 1998) on Wentworth Creek, c.1km south of the southern edge of Hexham Swamp. To date, there are few details available on the results.
and the significance of this work, but it appears that a low density scatter of artefacts was present on a high, moderately sloping bank overlooking a junction of several creek channels. A total of 25 1m x 1m square pits were dug at 5 locations, ie 5 pits at each location. Each pit was dug by backhoe, to a depth of c.30-40cm, and the deposit was dry sieved through 5mm mesh. A total of 104 artefacts were recovered from the excavations. All artefacts were apparently made on silcrete, although information on the full range of artefact types and raw materials represented is not yet available (Mills, pers. comm.)

At one location, 58 artefacts were found in five pits; the maximum number of artefacts found in one pit at this location was 18, while 15 were found in another pit. The proportion of modified artefacts at this location was remarkably high, consisting of 10 flakes and 1 flaked piece with retouch/usewear, plus 1 core. At another location, 31 artefacts were found, in 5 pits; the maximum number of artefacts in one pit was 11. At the remaining three locations, the total number of artefacts varied between 2 and 10, found in 2-4 pits. These densities are much lower than those encountered at the 3 sites excavated at Black Hill.

5. SURVEY PROCEDURE
The current survey was conducted by the archaeologist and the Land Council representatives walking across the study area, carrying out a systematic examination of the landscape. Particular attention was directed to the relatively few areas of higher visibility present. On the basis of the known site types recorded in the region, and the form of landscape being inspected, open campsites were considered the most likely site types to be encountered.

Visibility was low (<5%) over almost the entire block, due mainly to a continuous ground cover of dense grass. Several isolated areas of high visibility were provided by a number of exposures eg around the sheds at 'Holmwood', visibility was ≤90% over an area of c.200 square metres of bare earth, while moderately high visibility (30%-60%) occurred on a short section of partly grassed road leading south from the sheds. An exposure of c.100 square metres with ≤95% visibility was provided by a scald on the lower floodplain. Several cattle tracks provided narrow strips of higher visibility (≤90%).

Heavy rain immediately prior to the survey had resulted in waterlogging with extensive surface water in several lowlying areas.

6. RESULTS OF THE SURVEY
No specific evidence of Aboriginal occupation or activity was found during the survey. However, a high proportion (c.95%) of the study area was densely grassed, and surface visibility was consistently very low. The apparent absence of evidence may be a consequence of the low visibility across the area, and an accurate assessment of the archaeological character of the entire area could not be determined by a surface inspection alone.

No bedrock outcrops suitable for the formation of axe grinding grooves or shelters were
present in the study area. Very few possibly mature trees remained in the area; these were inspected for Aboriginal scars but without result.

One location (P1) was identified as a suitable Aboriginal campsite location, with potential for the occurrence of in situ archaeological deposit with research value (Figure 3). P1 occurred on the low, densely grassed rise between the Weakleys Flat Creek floodplain and the drainage line of Viney Creek.

A scatter of silcrete fragments was noted on an elevated pad which has been built up on the edge of the ‘Holmwood’ industrial estate adjoining the north-east edge of the current study area. This pad had apparently been formed of soil material introduced from an unknown source, and the silcrete fragments appeared to have been brought to this location mixed with the soil, as discussed in Section 4, in relation to the situation at #38-4-388. Natural silcrete gravels are known to occur in the Beresfield area and have been found during excavations at Woodberry Swamp (Kuskie, 1995). Several of the fragments appeared to be artefactual, but may be the product of impact from heavy machinery.

No structures or items of possible European historical significance were noted during the survey.

7. DISCUSSION AND ASSESSMENT

The results of the detailed research previously carried out on the western side of Woodberry Swamp (Kuskie, 1994) and at Black Hill (Silcox & Ruig, 1995, Kuskie & Kamminga, 1997;) have confirmed the existence of substantial amounts of sub-surface evidence of Aboriginal occupation on low gradient, elevated surfaces adjacent to the extensive Hexham Swamp system. Aboriginal occupation of the swamp margins was likely to be widespread and intensive, and consideration must be given to the possible impact by proposed developments on Aboriginal cultural heritage anywhere in this zone. However, detailed investigation has so far been limited to only a few locations on the swamp margins, and it is not known whether similar findings would apply elsewhere around the swamp. It is also not known how the prehistoric settlement pattern may be represented in the hinterland away from the swamp.

P1

In the current study area, the main location of potential archaeological significance (P1) occurred on the elevated surface of a low rise which forms an expanse of suitable living surface, with potential for the existence of in situ archaeological deposit, between the Weakleys Flat Creek floodplain and the Viney Creek drainage line. This location is currently crossed by an existing access road from Weakleys Drive to the ‘Holmwood’ residence (Figure 3).

P1 is situated for ready access to Woodberry Swamp to the north and to the main body of Hexham Swamp to the south-east, as well as to the hilly terrain to the west. It may therefore be possible to investigate whether this location formed part of a larger ‘base camp’ complex which concentrated on the exploitation of the swamp resources, or

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whether there are indications of transitory settlement associated with the exploitation of the terrestrial resources of the hinterland, or whether it was an intermediate focus of occupation related to the exploitation of both types of environments.

As discussed previously, the information recorded by Curran (1995) as to the density and variety of archaeological evidence present at #38-4-388 on the Viney Creek drainage line, was inconclusive, but it is possible that evidence of occupation does exist in this area and may extend across the densely grassed surface to the north-west, into P1. The only way to determine whether any substantial amounts of archaeological deposit is present and to assess its significance is by a program of systematic and controlled excavations.

The area of maximum potential sensitivity was arbitrarily defined as c.150m x c.150m (Figure 3), to provide a representative sample of the potential occupation surface. Visibility across the ground surface was extremely low (≤5%) due to a continuous grass cover and/or sediment mantle, and the archaeological character of the area could not be determined by surface inspection alone. It is proposed to construct a new access road from Weakleys Drive, to cross this area and continue to the east, to connect with an existing road in the adjoining 'Holmwood Business Park'.

As far as can be determined, the surface of the rise at P1 has not been disturbed, apart from the existing access road. Some form of cultivation may have taken place across the area but the extent and depth of any disturbance is not known and would only become apparent by excavation. There is still potential for undisturbed deposit to have survived below a plough zone.

It is therefore proposed that a program of test excavations should be undertaken at appropriate intervals across P1, to determine whether archaeological material is present in a subsurface context and to assess its nature, distribution and potential significance. Subsequent management of the area in relation to the proposed development would depend on the results of this investigation.

Aboriginal sites are nominally protected under the National Parks & Wildlife Act (1974), which makes it an offence to knowingly destroy, deface or damage any Aboriginal relic or places without the written permission of the Director of the National Parks and Wildlife Service (NSW).
8. RECOMMENDATIONS

On the basis of the results of the survey, and the preceding discussion, it is recommended that:

1. a program of test excavations should be undertaken at appropriate locations across P1 to determine whether archaeological deposit is present and to assess its nature, extent and likely significance.

These recommendations are conditional on the final agreement of the Mindaribba Local Aboriginal Land Council and the National Parks and Wildlife Service.
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Archaeological Assessment for a Proposed Industrial Estate, Weakleys Flat, Beresfield - R Silcox, 1998
APPENDIX 1: PHOTOGRAPHS
PHOTO 1: View across study area, looking south-west from Weakleys Creek. P1 is in front of white shed in left background, on low rise.

PHOTO 2: View south across densely grassed surface in eastern half of study area, looking from near Weakleys Creek.