

**Archaeological assessment of
Indigenous Heritage values in the
Western Precinct of the St Marys Site, St Marys**

April 2009



Report to Maryland Development Company

Executive Summary

A total of 39 surface archaeological sites with almost 250 artefacts have been recorded within the Western Precinct at the St Marys Development Site. Previous sub-surface investigations in the western end of the Site have produced over 7,000 stone artefacts. The following findings are central to the devising the appropriate management outcome for the Precinct:

- ⊗ Surface archaeological evidence has been found across the Precinct wherever conditions have been appropriate to allow its discovery;
- ⊗ 130 hectares of land has been identified as having archaeological sensitivity (Zones 1, 2 and 3) within this Precinct (Table 4);
- ⊗ A range of landscape and topographic characteristics are found across this Precinct;
- ⊗ Ridge tops, low ridge tops, headwater and 1st order creek lines and upper hillslopes are shale hillslope landscapes particular to this end of the St Marys Site: these are landscapes will be significantly impacted by development here;
- ⊗ The Regional Park will retain a representative proportion of all of these except ridge tops and headwater tributaries (Table 4).

Seven target areas within the developable lands of the Western Precinct have been identified as requiring archaeological salvage prior to development taking place (refer Figure 19).

Table of Contents

1. INTRODUCTION AND BACKGROUND	1
1.1 Background.....	1
1.2 Summary of Indigenous cultural heritage management issues.....	5
1.3 Summary of current assessment and recommendations	8
2. ABORIGINAL CONSULTATION	9
3. ADI SITE: STRATEGIC MANAGEMENT MODEL	10
3.1 Strategies for managing Indigenous Archaeological Sites	10
<i>Background</i>	10
3.2 SMM Protocols	13
4. THE STUDY AREA - the Western Precinct	17
4.1 Geology	17
4.2 Topography	20
4.3 Landscape elements.....	20
<i>Stream Order</i>	22
4.4 Stone Raw Material Sources.....	23
4.5 Vegetation	24
4.6 Existing disturbance	25
4.7 Effective survey coverage (JMcD CHM 1997a, 2006d)	27
5. PREVIOUS FIELDWORK.....	30
5.1 Previous results	31
6. RESULTS	32
6.1 Previous recommendations.....	32
6.2 Landscape elements and areas for investigation.....	38
7. DISCUSSION	41
7.1 The Western Precinct.....	41
7.2 Management Processes: applying the protocols	42
7.3 Salvage Research Design	42
7.4 Impact from the proposed development	49
7.5 Conclusions	49
8. RECOMMENDATIONS.....	50
9. REFERENCES	52

Appendix I – Reports on Indigenous Cultural Values

Tables

Table 1: Proportions of landscape types within the St Marys Site.	17
Table 2: Proportions of landscape types in the Western Precinct.....	17
Table 3: Proportions of landscape types in the Regional Park - west of tributary I.	20
Table 4: Landscape elements at the western end of the St Marys Site, indicating those which occur within the Western Precinct.	21
Table 5: Correlation of archaeological sensitivity zones with degrees of land use impact.	26
Table 6: West end and Western Precinct: Proportions of management zones (in ha).	27

Table 7: Western Precinct: Proportions of land use impact zones.....	27
Table 8: Recorded surface features in the Western Precinct (including sites located long the proposed Fauna Fence).	34
Table 9: Suggested salvage locations in the Western Precinct and adjoining Fauna Fence.....	39

Illustrations

Figure 1: Aerial photograph of the St Marys site.	2
Figure 2: The St Marys Precinct boundaries as defined in current SREP 30 (subject to amendments under a current draft SREP 30 amendment). The Western Precinct is adjacent to the Northern Road.	4
Figure 3: The St Marys Development Site showing development precincts. The Western Precinct is at the western end of the Site.....	7
Figure 4: The four management zones identified across the St Marys Site.	15
Figure 5: Western Precinct – Protocols and strategies flow chart.	16
Figure 6: Air photo showing the Western Precinct and the land considered as the western end of the St Marys Site (outlined in yellow).	18
Figure 7: The Western Precinct framework plan.	19
Figure 8: The different landscapes in the Western Precinct.	20
Figure 9: Stream catchments at the Western End of the St Marys Site.	23
Figure 10: West end of the St Marys Development Site, showing Management Zones, and the location of the Western Precinct.	29
Figure 11: The West end of the ADI Site showing the Western Precinct and archaeological management zones, overlain on aerial photo.	29
Figure 12: Western Precinct: Shale and alluvium landscapes showing management zoning. ...	30
Figure 13: Surface exposures (and combined sites) after the 1996 survey (background Springwood 1:25k map). Western Precinct shown in dashed purple line.....	33
Figure 14: Results of the Fauna Fence Survey (JMCD CHM 2006d).	34
Figure 15: The proposed sample locations recommended for further sub-surface investigation in the JMCD CHM 1997a report.....	36
Figure 16: The locations of all identified surface features, showing background of sensitive topography (Zones 1, 2 and 3).	39
Figure 17: Surface sites, sensitive topographic zones and suggested salvage locations.	40
Figure 18: Aerial photo of Western Precinct and Access road showing locations of suggested salvage locations (numbered as per Table 9).	40

I. INTRODUCTION AND BACKGROUND

I.1 Background

The former Australian Defence Industries (ADI) site at St Marys, now known as the St Marys Development site, was endorsed by the NSW Government for inclusion on the Urban Development Program (UDP) in 1993. The site was seen to present an opportunity to provide housing for Sydney's growing population within an environmentally sustainable framework.

The St Marys site is located approximately 45km west of the Sydney CBD, 5km north-east of the Penrith City Centre and 12km west of the Blacktown City Centre. The main western railway is located approximately 2.5km south of the site. The Great Western Highway is located another 1 km south and the M4 Motorway a further 1.5km south.

The overall Site had an area of 1,545ha. It stretches approximately 7 kilometres from east to west and 2 kilometres from north to south, from Forrester Road, St Marys in the east to The Northern Road, Cranebrook in the west. It is bounded by Llandilo and Wilmott in the north and Cambridge Gardens/ Werrington County and the Dunheved Industrial Area in the south (see Figure 1).

Given that the site straddles the boundary between two local government areas (Blacktown and Penrith); the Government decided that a regional environmental plan should be prepared for the site. Technical investigations into the environmental values and development capability of the land were commenced in 1994, and the Regional Environmental Plan for St Marys [Sydney Regional Environmental Plan No. 30 (SREP 30)] was gazetted in January, 2001. It zoned the land for a combination of 'urban', 'employment', 'regional open space'; 'regional park', 'road and road widening' and 'drainage' uses (Figure 2).

In view of the original scale of the residential and employment uses, a package of documents was prepared to guide and control development. It comprised the REP (maps and written instrument), and an Environmental Planning Strategy (EPS) which sets out performance objectives and strategies to address key aspects associated with the site, including: conservation, cultural heritage, water and soils, transport, urban form, energy and waste, human services, employment, and land contamination.

A Deed of Agreement was entered into in December 2002, between the landowner and developers of the land (a Joint Venture comprising ComLand and Lend Lease Development) and the NSW Government. This sets out the developer's and State Government's responsibilities in providing services and infrastructure.

SREP 30 identified 6 development "precincts", known as the Western Precinct, Central Precinct, North and South Dunheved Precincts, Ropes Creek Precinct and Eastern Precinct (Figure 3).

SREP30 requires that a Precinct Plan be adopted by Council prior to any development taking place.

Planning for any precinct is to address all of the issues in SREP30 and the EPS, including preparation of management plans for a range of key issues.

Figure 1: Aerial photograph of the St Marys site.



In March 2002 the Australian Heritage Commission (AHC) declared that additional areas of the site should be included on the Register of the National Estate (RNE) and be set aside for Regional Park, on the grounds of their environmental value. This had the effect of changing the boundaries of the areas to be set aside for conservation, and areas available for residential and employment development. In April 2006, the precinct boundaries in SREP 30 were amended to reflect the RNE boundaries.

Initial planning for the St Marys site suggested that development would commence with the Western Precinct adjacent to The Northern Road, progressing eastwards through the site. However, the listing of additional lands on the Register of the National Estate changed this. The Joint Venture decided that the focus of initial development should commence with the Eastern Precinct, while boundary adjustments were resolved. Since then the Ropes Creek Precinct and Dunheved Precincts have similarly progressed through the Precinct Planning stages.

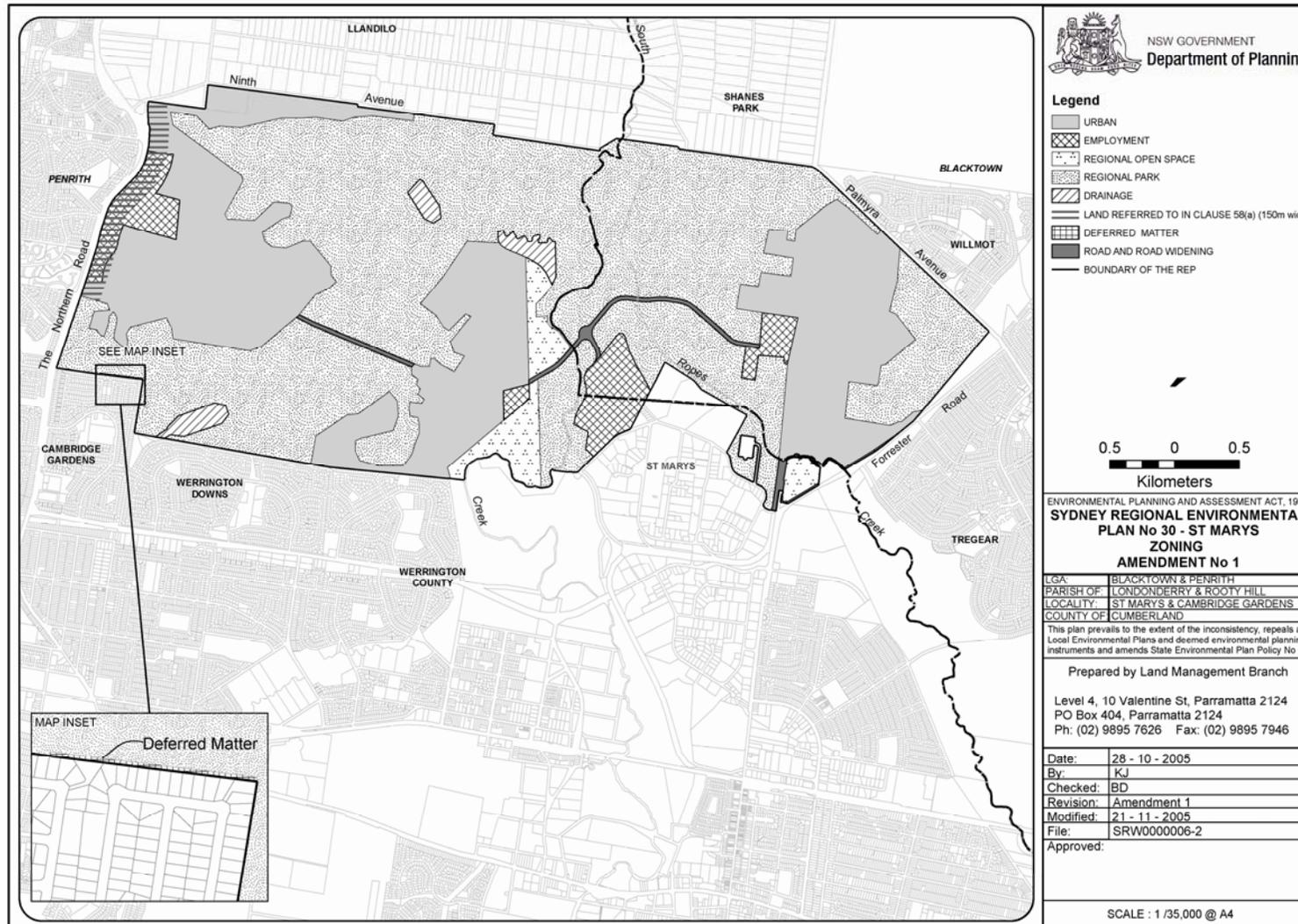
In September 2006 the Minister for Planning declared the Western Precinct a Release Area, paving the way for the preparation of a Precinct Plan for this area. In December 2006, the Minister for Planning directed the preparation of a draft amendment to consolidate and rationalise the employment lands on the St Marys development site. This is proposed to entail a relocation of the Employment zone from the Western Precinct to the Central Precinct.

The Western Precinct is proposed to be developed for mostly residential uses, as well as related uses including retail and commercial, community uses, open space, drainage infrastructure and roads.

This report has been prepared in accordance with the requirements of SREP 30 and the St Marys EPS, and addresses all relevant legislation. It is also written in accordance with the Principles defined in the Penrith City Council's *Sustainability Blueprint for Urban Release Areas* (PCC 2005) - specifically Principles 1 and 2.

It supports the draft Precinct Plan for the Western Precinct. While the focus of the report is on the Western Precinct specifically, the investigations carried out have taken into account the implications of planning for the nearby Central Precinct, the installation of a fauna fence around the Regional Park and in particular the conservation outcome achieved at this western end of the St Marys Site.

Figure 2: The St Marys Precinct boundaries as defined in current SREP 30 (subject to amendments under a current draft SREP 30 amendment). The Western Precinct is adjacent to the Northern Road.



1.2 Summary of Indigenous cultural heritage management issues

The Sydney Regional Environmental Plan No. 30 – St Marys (SREP) and the St Marys Environmental Planning Strategy (EPS) were gazetted in January 2001. These documents outline the processes, guidelines and objectives to be adopted for Precinct Planning following the declaration by the Minister for Urban Affairs and Planning of a Release Area on the site.

This report relates to the Western Precinct (Figure 4). This Indigenous archaeological assessment forms part of a suite of investigations being undertaken as part of the Precinct planning process.

The Interim Heritage Management Report, ADI Site, St Marys classified the site into four management zones based on archaeological sensitivity (Figure 5). Management strategies were recommended for each of these (JMcD CHM 1997a). The Section 22 Committee concluded (Draft Report of the Section 22 Advisory Committee for the ADI Site St Marys July 1997) that:

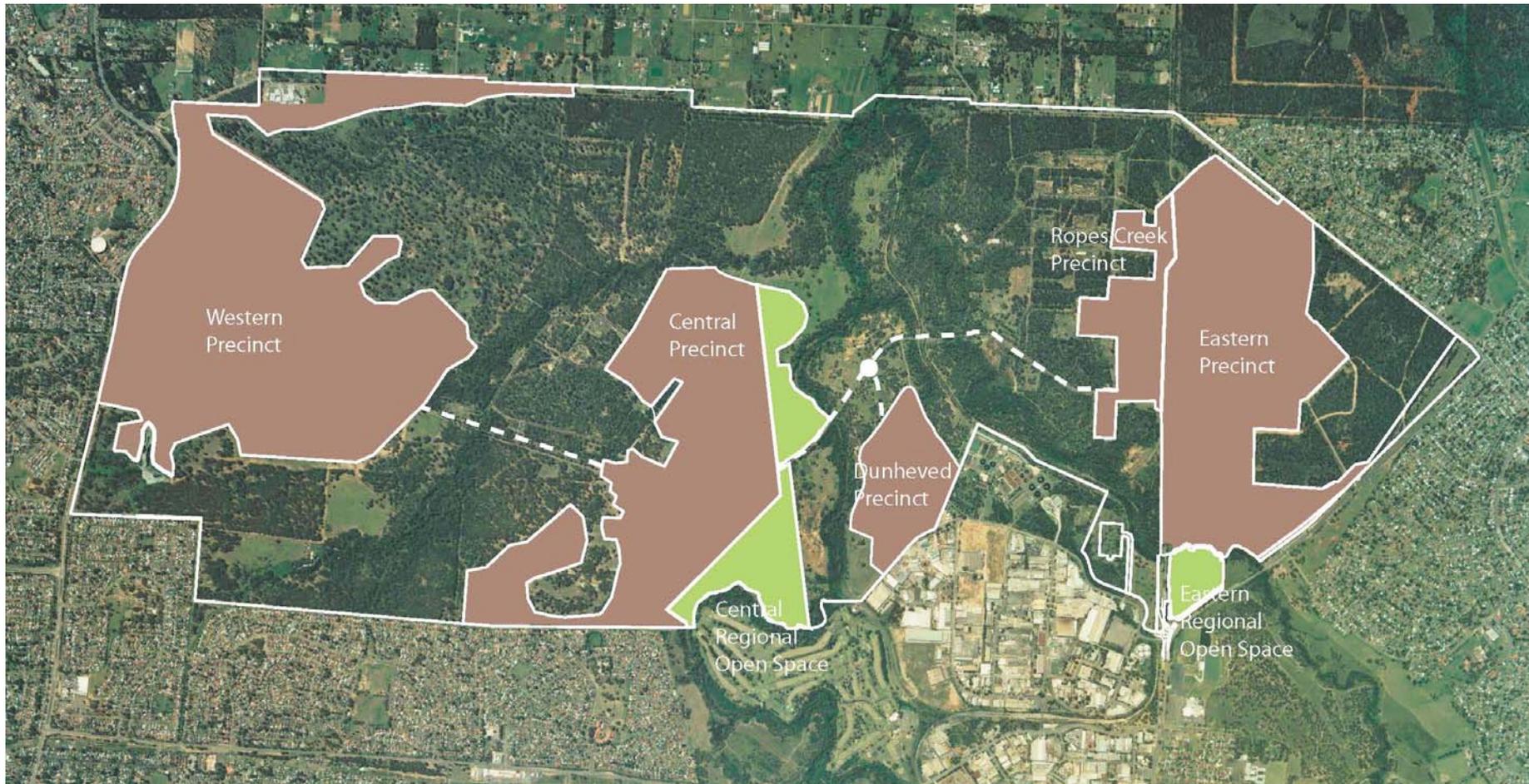
- ⊗ The Committee supports ... and accepts that the Core Conservation Zone (i.e. the Regional Park) which has been proposed forms a suitable basis for the conservation of Aboriginal Heritage on the site;
- ⊗ there is a suitable information base to make decisions about planning of the site; and,
- ⊗ the outline of an appropriate set of strategies and protocols for controlling future development has been identified.

Previous work (JMcD CHM 1997a) and the EPS defines a conservation outcome for the majority of lands with Indigenous cultural heritage values in the Western Precinct. Following on from the logic and methodology of the previous work (and see JMcD CHM 2003, 2004, 2006) and the planning outcome, the Western Precinct in its entirety is assumed to be developable land. The conservation of additional archaeological sites/Indigenous cultural heritage features within this area is not envisaged and it is assumed that the management of any identified features which are assessed as having potential and/or significance within this area would be managed by

way of mitigation (i.e. salvage excavation). Given these assumptions, the methodology for undertaking the archaeological component of this work has been as follows:

- ☉ Identify what lands within the Western Precinct fall within Archaeological Zones 1, 2 and 3 (i.e. those which may require further archaeological investigation);
- ☉ Overlay the ground-truthed land-use mapping with topography and landscapes to identify the representative range of landscapes and proportions of these in the four archaeological zones (i.e. identify management options for potentially intact Aboriginal heritage landscapes);
- ☉ Consult with the Deerubbin Local Aboriginal Land Council and other Indigenous stakeholder groups, i.e. Darug Custodians Aboriginal Corporation Darug Tribal Aboriginal Corporation, Darug Aboriginal Cultural Heritage Assessments and Darug Land Observation's (sic);
- ☉ Confirm by field inspection locations with limited previous land-use disturbance (from Zones 1, 2 and 3) within the Western Precinct. This would include site inspection and ground-truthing of existing/current levels of disturbance, and the selection of likely locations for future site investigations;
- ☉ Document the results of field survey and other available information, making appropriate management recommendations in relation to this Precinct; and,
- ☉ Write a report detailing the results of these investigations, identifying any development constraints and opportunities. An appraisal of the strategic management model's utility, in terms of dealing with Indigenous archaeological landscapes across the Western Precinct, will be made.

Figure 3: The St Marys Development Site showing development precincts. The Western Precinct is at the western end of the Site.



1.3 Summary of current assessment and recommendations

The Western Precinct will impact on c.131 ha of land with defined archaeological sensitivity. A total of 39 surface archaeological sites with almost 250 artefacts have been recorded within the Western Precinct. Previous sub-surface investigations in the western end of the St Marys Site (at SA4, SA5 and ADI-47+48) have produced over 7,000 stone artefacts. The following findings are central to the devising the appropriate management outcome for the Precinct:

- ⊗ Surface archaeological evidence has been found across the Precinct wherever conditions have been appropriate to allow its discovery;
- ⊗ 130 hectares of land has been identified as having archaeological sensitivity (Zones 1, 2 and 3) within this Precinct (Table 4);
- ⊗ A range of landscape and topographic characteristics are found across this Precinct;
- ⊗ Ridge tops, low ridge tops, headwater and 1st order creek lines and upper hillslopes are shale hillslope landscapes particular to this end of the St Marys Site: these are landscapes will be significantly impacted by development here;
- ⊗ The Regional Park will retain a representative proportion of all of these except ridge tops and headwater tributaries (Table 4).

There are two major landscape bases and a total of 12 topographic landscape elements across this Precinct (see Figure 17). Seven target areas within the developable lands of the Western Precinct have been identified as requiring archaeological salvage prior to development taking place (refer Figure 19).

It is recommended that:

1. There is a significant conservation outcome in this western part of the St Marys Site, with more than 60% of the total land area and more than 98% of the land with high archaeological sensitivity being excluded from the developable lands.
2. The basic precepts of the strategic management model are achieved by the planning process with this Precinct;

3. Six areas within the Western Precinct and the fauna fenceline along the road between the West and Central Precincts are identified as requiring archaeological salvage prior to development taking place (Table 9):
4. Depending on the timing of the proposed works programme, the Proponent should apply to the DECC NSW for either a s87 Permit or a s87/s90 Consent with Salvage to undertake these works.

2. ABORIGINAL CONSULTATION

The St Marys Development falls within the boundaries of the Deerubbin Local Aboriginal Land Council (DLALC). The study area also falls within the area of interest to the Darug Tribal Aboriginal Corporation (DTAC) the Darug Custodial Aboriginal Corporation (DCAC) and Darug Aboriginal Cultural Heritage Assessments (DACHA).

Fieldwork was first undertaken across the Western Precinct in mid-February 1996 (JMcD CHM 1997a). At that time, both the Deerubbin (then Daruk) Local Aboriginal Land Council and the (then) Daruk Link were consulted with. This was done on the advice from the (then) NPWS Sydney Zone, with an evolving NPWS NSW Consultation Policy whereby archaeologists in NSW were for the first time asked to consult with additional Aboriginal interest groups, particularly Native Title claimants.

Fieldwork in relation to the Xavier High School Site in the north west of the Precinct (JMcD CHM 2001, 2002) was done in consultation with the DLALC and the Darug Tribal Aboriginal Corporation (DTAC) and the Darug Custodial Aboriginal Corporation (DCAC).

The next fieldwork done within the Western Precinct was in 2004, with the survey of the initial fauna fence line proposal. This was undertaken between Monday 7th June and Friday 11th June, and the archaeologist (Mark Rawson) was accompanied by Steve Randall (Deerubbin LALC) on the 7th and 10th June, Jamie Eastwood (DCAC) on the 8th June, Justine Copeland (DCAC) on the 10th June, Celestine Everingham (DTAC) on the afternoon of 8th June, and Leanne Wright (DCAC) on the 11th June 2004.

Survey of the proposed realignment to the fauna fence route was undertaken on Thursday 8th December and Friday 9th December 2005. This time, the archaeologists (Amy Stevens and Andrea Ward) were accompanied by Phil Khan (Deerubbin LALC) on the 8th December and by Justine Copeland (DCAC) and Gordon Morton (DTAC)

on 9th December. Sometime after this survey the DTAC group split and formed two groups, with the second being called the Darug Aboriginal Cultural Heritage Assessments (DACHA).

In 2007 the consultative process has involved the Deerubbin LALC and three groups that have also been consulted with in the Eastern, Ropes Creek and Dunheved Precincts (DTAC, DCAC, DACHA). Representatives of all four groups were briefed at the commencement of the Precinct Planning phase by the consultant. All four groups have been invited to participate in the field inspection of the Western Precinct and to discuss the salvage options. Since this draft report was written, the DTAC group has also had a split and there is now an additional group known as Darug Land Observation (DLO).

A further field inspection is planned now that this report has been circulated and in response to the completion of the Precinct Plan when all impacts are known. The draft of this report was circulated to all groups for further discussion of the salvage options on the 23rd May 2008. All groups have indicated that they will produce reports on the cultural values of the Western Precinct lands (Appendix 1 includes those reports which had been received at the time of this report's production).

3. ADI SITE: STRATEGIC MANAGEMENT MODEL

3.1 Strategies for managing Indigenous Archaeological Sites

Background

The St Marys Site at St Marys included approximately 1,500ha of land which have been the subject of studies since the early eighties (Koettig 1980, Smith 1989). In 1994 a Regional Environmental Study was undertaken (Kinhill 1994) as were more intensive studies for the section 22 committee process (McDonald and Mitchell 1994). These studies resulted in more than 45% (670ha) of the Site being identified as having high conservation value – for both Indigenous heritage and biodiversity. This land with high conservation value was recommended to be included in a Regional Park. A subsequent Australian Heritage Commission listing added 273ha (with mixed archaeological

sensitivity) to the conservation outcome, and the Regional Park will now comprise approximately 900ha.

The early planning work was targeted at providing a conservation outcome for Indigenous cultural heritage generally across the St Marys Site, and at facilitating the systematic management of Indigenous cultural heritage in the resultant development Precincts. A strategic management model (SMM) was devised, the overriding aim of which was the preservation of a representative sample of intact landscapes across the St Marys Project (McDonald & Mitchell 1994, Jo McDonald CHM 1997a, 2003, 2005, 2006). Previous land use disturbance and a predictive model were used to identify areas with high conservation potential (i.e. the least disturbance), and representative landscapes where a variety of different types of archaeological sites are predicted to occur. The SMM was seen as a meaningful management outcome which could be refined throughout the life of the Project.

The SMM for the St Marys Project is predicated on a landscape-based philosophy. Rather than targeting only sites of known surface extent or known significance (e.g. through sub-surface investigation) landscape parameters are defined. The management of these landscapes is based on their conservation potential.

Most archaeological sites in western Sydney are open stone artefact scatters. Different site types (base camps, quarries, etc.) provide information on the different ways that the Plain landscapes were used by Aboriginal people. It is the variety of site types which have the potential, through their content and distribution across the region, to enhance our general model of prehistoric human occupation on the Cumberland Plain. Various types of evidence are likely to be present across the St Mary Project because of the range of landscapes present. Conservation potential here was high because a large proportion of this land has remained relatively undisturbed.

The SMM principles are summarised as follows:

- ☉ The primary selection criterion for the conservation strategy was the selection of landforms which have been minimally disturbed by land-use practises over the last 200+ years;

- ☉ A similarly important criterion for the selection of conservation areas was that these must provide, and be representative of, the range of landscapes present across the St Marys Project;
- ☉ Regionally threatened landscapes, sites of recognised regional significance (i.e. rarity) and areas of significance to the Aboriginal community should also be included in the conservation area, as long as these are in good condition;
- ☉ A predictive model of Aboriginal site occupation on the Cumberland Plain has been devised, since some landscapes contain archaeological sites of higher significance than others;
- ☉ Landscapes which have been comprehensively disturbed by soil removal and/or rearrangement are of limited potential for archaeological sites. These require no further archaeological investigation and pose no constraint for development.

Four zones were devised with different designated management outcomes (Figure 5).

- ☉ Zone 1 – Very high potential for intact archaeological evidence; potential conservation zone
- ☉ Zone 2 – High potential for intact archaeological evidence;
- ☉ Zone 3 – Moderate potential for intact archaeological evidence;
- ☉ Zone 4 – Low-no potential for intact archaeological evidence. no further work required

Zone 1 was identified initially as the potential conservation zone. From this, based on a number of criteria, the Core Conservation Zone was selected (JMcD CHM 1997a: Figure 7). The CCZ falls within the defined Regional Park. The Regional Park includes areas identified with varying archaeological values – both high conservation potential (i.e. the CCZ) along with other areas which have lesser potential for intact archaeological sites but which have other conservation values (e.g. flora and fauna biodiversity). It was envisaged that no development would take place within the CCZ and that this would be managed into the future on the basis of its Aboriginal heritage values. It was also proposed that no archaeological investigations – these being inherently destructive – would take place within the CCZ.

Protocols and strategies are being developed by DECC (formerly NPWS NSW) for the Aboriginal (archaeological) Conservation Areas within the Regional Park (Katie

Littlejohn DECC, pers. comm., 2007). The nature and range of impacts which are likely to be acceptable within the archaeological CCZ will be limited.

The Western Precinct is the developable land of interest to the current planning activity. There is no constraint to development in this Zone. Around 40% of the Western Precinct is Zone 4 (see below), with minimal or no archaeological potential. There is a very small area of Zone 1 but quite large areas of Zones 2 and 3.

The SMM presumes that once the conservation zone had been designated and the Regional Park finalised that the remaining lands (the Precincts) would be developable and that the archaeology here would be affected by a range of development impacts. It was also envisaged that landscapes with sensitivity in the Precincts would provide the archaeological evidence (through salvage) documenting both the areas to be impacted by the Precinct and likely to be conserved within the adjacent Regional Park.

3.2 SMM Protocols

Strategies and protocols have been developed to guide ongoing Aboriginal heritage work in the development precincts. These have needed to be flexible and to develop robust compliance/validation procedures. The aim of the SMM was to streamline the development process and minimise undue procedural delay. It was also desirable to increase the usefulness of archaeological investigations undertaken.

These protocols have already been applied in the Eastern, Ropes Creek and Dunheved Precincts. Continuing consultation with the DECC and the Aboriginal community has been undertaken in all of these Precinct Planning works and regulatory changes have meant that some aspects of the SMM have now been refined. The current approach has been endorsed in the previous Precincts (see Figure 6):

1. All archaeological works are undertaken according to a research design that encompasses the entire St Marys Project and targets specific landscapes within the development Precincts for further investigation. This work is completed prior to development commencing and entire development precincts are investigated at one time. The research design, while broadly inclusive for the St Marys Project recognises development phasing and prioritises impact investigations.
2. Zones 1, 2 and 3 in the developable lands have high, good and moderate archaeological potential. A range of representative landscapes from these zones

should be targeted for investigation as per the overarching research design. All investigations include a testing phase and an open area excavation phase (of features/sites within landscapes to ensure statistically viable assemblage samples).

3. Zone 4 lands have had such high levels of previous land-use disturbance that they have no archaeological potential. No further archaeological work is required in Zone 4.

The targeting phase in each precinct will identify which lands from each of the zones will require further investigations and which will require no further archaeological work.

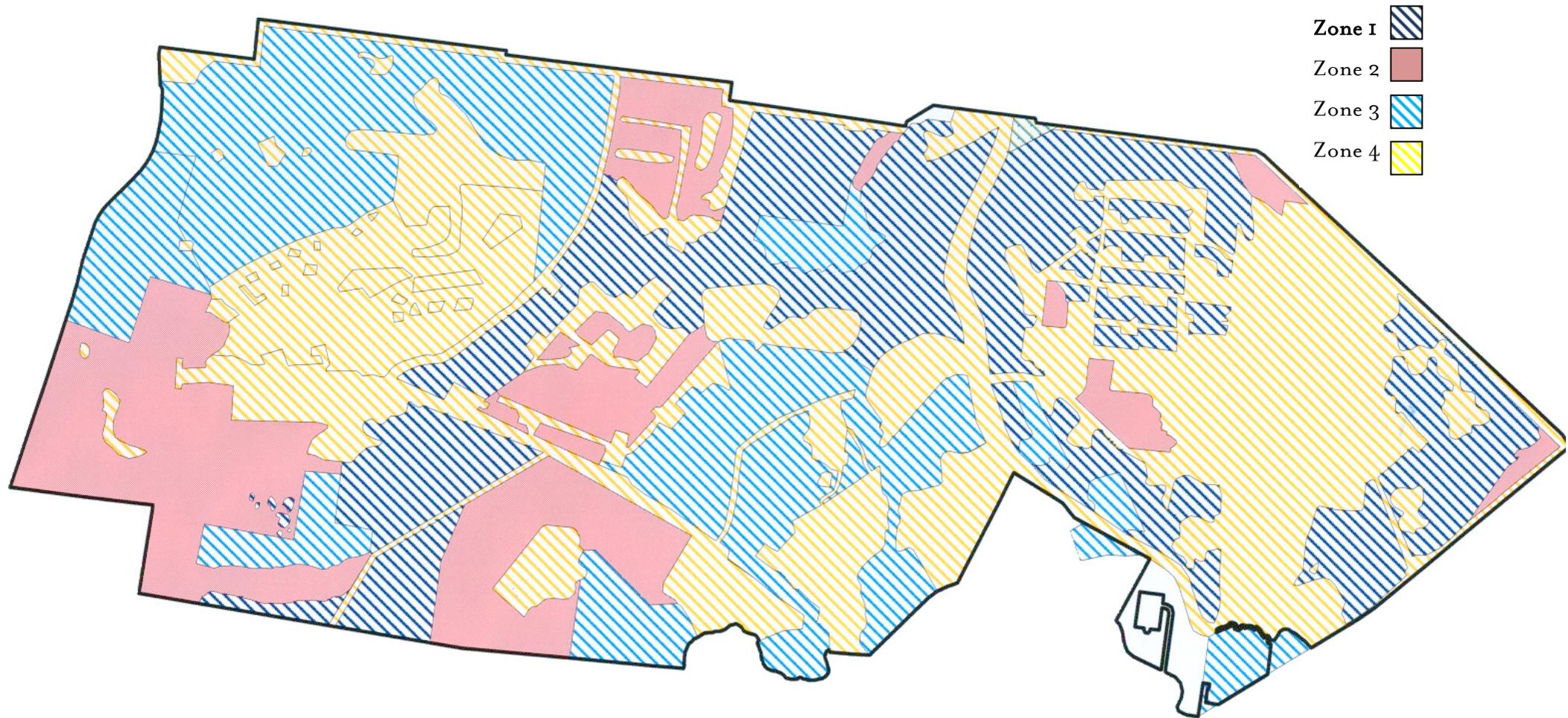
4. The selection procedure and consultation process forms part of the regulatory process. Once selection of target areas is complete, the proponent applies to DECC NSW for a whole of Precinct s.90 consent. This is granted on the condition that salvage excavation is completed in the designated target areas. Development is allowed to proceed in those parts of the developable land not affected by further archaeological investigation.
5. Upon completion of fieldwork in each target area, a clearance report is submitted to DECC, allowing the proponent to activate the s90 consent in that target area to allow construction to proceed. Full reporting on the excavation and analyses phases will be completed in due course and will be subject to review by DECC. The Aboriginal community may wish to monitor construction activity - but at this stage the archaeological requirements of the regulatory authority would be deemed complete.

There is a normal time limit of two years on s90 Consents. It has been general practise with the preceding Precincts to apply for a longer (generally 5 year) time period to ensure that all works associated with the Precinct development are covered by this s90.

The Strategic Management Model has the following advantages:

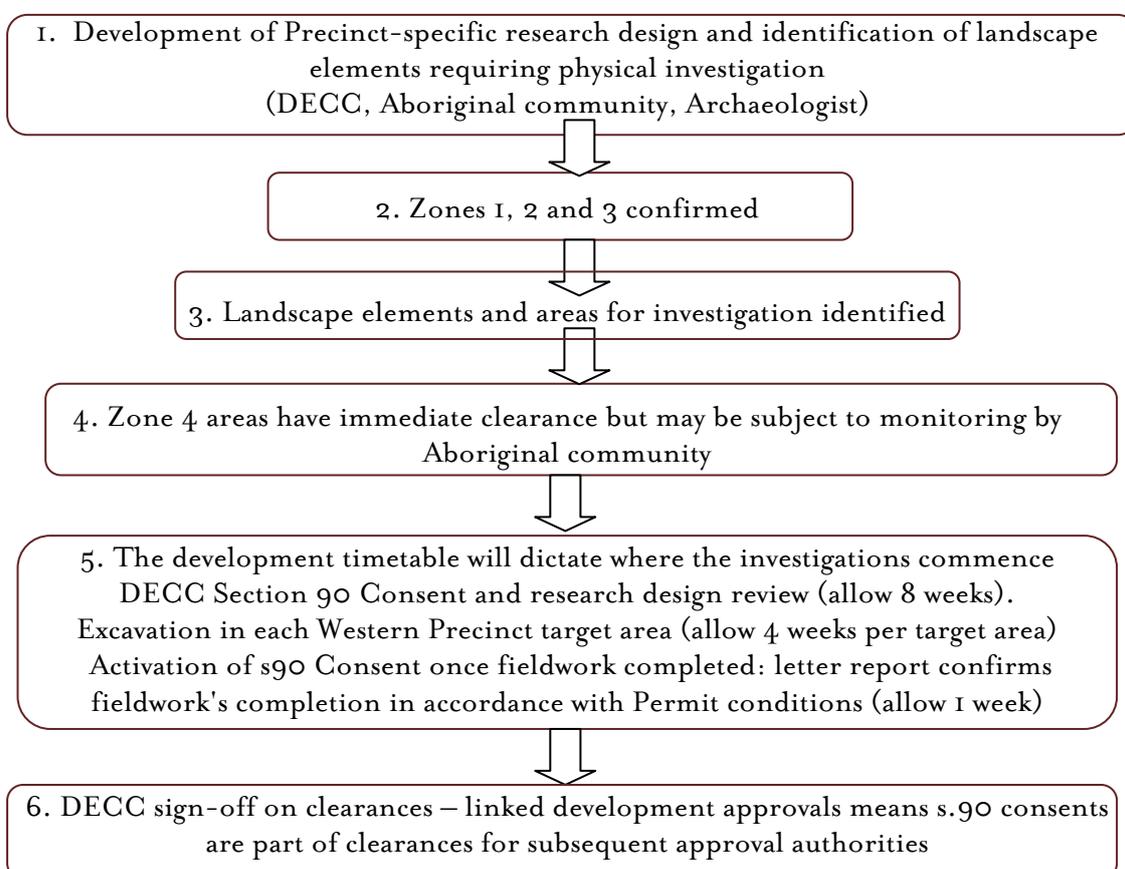
- ⊗ The cultural heritage process is predicated on a conservation outcome which has been endorsed by the s.22 Committee. The conservation outcome is in lands now designated Regional Park. and,

Figure 4: The four management zones identified across the St Marys Site.



- ☉ The SMM enables planning and development of the St Marys Project to proceed with certainty and clarity. The Precincts are designated developable lands but with varying levels of archaeological sensitivity. Salvage from these Zones provides the archaeological evidence upon which management of the Conservation Area will be based, and by which an understanding of the cultural heritage resource can continue to be developed. It also provides for the mitigation of impacts on archaeologically sensitive landscapes.

Figure 5: Western Precinct - Protocols and strategies flow chart.



4. THE STUDY AREA - THE WESTERN PRECINCT

The Western Precinct is located at the western end of the St Marys Site (Figure 4). It covers an area of c.229ha. It is bounded by the Northern Road to the west and the Regional Park lies to its north, south and east, and the boundaries with the Park are irregularly shaped. The preliminary concept plan for the Western Precinct is shown (Figure 7).

For the purposes of discussing the conservation outcome in the Western Precinct, all land at the western end of the St Marys Site is considered. This covers approximately 574ha, and includes all land between the Northern Road and the main south tributary creek line which runs from Llandilo and joins with South Creek near its exit from the overall Site.

4.1 Geology

The three main landscapes identified within the St Marys Site are shale hillslopes (42%), Tertiary Terrace (28.5%) and Quaternary floodplain (30%: Table 1). Their proportions and levels of disturbance were mapped and calculated during the 1997 investigations (JMcD CHM 1997b: see Table 15). The Shale hill slope dominates this Precinct, covering 91% of the area. Quaternary alluvium is the only other landscape in this Precinct (9%: Table 2).

Table 1: Proportions of landscape types within the St Marys Site.

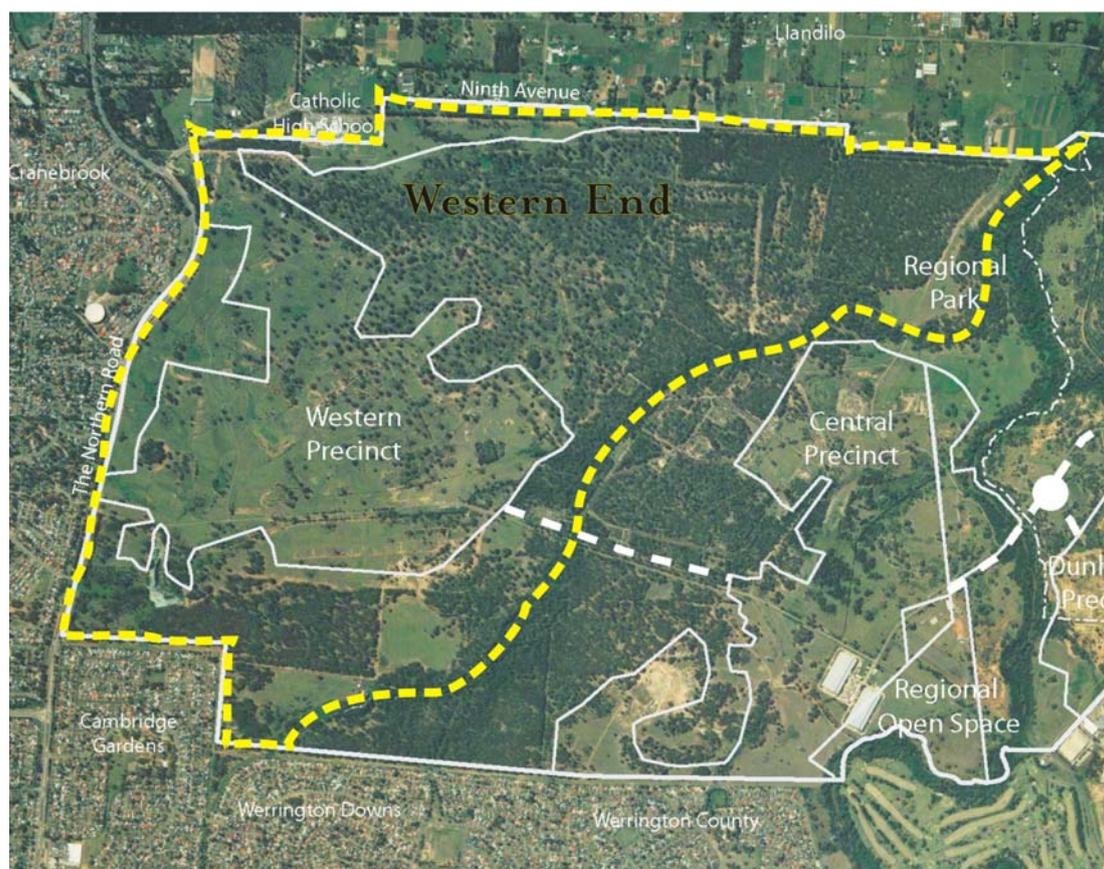
Landscape	Hectares	%f
Shale uplands	624	41.6
Tertiary terraces	427	28.5
Quaternary alluvium (including channels)	448	29.9
	1,499	100

Table 2: Proportions of landscape types in the Western Precinct.

Landscape	Hectares	%f
Tertiary terrace	0	0
Shale uplands	203.2	90.7
Quaternary alluvium	20.9	9.3
	224.1	100.0

Of particular interest to the current analysis is both the proportion of these landscapes within the Regional Park (RP) and those within the Western Precinct (WP: Table 3, Figure 8). The proportions of the representative landscapes in good condition – both in the RP and the WP – also require discussion in terms of identifying the conservation outcome at this end of the St Marys Project.

Figure 6: Air photo showing the Western Precinct and the land considered as the western end of the St Marys Site (outlined in yellow).

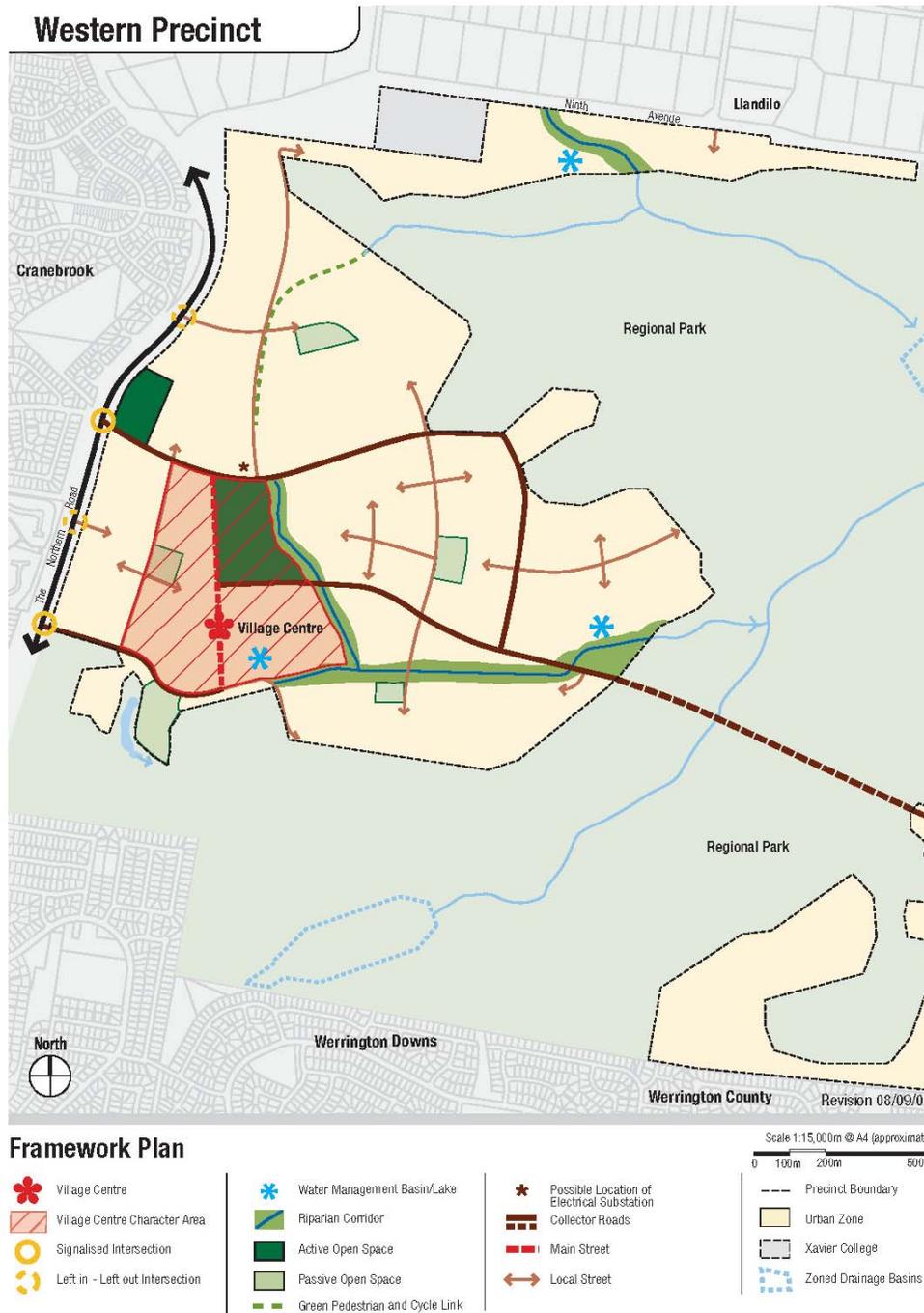


The conservation outcome at this western end of the St Marys Site is significant. As the Western Precinct is 229 hectares, the conservation outcome at this end of the Site represents more than 61% of the overall land.

The conservation outcome for the different landscapes in this western end of the Regional Park is also good. More than half (55%) of the shale hillslope landscapes falls within the Regional Park, while even larger percentage of the Quaternary alluvium (61%) is in the Park. The entire Tertiary terrace at the western end of the St Marys Site is within Regional Park (Table 3).

This is a substantial conservation outcome - which is even more significant when the proportions of archaeologically sensitive lands within the Regional Park are considered. In terms of the representativeness of landscapes being conserved within the Regional Park (see Table 4) all landscape types are conserved - and more than half of the predominant landscape (Shale Hillslopes) will be protected.

Figure 7: The Western Precinct framework plan.



4.2 Topography

There is a range in elevation between c.60m (AHD) at McGarritys Hill in the north west of the Western Precinct to c.30m AHD where the creek lines exit the Precinct. South Creek flows out of the St Marys Site at c.10m AHD. The Western Precinct is characterised by hilly terrain - generally sloping down from west to east.

Figure 8: The different landscapes in the Western Precinct.

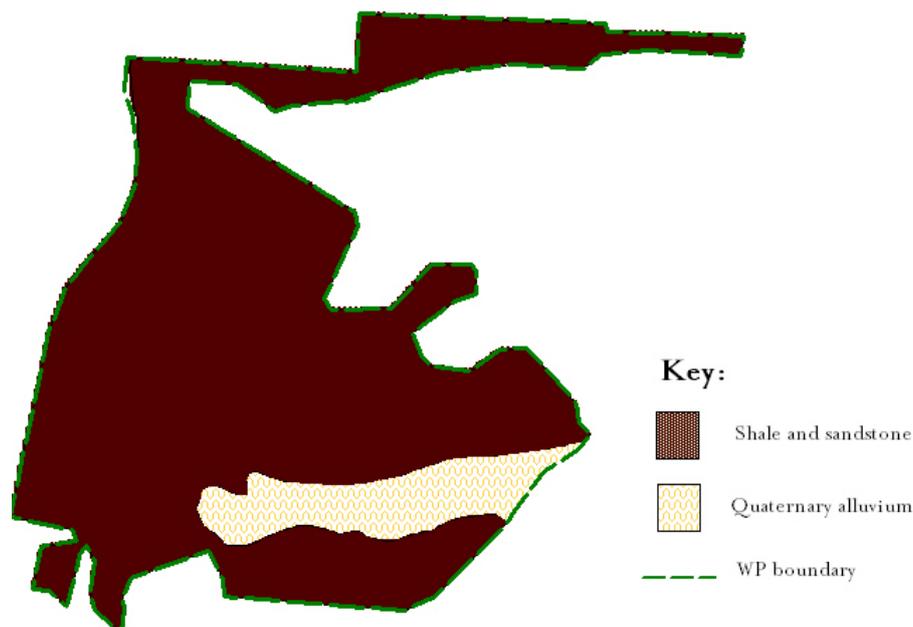


Table 3: Proportions of landscape types in the Regional Park - west of tributary 1.

	Western Precinct (ha)	Western end (ha)	Regional Park (ha)	% Landscape in Regional Park
Tertiary terrace		67.5	67.5	100
Shale	203.2	449	245.8	54.7
Qal	22.4	57.8	35.4	61.2
	225.6	574.3	348.7	60.7

4.3 Landscape elements

Landscape parameters were applied to the St Marys Site when regional comparisons were made and the SMM devised (JMcD CHM 1997b). This approach has since been used extensively in the Rouse Hill Development Area in the ongoing assessment of

Aboriginal sites during Stages 2 and 3 of the Rouse Hill Infrastructure Project (JMCD CHM 1999, 2002a, 2005d). A similar approach has been applied here.

The following topographic categories (as definitions) have been used in these analyses. These categories within both the Western Precinct and at the western end of the St Marys Site have been analysed. The codes used on Table 4 are shown in brackets.

- ☉ Creek bank (CB#) <50m to stream channel - number indicates stream order i.e. CB1 is a first order creek bank.
- ☉ Flood Plain (FP) >50m to water, flat land to slightly sloping
- ☉ Lower Hill Slope (LS) <200m to water
- ☉ Tributary headwaters (TH) sloping land <50m to water course
- ☉ Upper Hill Slope (US) >200m to water
- ☉ Flat plain (PL) >500m to water (many are alluvial terraces)
- ☉ Low Ridge (LR) <200m to water, <10m elevation above creek
- ☉ Low Ridge Top (LRT) >200m from water, <10m elevation above ck
- ☉ Ridge Top (RT) >200m to water, >10m elevation above creek

Table 4: Landscape elements at the western end of the St Marys Site, indicating those which occur within the Western Precinct.

Topographic elements	Geology	Western End (ha)	%f	Geology	Western Precinct (ha)	%f	%f in Regional Park
RT	Shale/s'stone	17.9	3.1	Shale/s'stone	15.6	6.9	13.2
LRT	78.2%	79.9	13.9	90.4%	39.4	17.5	50.7
US		48.3	8.4		15.6	6.9	67.8
LS	T. terrace	178.9	31.1	T. terrace	88.9	39.4	50.3
PL	11.8%	72.6	12.6	0	2.4	1.1	96.7
FP		74.1	12.9		16.8	7.5	77.3
TH		5.2	0.9		4.3	1.9	17.6
CB1	Qu'al	30.1	5.2	Qu'al	16.9	7.5	43.5
CB2	10.1%	38.7	6.7	9.6%	25.5	11.3	34.1
CB3		15.75	2.7		0	0.0	100.0
CB4		10.34	1.8		0	0.0	100.0
CB6		2.49	0.4		0	0.0	100.0
		574.35	100.0		225.6	100.0	60.7

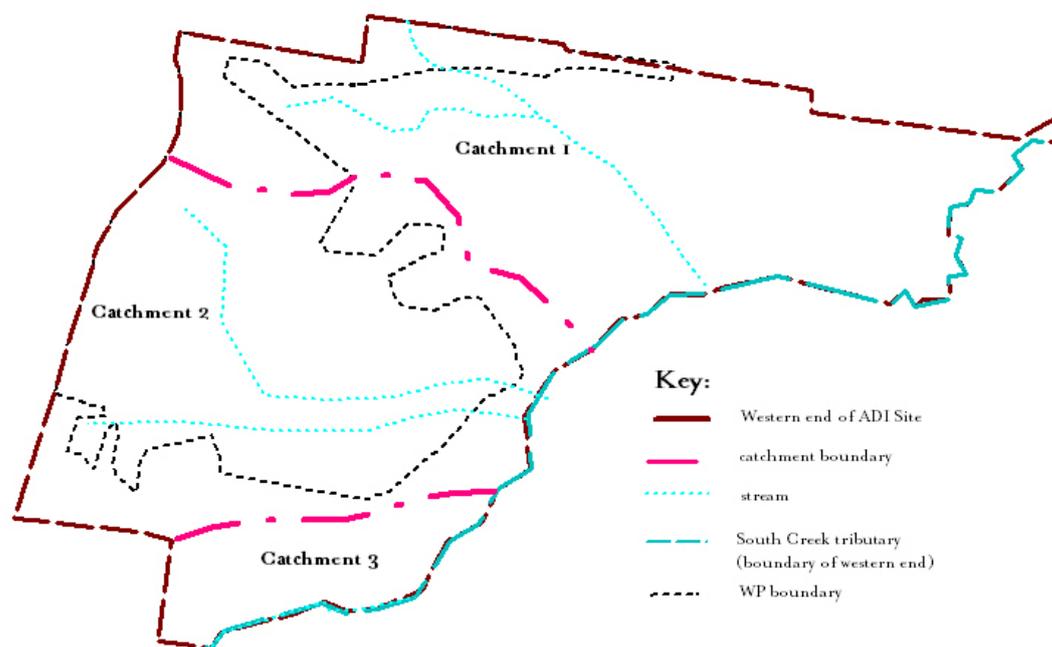
The range of landscape elements within the Western Precinct is smaller than found at the western end of the St Marys Site, largely because of the inclusion of the major tributary creek line and particularly the lower reaches of this within the Regional Park. The large area of plain (on Tertiary Terrace) at the western end is also almost entirely within the Regional Park (Table 4).

Good proportions of all landscapes will be conserved within the Regional Park, with the exception of ridge tops and headwater tributaries (RT and TH: Table 4). Less than 20% of these are to be conserved within the Regional Park. These landscape need to be emphasized in the selection of areas for targeted salvage.

Stream Order

The St Marys Site contains three major stream conjunctions on South Creek with a representative set of nodes from first to fourth order streams on the western side of South Creek. These are all found in the western end of the St Marys Site. A number of smaller streams through the shale hillslopes all flow eventually into a single left bank tributary of South Creek - the eastern boundary for 'the western end'. Three sub-catchments were originally defined (JMcD CHM 1997) as catchments 1, 2 and 3 (Figure 10). Ephemeral creek lines rise within the study area, and feed into these three main sub-catchments: some creeklines have their headwaters outside the St Marys Project.

The Western Precinct contains most of catchment 2. Almost all of catchments 1 and 3 are in the Regional Park. The main tributary stream (the boundary of the western end) is entirely within the Regional Park. Most of the streams within the Western Precinct are headwater, 1st and second order tributaries (Table 4). While all stream orders found within the Western Precinct are conserved within the Regional Park, proportionally more of the smaller order creeks will be impacted by development within this Precinct. These too should be considered in choosing target locations for salvage excavation.

Figure 9: Stream catchments at the Western End of the St Marys Site.

4.4 Stone Raw Material Sources

Silcrete was the raw material used extensively by Aboriginal people over the last 5,000 years. This material is found within the St Marys Formation, first identified in the railway cutting near St Marys railway station (Byrnes 1980, McDonald & Mitchell 1994, Corkill 1999). In 1997, targeted archaeological survey across the Tertiary Terraces of the St Marys Site determined a number of naturally outcropping silcrete locations and/or silcrete extraction sites (i.e. quarries). This targeted survey determined that the Tertiary terrace at the eastern end of the St Marys Site had several silcrete outcrops along Ropes Creek and a major cobble and boulder outcrop at a break-of-slope on the Tertiary Terrace. A major silcrete outcrop (ADI-57) in the Regional Park has extensive evidence for on-site testing and flaking. Salvage work in the Eastern Precinct (at ADI-EPI) demonstrated that quarrying extended beyond the obvious surface manifestations (JMcD CHM 2006b). More recent salvage along the fauna fence separating the Eastern Precinct from the Regional Park has similarly documented extensive quarrying activity closer to Ropes Creek (JMcD CHM 2008).

The Tertiary Terrace found in the western end of the St Marys Site does not have surface outcrops of silcrete present (JMcD CHM 1997b: Map 7).

4.5 Vegetation

The vegetation across the study area is dependent on the soil associations - which are related to the underlying geology. The variability in the soils here would have provided a resource rich interface (i.e. an ecotone). Seven different vegetation communities have been encountered during previous surveys of the western end of the St Marys Site. These are:

Cleared open woodland - trees 10-30m height; 10% canopy cover; *Eucalyptus moluccana* (Grey Box), *Eucalyptus tereticornis* (Forest Red Gum), and grasses maintained by grazing and mowing;

Woodland (some areas significantly disturbed) – trees 10-30m height; 10-30% canopy cover; *Eucalyptus moluccana* (Grey Box), *Eucalyptus tereticornis* (Forest Red Gum), *Eucalyptus amplifolia* (Cabbage Gum), *Bursaria spinosa* (Blackthorn), *Acacia implexa* (Hickory), *Themeda australis* (Kangaroo Grass);

Cleared grassland – flood prone land, some areas of marshes; drainage significantly altered by channelization; *Eucalyptus moluccana* (Grey Box), *Casuarina glauca* (Swamp Oak) are dominant, grazed grassland understorey;

Creeks and watercourses – *Casuarina glauca* (Swamp Oak) dominant species; weed impacted e.g. Privet (*Ligustrum lucidum*). South Creek has been severely impacted from upstream development. Large introduced trees include willows (*Salix babylonica*);

Closed Forest - trees 10-30m height; 70-100% canopy cover; *Casuarina glauca* (Swamp Oak) along original creek lines;

Cleared Open Woodland – trees 10-30m height; 10% canopy cover, *Eucalyptus fibrosa* (Broad-leaved Ironbark), *Eucalyptus sclerophylla* (Scribbly gum), *Eucalyptus moluccana* (Grey Box), *Eucalyptus crebra* (Narrow-leaved Ironbark) and grasses;

Open Forest – (some areas significantly disturbed) – trees 10-30m height; 30-70% canopy cover; *Eucalyptus fibrosa* (Broad-Leaved Ironbark), *Eucalyptus moluccana* (Grey Box), *Eucalyptus crebra* (Narrow-leaved Ironbark), thick understorey.

4.6 Existing disturbance

The current study area has suffered a variety of previous land use disturbance impacts. These have affected the ground surface and sub-soil, and would have resulted in varying degrees of damage and/or destruction of potential Aboriginal sites. The entire ADI Site was utilised for grazing and farming for approximately 150 years before the construction of the early factory and munitions storage complexes in the mid 1940s. This type of activity has had minimal impact on the soils and hence the archaeological deposit. In the Western Precinct, most serious impacts and damage were created in the 1950s by the construction of the storage bunkers, channels, road access and bridges in this part of the St Marys Site. These types of impact were relatively localised however and because of the need to have bunkers separated by some distance (to avoid the risk of fire, explosions and etc.) there are areas of low impact between the higher impact areas. There are thus localised areas of good potential between higher impact areas.

To quantify the previous land use impacts across the study area, aerial photo interpretation was undertaken (McDonald & Mitchell 1994, JMcD CHM 1997b). This mapping was ground-truthed during the previous survey of the western end of the Site (JMcD CHM 1997a). The land use mapping and analysis undertaken in 1994 and 1997 involved several stages. Data sources for this assessment task included the following:

- ⊗ Stereo pairs of air photographs taken in December 1946 by Aadastra and labelled 'Landsphoto';
- ⊗ Oblique low altitude photographs of parts of the site taken in August 1955 and October 1956 by RAAF 22 Squadron;
- ⊗ Stereo pairs of air photographs taken in August 1965 by the Department of Lands;
- ⊗ Enlarged colour air photo taken early in 1994;
- ⊗ Orthophotomaps at 1:4,000 scale produced by the Central Mapping Authority of New South Wales;
 - St Marys U7360-1, U7360-2 and U7360-3; with 2m contour intervals based on air photographs taken in May 1982;
 - Llandilo U7367-7 and U7367-8; with 1m contour intervals based on air photographs taken in October 1980.

This mapping process initially identified five zones [subsequently amalgamated into four management zones (see Table 5)] which form the basis for the strategic management model.

The disturbance mapping for the western end of the St Marys Site is shown (Figure II). Calculations of land-use disturbance proportions across this, the Western Precinct and this part of the Regional Park have been made (Table 6). There is a significant conservation outcome at this western end of the St Marys Site. Not only is more than 61% of the total area to be conserved within the Regional Park, but this includes a significant proportion of the land with conservation value in this area. Of the 76 hectares of Zone 1 land identified, 75 hectares (97%) falls within the Regional Park. Similarly, most (67%) of the Zone 2 lands falls within the Regional Park and will therefore be unaffected by development within the Western Precinct.

Table 5: Correlation of archaeological sensitivity zones with degrees of land use impact.

Archaeological Sensitivity/ Management Zone	1994/1997 impact code	Land use impact
4	E	Extremely disturbed - land which has been subject to total vegetation clearance and soil disturbance by bulldozing; shallow soil removal for construction of earthen blast walls; tips and rubbish dumps; quarrying; and the construction of drains, roads, railway lines and buildings, creek channelisation and severe soil erosion. There is virtually no chance of any Aboriginal sites remaining intact in these areas.
4	H	Highly disturbed - land which has been almost totally cleared and has scattered buildings with blast walls, multiple tracks, roads tramlines, and extensive soil conservation earthworks.
3	M	Moderately disturbed - land which has been cleared and grazed, and on which there is evidence of at least one phase of ploughing. Aboriginal sites may be found in these areas but they will have been disturbed to a depth of about 20 to 30 cm.
2	L	Lightly disturbed - land which has been cleared and grazed but probably never ploughed. These areas often carry regrowth forest or woodland.
1	U	Relatively undisturbed - forest and woodland areas which have remained intact since 1946 and which were probably never cleared. Vegetation cover in these areas varies with the composition of the woodland/forest.

Table 6: West end and Western Precinct: Proportions of management zones (in ha).

Landscape	Zone 1	Zone 2	Zone 3	Zone 4	Total Area
West end St Marys Site	76.7	126.8	186.9	183.9	574.3
Western Precinct	1.6	42.2	87.4	94.4	225.6
Regional Park	75.0	84.6	99.5	89.5	348.7
<i>% in Regional Park</i>	<i>97.8</i>	<i>66.7</i>	<i>53.2</i>	<i>48.7</i>	<i>60.7</i>

Table 7: Western Precinct: Proportions of land use impact zones.

Landscape	Zone 1	Zone 2	Zone 3	Zone 4	Total Area
Shale	0.4	40.5	87.4	74.9	203.1
Quaternary alluvium	1.2	1.7		19.5	22.4
Total	1.6	42.2	87.4	94.4	225.6

4.7 Effective survey coverage (JMcD CHM 1997a, 2006d)

Previous survey of the subject land has indicated that visibility across the study area depends mostly upon the amount of vegetation present and on existing degrees of sub-surface disturbance (JMcD CHM 1997a, 2006c). Almost without exception, effective survey coverage was extremely low. This is due mainly to very low surface visibility except where there has been some form of previous land use disturbance.

The aim of the 1996 fieldwork was to provide quantitative data on surface evidence across the study area - to progress the management model. The types of exposures present (i.e. grading, clearing, erosion and so on) and the limitations that disturbance has had on artefact exposure, survival and recovery were assessed. The comparability of the surface recording results was also considered.

The 1996 survey recorded the following information:

- ⊗ landscape parameters (soils, topography, distance to water, stream order);
- ⊗ area of exposure (length x width);
- ⊗ visibility on exposure (as a %);
- ⊗ the type of exposure (natural/'artificial', i.e. graded, bulldozed, vehicle track, cattle track, etc.);
- ⊗ the degree of disturbance in the area/on the exposure;
- ⊗ the degree of soil intactness, i.e. is the presence of intact Unit A likely to impede artefact discovery;

- ☉ artefacts present (including totals, raw material, size, general technological information);
- ☉ maximum and averaged artefact density; and,
- ☉ possible associations of Potential Archaeological Deposit (PAD).

The 1996 survey targeted exposures, and these were recorded regardless of whether artefacts were present on the surface or not. The aim was to recover a representative and comparable sample from across this area, upon which further predictions could be made about archaeological potential. The only exposures which were not recorded (after day 1) were those which were so severely disturbed that only shale/clay soil material was present (e.g. deconstructed dam walls).

The 74 exposures were recorded on specially designed forms (JMcD CHM 1997a: Appendix 1), plotted on 1:4,000 orthophoto maps and on a 1:10,000 aerial photo.

Exposures were recorded in all landscape units present across that study area, with 8.4ha being systematically recorded. This represented a 1.5% sample of that 550ha study area. Overall, however (i.e. areas with very low surface visibility were surveyed on foot or by vehicle); survey coverage was in the order of 80% (c. 440ha). Further, the areas recorded were a comprehensive sample (c. 80%) of areas with good ground visibility. In other words, the survey effectively targeted exposures and the majority of these were recorded during the 1996 fieldwork.

The macro fauna management strategy involves the construction of a fauna-proof fence around the Regional Park (JMcD CHM 2006d). The fauna fence fenceline survey (in 2004 and then 2005) recorded a total of 43 exposures with varying degrees of surface visibility were recorded using the same procedures as the 1996 survey (JMcD CHM 2006d: Appendix 3). These exposures covered an area totalling of 35,365 m². This equates to 17.9% sample of that survey corridor (i.e. 196,980m² = 19,698 km long x 10m wide). Archaeological evidence was recorded on 23 of these exposures. Visibility along the proposed route was mostly low (zero-20%), limited by grass cover and leaf litter. On vehicle tracks and sheet erosion features, visibility was up to 50-80%, limited by grass, leaf litter and ironstone gravels.

Figure 10: West end of the St Marys Development Site, showing Management Zones, and the location of the Western Precinct.

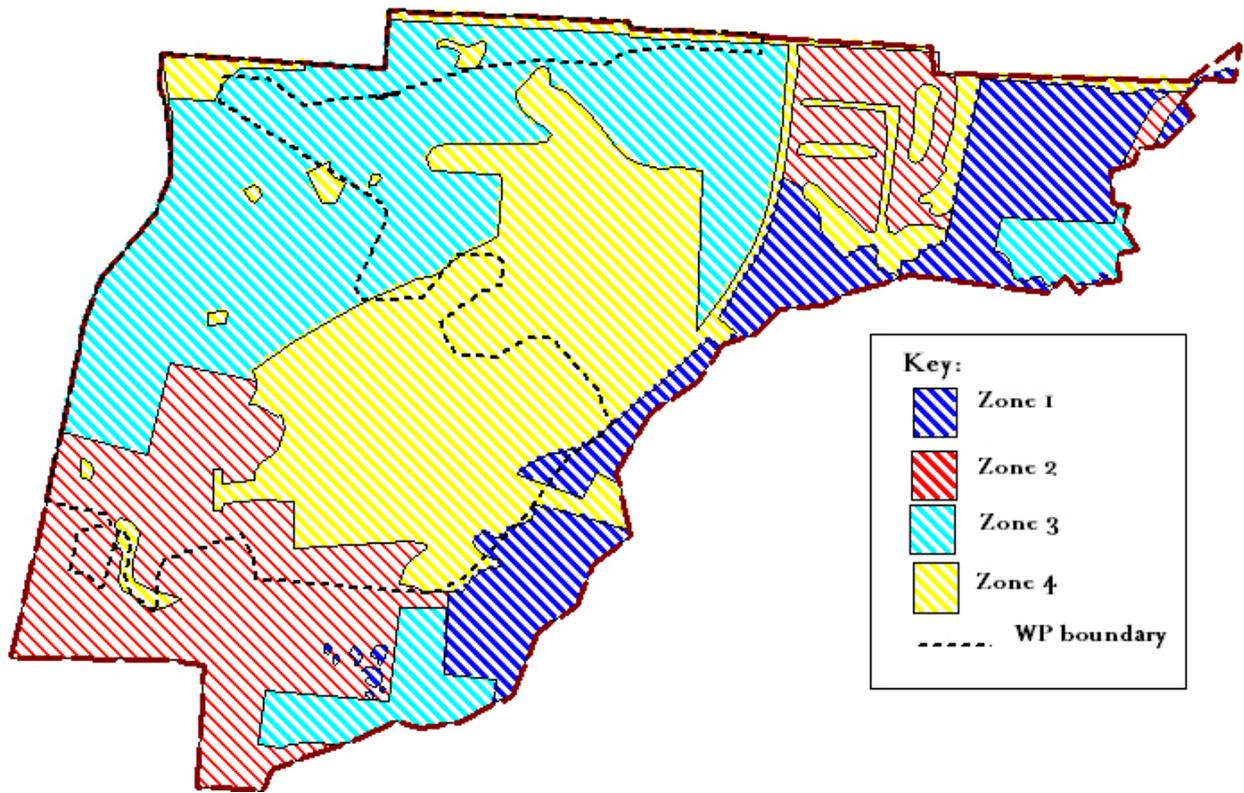


Figure 11: The West end of the ADI Site showing the Western Precinct and archaeological management zones, overlain on aerial photo.

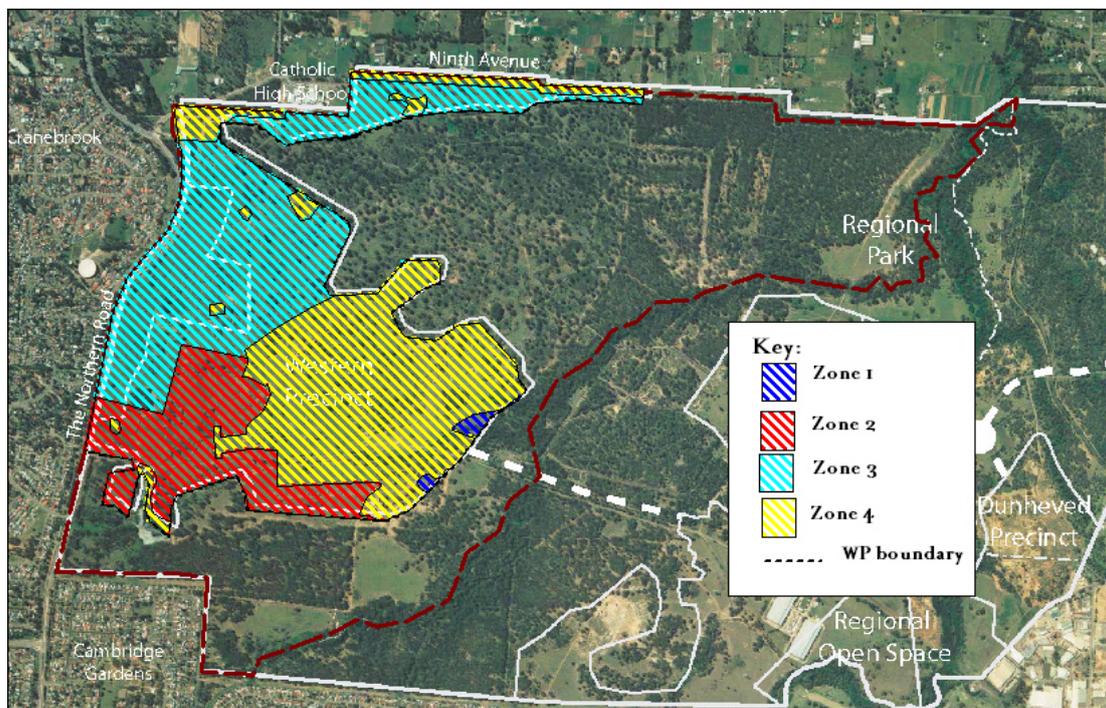
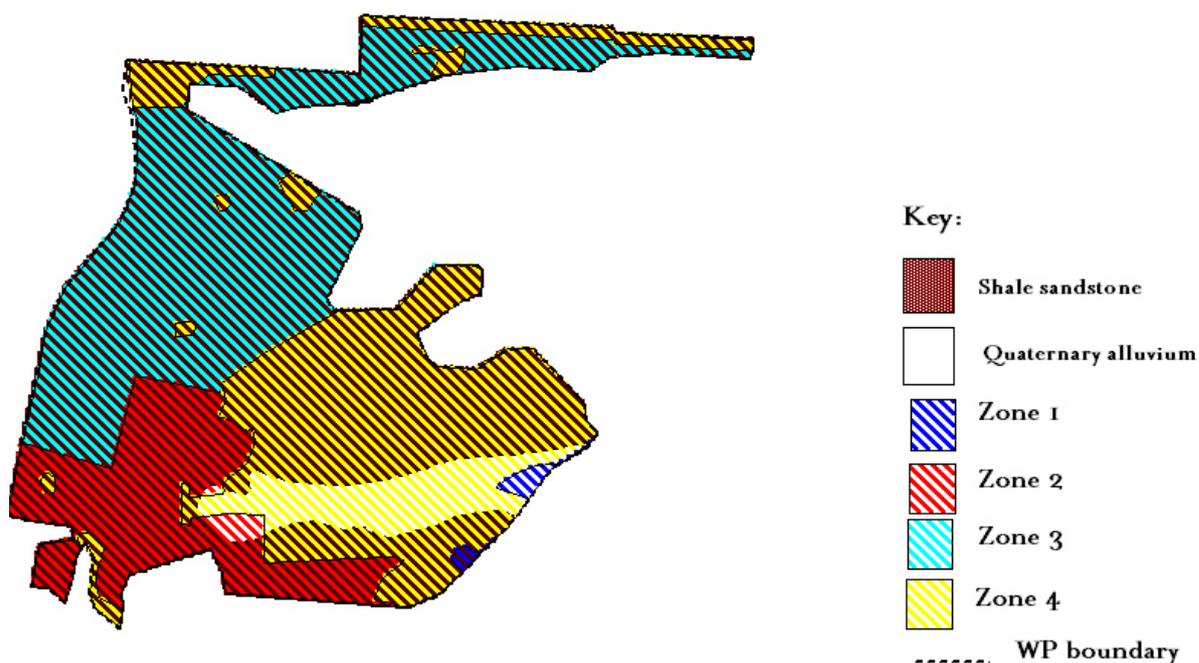


Figure 12: Western Precinct: Shale and alluvium landscapes showing management zoning.



5. PREVIOUS FIELDWORK

Fieldwork was first undertaken across the Western Precinct in early 1996 (JMcD CHM 1997a). This survey was undertaken over four days (26th and 27th February and 21st and 22nd March 1996) by Jo McDonald assisted by Huw Barton. A total of 10 person days were spent on this recording exercise. The area originally surveyed was 550ha - twice the size of the current Precinct. On Day 1 of the survey, the archaeologists were assisted by Mr Luke Hickey (DLALC). On Day 2 of the survey, Mr Colin Gale (then Daruk Link) took part in the survey. The last two days of the survey were done by the archaeologists alone.

In 1997, a series of test excavations were done across the St Marys Site to groundtruth the SMM (JMcD CHM 1997b). This was done in support of the S22 Committee report - which ultimately defined the SREP and EPS for the St Marys Project. Five test excavations across various landscapes were excavated, with two of these (SA4 and SA5) at the west end of the St Marys Site. Sample Area 4 (near WD-63: AHIMS # 45-5-702) was in the south of the western area and traversed the main tributary creekline. Sample Area 5 (near ADI-43: AHIMS # 45-5-1044) was towards the northern fenceline and crossed a minor tributary creek. Both excavated sample areas produced significant and

intact assemblages. These excavations were done with the involvement of the Deerubbin LALC: Daruk Link members inspected the excavations on several occasions. Both of these excavated areas are within the Regional Park.

In 2003, salvage investigations were carried out on a ridgeline in the north-west corner of the St Marys Site, prior to construction of the Xavier College High School (JMcD CHM 2003a). Two surface open campsites, ADI-47 (AHIMS#45-5-1048) and ADI-48 (AHIMS# 45-5-1049) had been recorded here (JMcD CHM 1997a). This salvage targeted Area 16, identified as a suitable location for testing the archaeological predictive model (JMcD CHM 1997a: Figure 9). The salvage programme included surface collections, 42 dispersed test pits and two large open area excavations. Almost 5,000 stone artefacts were recovered from within the 6ha development area. The excavated archaeological material here revealed at least four foci of prehistoric activity. This area is now described as the 'ADI 47+48 archaeological landscape'. The assemblage evidence revealed that this landscape was occupied repeatedly as a limited use and/or 'dinner-time' camp.

The macro fauna fence survey covered a 12.7km survey route (in 2004), and the realignments covered 8.9km (JMcD CHM 2006d: Figure 5). This development proposal had a narrow linear impact, and inspection focused on the centreline, with a 5m corridor on either side. All areas of surface exposure along the 10m wide corridor were closely inspected for artefacts and old growth and dead trees were inspected for scars of possible Aboriginal origin. For these surveys in 2004 and 2005, Deerubbin LALC and three Darug groups were involved and many of the 1996 sites were revisited at this time.

5.1 Previous results

Prior to our 1996 survey, nine sites (ADI-7, 12, 13, 14, 15, 16, 17, 18, 19) had been recorded at the western end of the St Marys Site (Kinhill 1994).

During the 1996 survey, 60 of the 74 recorded surface exposures were found to be artefact locations (JMcD CHM 1997a: Figure 6; Appendix 2). A total of 471 artefacts were recorded on these (JMcD CHM 1997a: Appendix 3). Most of these represented relatively sparse surface finds: only 13 artefact locations (22%) had more than 10 artefacts; 18 (30%) had single isolated finds and 13 (22%) had 2-3 artefacts (Figure 14).

Artefact numbers varied across the study area according to catchment and topography. Most artefacts (44%) were found in catchment 1, followed by catchment 2 (35%). Lots of artefacts (21%) were also recorded on the knoll/watershed between these two catchments. With the exception of the knoll/spurs in catchment 1, artefacts were recorded in all topographic locations.

During the initial (2004) fauna fence survey, open artefact scatters and isolated finds were found on 21 of the 41 exposures recorded along the proposed fenceline route. Thirteen sites previously recorded were relocated and 131 lithic artefacts were recorded at the new site locations (JMCD CHM 2006d: Table 5, Figures 7, 8). All recorded features are open campsites or isolated finds. The subsequent (2005) survey of fence realignments identified a further four open artefact scatters and two isolated finds. These realignments, however, avoid seven previously identified sites (ADI-12, ADI-23, ADI:FF-4, ADI:FF-5, ADI:FF-14, ADI:FF-15, ADI:FF-16 and ADI:FF-17). All sites were described and recorded fully in the earlier reports.

6. RESULTS

As a result of the previous survey and assessment (JMCD CHM 1997a, 2006d, Kinhill 1994) a total of 39 surface sites have been identified within the Western Precinct (Table 8). All previously recorded sites in the Western Precinct are shown (Figures 14, 15 and 16). These have been located on surface exposures across the subject land, in a variety of landscape settings and management zones. The descriptions of these sites are not repeated here (see JMCD CHM 1997a: Appendix 3; 2006d: 26-47 and Appendices).

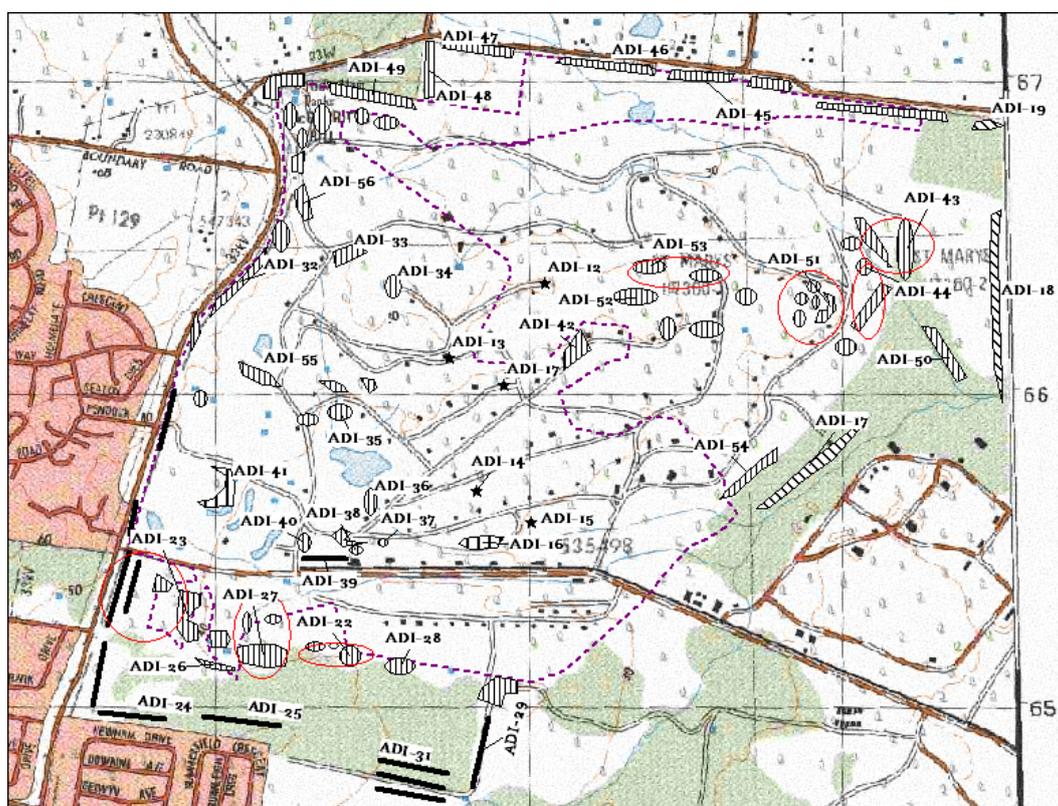
6.1 Previous recommendations

The earlier recommendations for the Western Precinct were directed at refining the SMM during the development of a conservation outcome (JMCD CHM 1997a:32-34). They pre-dated the test excavation report written in support of the s22 committee report (JMCD CHM 1997b) and also pre-dated the designation of the SREP 30 and EPS guidelines. They still have relevance because they identify the need for representative testing across the Precinct to document the range of occupation behaviours preserved there. Since that time, there have now been numerous widespread excavations across the Cumberland Plain which have developed aspects of the predictive

model and confirmed the extensive (buried) nature of the archaeological resource in this part of Sydney. The relevant recommendations are reiterated here:

1. Subsurface investigation is required ... so that the management model can be better assessed. This sub-surface testing should be directed at 'ground-truthing' the proposed strategic management model by documenting both the degrees of disturbance ... and the range of archaeological evidence present;

Figure 13: Surface exposures (and combined sites) after the 1996 survey (background Springwood 1:25k map). Western Precinct shown in dashed purple line.



2. Sub-surface testing should aim at sampling each of the four proposed management zones (and) should be directed at the range of landscape units present within this area. A number of testing locations fulfilling these criteria were identified (Figure 16) covering a range of archaeological potential;
3. An area representing 10% of the shale hillslope within the ADI Site (c. 50ha) needs to be identified as core conservation area. This should include ridgetop, hillslope and valley floors, to ensure that the range of landscapes is preserved.

While the selection of the conservation area requires more detailed fieldwork, subsurface testing should be restricted within Zone I to areas where there are likely to be development impacts.

Figure 14: Results of the Fauna Fence Survey (JMcD CHM 2006d).

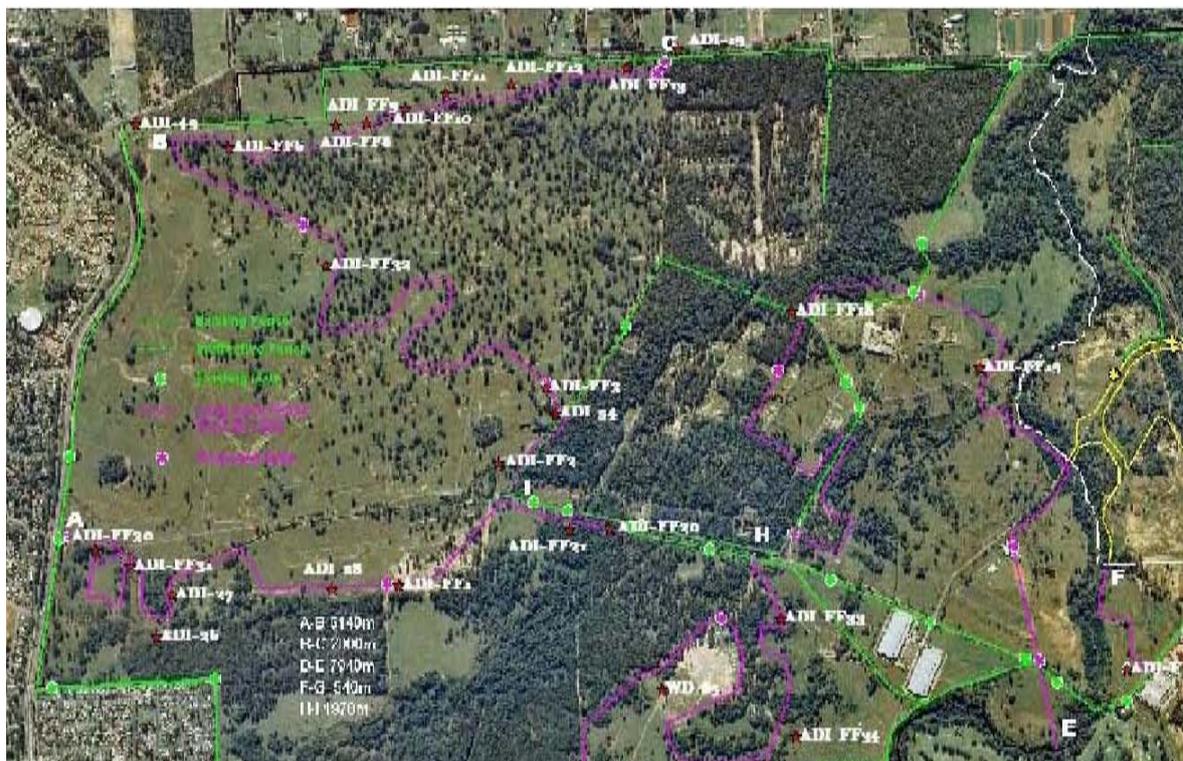
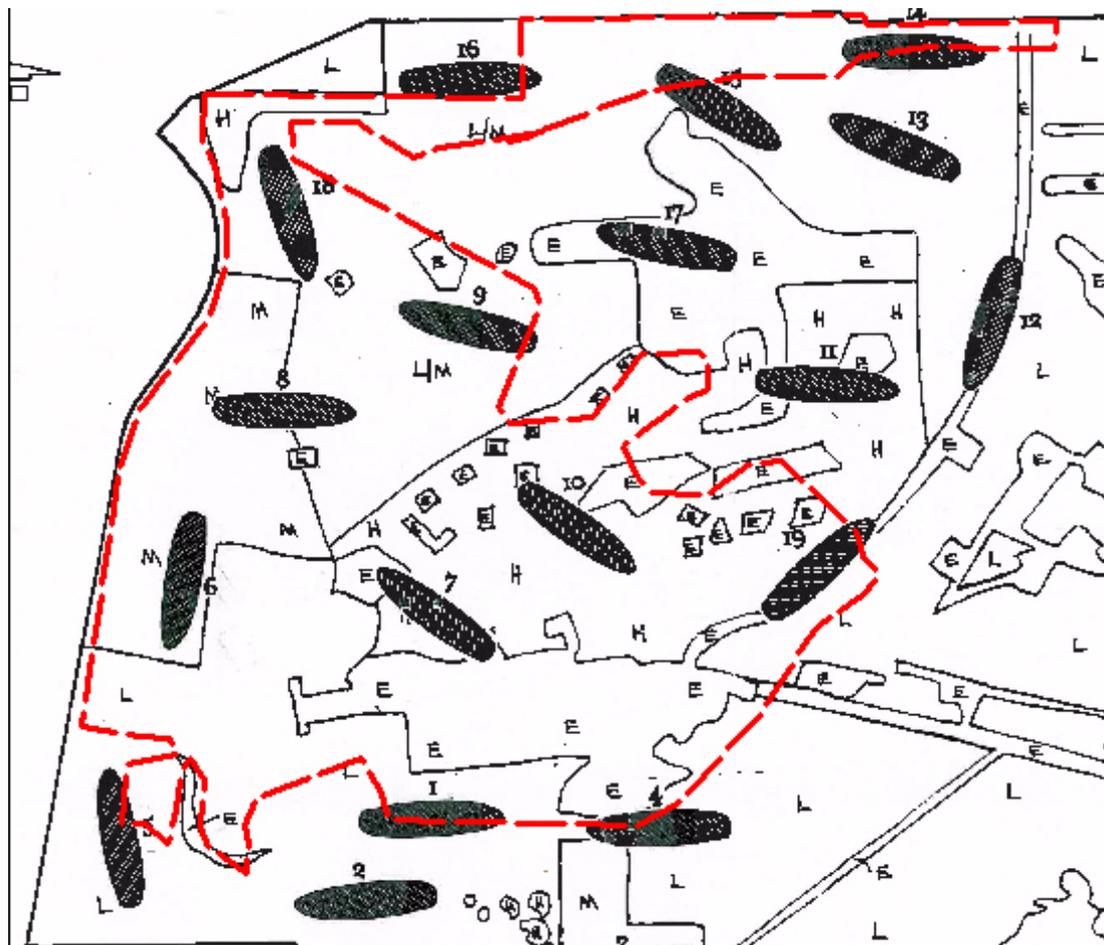


Table 8: Recorded surface features in the Western Precinct (including sites located long the proposed Fauna Fence).

Site Name	Exposure	Easting	Northing	Artefacts	Landscape	Topo	Zone
ADI-12		290778	6266882	2	Shale	UHS	Zone 3
ADI-13		289742	6266123	5	Shale	LRT	Zone 3
ADI-14		289829	6265696	5	Shale	LHS	Zone 4
ADI-15		290004	6265595	5	Shale	CB2	Zone 4
ADI-16		289845	6265507	5	Qal	FP CB2	Zone 4
ADI-17		289916	6266036	5	Shale	UHS	Zone 4
ADI-22		289330	6265200	18	Shale	LHS	Zone 2
ADI-26		288986	6265084	5	Shale	LHS	Zone 4
ADI-27		289080	6265230	11	Shale	LHS	Zone 2
ADI-28		289670	6265140	1	Shale	UHS	Zone 2
ADI-32	Exp-25, 26	289077	6266354	10	Shale	RT	Zone 3

Site Name	Exposure	Easting	Northing	Artefacts	Landscape	Topo	Zone
ADI-33	Exp-27	289488	6266448	3	Shale	RT	Zone 3
ADI-34	Exp-28	289539	6266322	3	Shale	RT	Zone 3
ADI-35	Exp-31, 33	289395	6265945	9	Shale	CB1	Zone 3
ADI-36	Exp-33	289471	6265703	1	Shale	CB2	Zone 2
ADI-37	Exp-34	289570	6265494	1	Qal	FP CB2	Zone 4
ADI-38	Exp-35,36	289463	6265450	3	Qal	FP CB2	Zone 4
ADI-39	Exp-37	289360	6265434	3	Qal	FP CB2	Zone 4
ADI-40	Exp-38	289281	6265528	10	Shale	LHS	Zone 2
ADI-41	Exp-39	289042	6265708	6	Shale	LRT	Zone 3
ADI-42	Exp-40	290153	6266148	2	Shale	UHS	Zone 4
ADI-45	Exp-53	290749	6266971	7	Shale	UHS	Zone 3
ADI-46	Exp-52	290239	6267012	20	Shale	CB2	Zone 3
ADI-49	Exp-46	289500	6266930	7	Shale	LRT	Zone 3
ADI-54		290650	6265640	21	Shale	FP CB3	Zone 4
ADI/FF-1		289922	6265112	1	Shale	UHS	Zone 2
ADI/FF-3		290637	6265743	5	Shale	FP CB3	Zone 4
ADI/FF-6		289681	6266839	27	Shale	UHS	Zone 3
ADI/FF-7		289857	6266809	1	Shale	CB2	Zone 3
ADI/FF-8		290096	6266847	1	Shale	LRT	Zone 3
ADI/FF-9		290210	6266840	1	Shale	CB2	Zone 3
ADI/FF-10		290368	6266865	5	Shale	CB2	Zone 3
ADI/FF-11		290527	6266893	24	Shale	UHS	Zone 3
ADI/FF-13		291218	6266870	1	Shale	PL	Zone 3
ADI/FF-20		290749	6265178	1	Qal	FP CB2	Zone 1
ADI/FF-21		290600	6265203	7	Qal	FP CB2	Zone 1
ADI/FF-30		288835	6265442	1	Shale	UHS	Zone 2
ADI/FF-31		288950	6265366	9	Shale	UHS	Zone 2
ADI/FF-32		289935	6266340	1	Shale	RT	Zone 3

Figure 15: The proposed sample locations recommended for further sub-surface investigation in the JMcD CHM 1997a report.



The survey of the fauna fence traversed the boundary of the Western Precinct but also included other lands (i.e. the Central Precinct boundary and lands adjoining these two precincts). That report made a number of recommendations (JMcD CHM 2006d: 53-55). Those relevant to the current Precinct planning process are reiterated here:

1. The proposed route crosses land of both high to very high archaeological sensitivity and areas of lesser significance (JMcD CHM 2006d: Figure 10; Table 10);
2. The proposed fauna fence would impact on 24 (surface) archaeological sites - 14 within the current Precinct and including the road access between this and the Central Precinct: JMcD CHM 2006d: Table 11);

3. The proponent should apply to the Director-General, DECC (NSW) for a section 90 Consent to Destroy (with Salvage) for the full extent of the proposed impacts for the fenceline development to cover all surface sites that have been identified as being impacted by the proposed development;
4. Fenceline routes (surrounding the Western Precinct) were identified as requiring further archaeological investigation. A number of locations were chosen to sample the range of landform units present (see section 8.5). It was envisaged that this work should be done under a section 90 (with Salvage) Impact Permit;
5. Some rare artefacts types i.e. ground edge hatchet heads, were identified as of scientific significance. These were found at the following sites:

- ④ Section A-B: site ADI/FF- 3I
- ④ Section B-C: site ADI/FF- 1I
- ④ Section K-L: site ADI/FF-2I

These should be collected under the Section 90 (with salvage) Permit.

It was envisaged that salvage along these sensitive sections would take the form of spaced pits along the centreline, with impacts being confined to the developable lands, The following areas were identified as having particular sensitivity and as forming the focus for subsurface sampling:

- ④ In the vicinity of sites ADI-22 and ADI-28. Lower hillslopes. Zone 2 (1,233m);
- ④ In the vicinity of site ADI/FF-2I. Lower hillslope/valley flats/creek bank (2+ order). Zone 1 (406m);
- ④ Between sites ADI/FF-1I and ADI/FF-13, on spur slopes off ridge in vicinity of shale /Tertiary terrace junction. Zone 3 (616m).

The recommendations of these previous reports (particularly those advocating areas of particular sensitivity or representativeness) are considered in this analysis of the various landscapes within the Western Precinct and management requirements of the SMM.

6.2 Landscape elements and areas for investigation

The previous recommendations are considered here in light of the current analyses of the Western Precinct. The following findings are central to the target area selection process:

- ⊕ Surface archaeological evidence has been found across the Precinct wherever conditions have been appropriate to allow its discovery;
- ⊕ 130 hectares of land has been identified as having archaeological sensitivity (Zones 1, 2 and 3) within this Precinct (Table 4);
- ⊕ A range of landscape and topographic characteristics are found across this Precinct;
- ⊕ Ridge tops, low ridge tops, headwater and 1st order creek lines and upper hillslopes are shale hillslope landscapes particular to this end of the St Marys Site: these are landscapes will be significantly impacted by development here;
- ⊕ The Regional Park will retain a representative proportion of all of these except ridge tops and headwater tributaries (Table 4).

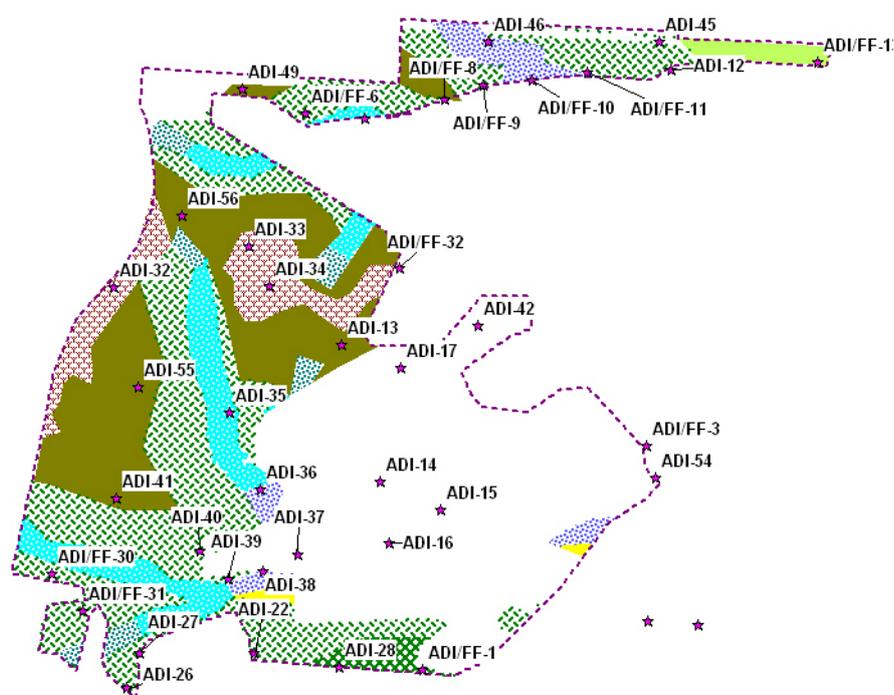
There are two major landscape bases and a total of 12 topographic landscape elements across this Precinct (see Figure 17).

When the three relevant sensitivity zones are combined with the amalgamated landscape parameters there are c. 40 combinations of potential targets for salvage. Based on representativeness criteria and the fact that there is such a substantial conservation outcome at this western end of the St Marys Site, it is considered that 40 salvage excavations would represent an excessive sampling target, particularly given the excellent conservation outcome afforded by the western end of the Regional Park. Instead, it is proposed that open area salvage excavation be undertaken in six target areas (Table 9).

These target areas cover the representative range of landscape elements. The average size of each target (or sample) area would be around 2ha, from which a goal of around 150 square metres of excavated deposit would be retrieved. The excavated sample would

represent c.0.75% sample of each Sample Area; the six Sample Areas will represent a 1.5% sample of the developable lands within Zones 1-3 of the Western Precinct.

Figure 16: The locations of all identified surface features, showing background of sensitive topography (Zones 1, 2 and 3).



The seven identified locations fulfil the necessary criteria of the SMM, both by testing a range of Management zones (1-3) and the range of representative landscape characteristics of the Western Precinct (Table 9, Figure 17, 18).

Table 9: Suggested salvage locations in the Western Precinct and adjoining Fauna Fence.

No.	Near	Catchment	Landscape	Topo	SMM Zone
1	ADI-FF11	1	Shale	UHS	3
2	ADI-34	1_2	Shale	RT	3
3	ADI-32, ADI-56	2	Shale	RT/LRT	3
4	ADI-41, ADI/FF-30	2	Shale	LHS, CB1	2
5	ADI-22, ADI-28	2	Shale	LHS	2
6	ADI-54, ADI-FF3	2	Qal	FP/CB2	1
7	ADI/FF20, 21; SA-4	3	Qal	LHS/CB2	1

7. DISCUSSION

7.1 The Western Precinct

The current investigation of the Western Precinct considered 225ha of developable land in the St Marys Site. There is a significant conservation outcome with respect to Indigenous archaeological cultural heritage at the western end of the St Marys Site. More than 60% of the land here falls within the Regional Park, and of this land almost 22% has high conservation value (i.e. is zone 1) and another 53% has archaeological sensitivity (zones 2 and 3). Of the Zone 1 land to the west of the South Creek tributary, 98% falls within the Regional Park.

A substantial proportion (42%) of lands within the Western Precinct has already been highly disturbed (i.e. is Zone 4). The Western Precinct will impact on only 1.6ha of land which has conservation potential (i.e. Zone 1), although it does impact on c.130 hectares of land with varying archaeological sensitivity (Zones 2 and 3). The fauna management fence line to be constructed along the margins of the access road between the Western and Central Precincts will also impact on Zone 1 landscapes.

In keeping with the precepts of the SMM, the investigation of a representative set of landscapes (in good condition) from the Western Precinct is required to assist in the interpretation and management of the archaeological resources in the Western Precinct and more broadly the Regional Park.

Six salvage locations within Western Precinct and another along the macro-fauna fence on the road linking the Western and Central Precincts have been identified as locations which fulfil the representativeness criteria of the SMM. The fauna fence salvage area crosses a landscape (floodplain and lower hillslope on Qal) which is not present in the Western Precinct in good conditions - but which is common in the Regional Park at this western end of the St Marys Site. Salvage of these six landscapes will add fundamentally to our understanding of Aboriginal occupation of this area throughout its human occupation. A research design, adapted from the overall Project Research aims has been developed to guide the investigation of these six locations (section 7.3). These proposed outcomes now require final discussion with the Aboriginal community and DECC Archaeologists.

7.2 Management Processes: applying the protocols

The management protocols (section 3.2; Figure 6) devised in 1997 have directed the works undertaken here, and those completed in the previous development Precincts. In terms of the protocols and strategies flow chart, the planning process for the Western Precinct is well underway.

An Indigenous heritage conservation outcome was determined by the REP, and the current work has completed stages 1-3 of the protocols (Figure 6). The Zone 4 areas within the developable lands can now be considered as 'cleared for development'. Once this approach has been validated by DECC and the procedures agreed, early development/construction works within the Zone 4 lands could proceed.

Once the Precinct Plan has been lodged with Council, the proponent should lodge with DECC NSW a section 87 + 90 application for Consent with salvage. That application should be accompanied by this report.

The current DECC NSW guarantee of service for processing a Consent application is eight weeks. Given their familiarity with the Project and the processes involved, DECC may not require this length of time. It should, however, be factored into the schedule.

Once the Consent is granted, the fieldwork would commence. A four week excavation period at each of the seven locations is envisaged.

Once the salvage excavation is completed, a preliminary report documenting the methods used and preliminary results of the excavation can be lodged with NPWS - and the proponent can then seek to activate the Consent for the (then) cleared salvage locations within the Western Precinct.

Once the analysis and reporting of the excavation is completed, sign off from DECC NSW will provide clearance for all subsequent works within the Western Precinct.

7.3 Salvage Research Design

This research design develops the overarching archaeological research aims of the St Marys Site, and specifically defines the works programme for the Western Precinct (and adjacent fauna fence) at the seven identified salvage locations.

A total of 39 surface archaeological sites with almost 250 artefacts have been recorded within the Western Precinct. Previous sub-surface investigations in the western end of the St Marys Site (at SA4, SA5 and ADI-47+48) have produced over 7,000 stone artefacts. Over 131 hectares of land with Potential Archaeological Deposit (Zones 1-3) have been identified here.

Study Area

The St Marys Project is located on the northern Cumberland Plain to the east of Northern Road. The St Marys Site comprised c.15 square kilometres straddling South Creek, at its confluence with Ropes Creek.

Impact of the proposed development

The proposed development Precinct involves mostly residential development (see Figure 5). A combination of housing, roads, retail/commercial, open space, and related infrastructure impacts will destroy any Indigenous cultural heritage remaining here. The location of this Precinct has been defined by SREP30 and it is assumed that the entire Precinct is developable. There is a major conservation outcome achieved by the broader management strategy in place for the St Marys Site: 98% of the lands west of the South Creek tributary identified as having conservation potential are to be included in the Regional Park.

It can be assumed that all and artefact-bearing topsoil across this developable area will be impacted by as range of development impacts. Any archaeological sites/Aboriginal objects located here would be destroyed. This research design reflects the need to salvage information from this western end of the Site, to ensure appropriate mitigation prior to development and to provide interpretation of Indigenous heritage resources within the Regional Park.

Aims

Given the extremely poor surface visibility across the Site generally (Jo McDonald CHM Pty Ltd 1997, 1996, 2001a, 2006d) and the fact that surface evidence is not a good indicator for the nature of the archaeological resource, salvage in each area will commence with a programme of random intensive sub-surface testing. Testing will

locate suitable assemblage(s) for salvage – in a manner which comparable with other recent excavations on the Cumberland Plain (particularly the RHIP Stage 2 and 3 works, Xavier College, the St Marys Eastern Precinct, Greystanes Estate and Plumpton Ridge).

The over-riding research aim of this salvage project is to investigate the archaeology in relation to landscape. Subsidiary aims include:

- ⊕ Characterising the locations investigated via artefact distribution and assemblage characteristics.
How do the assemblages at the various sites compare given the differences in stream order and other landscape characteristics?
The retrieval of assemblages from specific activities (including knapping floors) will investigate how technology was organised.
The identification of assemblage 'signatures' - tentatively identified during the earlier work and further explored in a range of subsequent investigations (e.g. across the St Marys Development Site, at Regentville, at Richmond and in the RHDA - will be part of these analyses.
- ⊕ The retrieval of statistically viable samples of artefacts will allow comparison with other similar salvage excavation.
- ⊕ The comparison of the results of the present investigations with results from other projects elsewhere on the Cumberland Plain, to identify intra- and inter-regional variation and to establish significance values.

Research framework

The project seeks to investigate Aboriginal use of this part of the Cumberland Plain.

Management investigations across the Cumberland Plain over the last 10 years have focussed on archaeological landscapes. This contrasts with the arguably ineffective and inappropriate site-based approach to heritage management. Archaeological landscapes are based on a combination of geomorphological and topographic criteria.

Technological organisation involves studying artefacts to explore how people used landscapes in the past. It is concerned with the production, use, transport and discard of tools and the materials needed for their manufacture and maintenance (e.g. Nelson 1991). Many factors influenced the particular strategies that were adopted by people - including the raw materials that were available (their physical properties) the particular kinds of jobs that tools were needed for (e.g. heavy duty chopping, wood shaving, fine cutting), whether tools could be made and used in the same place or whether they had to

be carried over long distances. Sometimes tools also had to code social information. More commonly understood strategies included curation, expediency, specialisation, and stone rationing (e.g. in response to great distance from stone sources).

Technological organisation and particular technological strategies are manifest in the archaeological record through people's stone discard actions. Previous analysis on the Cumberland Plain has already identified a variety of activities, including the procurement of raw materials, initial testing and reduction of stone, transport, heat treatment, systematic core reduction and production of formal tools (including backed artefacts), expedient reduction to produce unshaped tools, hafting, tool use, tool maintenance, storage and recycling or reuse.

Field methods

The salvage of the six identified landscapes in the Western Precinct will target areas with no (or minimal) surface archaeological manifestation. The approach being advocated is a combination of systematic testing and salvage excavation: the methodology includes both the discovery of buried features across a landscape and then the salvage of features encountered. It is important that this is done in a way which is comparable to other salvage excavations done in a range of landscapes across the Cumberland Plain.

- ⊗ Open-plan excavation: Salvage will target features/locations that intercept a number of activities. If the archaeological evidence is found to be dispersed and localised (i.e. activities were spatially discrete), more than one open plan excavation area may be needed. It is proposed that open plan excavation would proceed either until a statistically viable sample has been obtained – or until the edge/boundaries of the feature(s) are reached (whichever is smaller). The outer limits of a knapping feature are defined as either sterile deposit and/or a sufficiently low artefact density to signify the absence of interpretable artefactual material e.g. <10 small artefacts not including tools and/or retouched items.
- ⊗ Statistically viable sample: >2,000 artefacts/assemblage but preferably more, if possible. Sufficient artefacts need to be recovered so that assemblages can be described in terms of raw materials types, artefact types, artefact size, and so on. Some artefact types such as cores, backed artefacts and retouched and/or used tools may each make up <1-2% of the assemblage. In an assemblage of 2,000 artefacts there might therefore be only 10-80 artefacts of these types: the minimum number, statistically speaking, required to analyse these types further. To calculate a statistically significant result (e.g. for a chi-square test) it must be possible to calculate an expected value of at least five artefacts in each cell of a data table (Clegg 1990:176). If one wanted to compare the size of artefacts of silicified tuff and silcrete, and silicified tuff made up only 20% of an assemblage of 2,000 artefacts, then there would be only 400 artefacts of this raw material.

If only 1% of those artefacts were >4cm in size then there might be only 4 silicified tuff artefacts >4cm in size.

- ⊗ Moderate and high density locations: Moderate and high artefact density locations are needed to achieve statistically viable samples economically. If artefact density is only 20/m² then 100 square metres would need to be excavated to recover 2,000 artefacts. If densities were c. 50/m² then 40m square metres would need to be excavated to recover 2,000 artefacts. As artefact density may vary in relation to the kind of activity (systematic core reduction and backed artefact production may result in high artefact densities while casual reduction to produce unshaped tools may result in moderate or low densities) excavation areas ought not be restricted only to high density locations, unless a range of activities are indicated. Entire features should be retrieved where possible to ensure that the assemblage can be properly characterised.
- ⊗ Range of activities: Different activities indicated by different artefact types, including backed artefacts, partly made backed artefacts and backing debitage, tool retouching debitage, debitage with dorsal grinding, and retouched and/or used tools. Different activities are also indicated by different and/or distinctive raw materials.

The proposed methodology is as follows:

Sub-surface testing will be conducted across seven defined PAD locations.

Dispersed test pits measuring 1m x 1m will be excavated at 10m - 20m intervals across a grid centred over the proposed target PAD. The testing will aim to locate high and/or moderate density pits and/or interesting assemblages. Approximately 40-45 test pits will be excavated per target area.

Testing along the fauna fence line in Zone 1 near ADI/FF:22 will be located along the centreline of the proposed fence line. Features here will only be excavated on the road side of the fence (i.e. not into the Regional Park). The aim of this testing is to identify a suitable salvage location. Some variation to the spacing may be necessitated by the presence of large trees, areas of localised disturbance, etc.

General

It is intended open area excavation will be undertaken where features are encountered. A 'feature' would include a high density of artefacts in a square metre or a pit which contains unusual/diagnostic artefact types. Open area excavation aims to salvage an entire assemblage – or where this appears to be extensive and/or continuous a large enough sample of artefacts to be statistically viable (see above). The aim would be to

retrieve a statistically viable sample from this site/landscape to facilitate valid comparison with other sites/landscapes.

The size of the area to be open area excavated will depend on the retrieved artefact densities. A target of 100m² is generally required to yield the necessary artefact assemblage. An excavation area of this dimension will ensure comparability with other salvage projects currently being undertaken on the Cumberland Plain.

Test pits will be excavated in bulk, down to the base of the A₂ deposit. All the deposit will be wet sieved on site using a water truck and nested 8mm and 3.5mm sieves. The sieving location will be positioned in an area where there will ultimately be site disturbance (i.e. in developable land). Appropriate sediment controls will be used.

The site will be mapped to scale and the location of the excavated test pits clearly identified and logged using handheld (differential) GPS. Stratigraphic sections detailing the stratigraphy and features within the excavated deposit will be drawn and the excavation area (including any features encountered) will be photographed.

Artefacts will be analysed on a comparable level with previous analyses of excavated assemblages on the Cumberland Plain (e.g. Jo McDonald CHM Pty Ltd 1997b, 1997c, 1999b, 2001, 2004, 2005, 2006; McDonald and Rich 1993). This will ensure comparison of these sites with other open sites in (former) ADI Site and on the Cumberland Plain generally. The assessment of the sites' significance can thus be made.

The analysis will provide information on the kinds of activities carried out, what stone materials were used and in what quantities, how stone tools were made, used and maintained, and how they and the materials from which they were made were transported around the landscape. By comparing different investigation areas it will be possible to determine whether there were differences in the kinds of activities carried out and the way that stone technologies were organised across the landscape. Such differences could be expected if different aspects of settlement organisation varied in relation to the landscape units as defined.

- ⊕ Raw material type will be recorded to document what stone materials were used.
- ⊕ Flaking quality and whether stone was heat treated or not will be recorded to provide additional information on stone selection.

- ☉ Artefact size and weight will be recorded.
- ☉ To document information on tool production, use and maintenance an artefact type list will be developed, including formal tools such as backed artefacts, other artefacts used as tools, tools which were maintained (had retouched working edges), and artefacts struck from the working edges of tools (tool retouching debitage).
- ☉ To document how stone was reduced and tools were made, flaking pattern will be recorded for cores and conjoin sets.
- ☉ Where features of previously reported generalised reduction sequences or strategies are observed, these will be noted as relevant.
- ☉ To document the form of transported items the types of artefacts reconstructed through conjoining will be recorded, and from the nature of activities it may be possible to determine what other artefacts were brought to each area.
- ☉ Various types of evidence will be used to determine the kinds of activities that were carried out.

A full description of the recording methods will be included in the archaeological report. The lithic assemblage will be analysed by lithics specialist, Ms E. White. Limited conjoining to assist in discerning prehistoric 'events' will be attempted, depending on the nature and size of the assemblage retrieved.

Aboriginal Consultation

Consultation with the Deerubbin Local Aboriginal Land Council (DLALC) and the Darug Aboriginal community groups - The Darug Tribal Aboriginal Corporation, Darug Custodian Aboriginal Corporation, Darug Aboriginal Cultural Heritage Assessments and Darug Land Observations will continue. Aboriginal representatives/fieldworkers will be part of the field team. Representatives are to be involved in discussions subsequent to the sub-surface testing and prior to management recommendations being made. In accordance with DECC Community Consultation Guidelines, and advertisement will be lodged in the local print media at the time of lodgement of the s87/s90 application to ensure that no additional stakeholders have been omitted from this consultation process.

Personnel

The project will be undertaken by Jo McDonald CHM Pty Ltd. The Project Archaeologist directing the fieldwork will be identified at the time as will the field team of four fully qualified archaeologists and four Aboriginal representatives/fieldworkers.

7.4 Impact from the proposed development

Within the Western Precinct it can be assumed that development impact will be total, and that any remaining archaeological sites/features/objects (previously "relics") or landscapes will be totally destroyed. The appropriate management of the defined areas with archaeological potential to be affected by this development proposal is dealt with by this investigation.

The aim of the strategic management model (JMcD CHM 1997b) was to establish a significant conservation outcome for the St Marys Site. This has arguably been achieved. Around 900ha of land is to be included in the Regional Park. The majority of the lands identified as having high archaeological significance and/or potential (Zone 1) fall within the Regional Park, and the appropriate management of these will be provided for by a Plan of Management being devised by the DECC NSW.

7.5 Conclusions

For this Precinct planning process the strategic management model has directed the further investigation of Indigenous heritage values. The outcomes achieved are in line with the principles defined in the EPS. There a significant conservation outcome achieved by the Regional Park at this western end of the St Marys Project. Sub-surface investigation of archaeological evidence at six target locations in the developable land will achieve the other designated goal of the EPS, i.e. further investigation and interpretation of Indigenous archaeological values from the St Marys Site.

8. RECOMMENDATIONS

The following recommendations are made on the basis of:

- ⊕ legal requirements of the National Parks and Wildlife Act NSW 1974 (as amended) whereby it is illegal to damage, deface or destroy an Aboriginal object without the prior written consent of the Director, DECC NSW;
- ⊕ the interests of the Deerubbin Local Aboriginal Land Council, the Darug Tribal Aboriginal Corporation, Darug Custodian Aboriginal Corporation, Darug Aboriginal Cultural Heritage Assessments and Darug Land Observations;
- ⊕ the Strategic Management Model devised in 1997 and the processes as defined in the EPS;
- ⊕ the findings of the previous field surveys done within the current study area, confirmed by current site inspections with the Aboriginal communities;
- ⊕ the assessed potential of the landscapes and archaeological features identified within the study area; and,
- ⊕ the Precinct Planning stage of the development process.

It is recommended that:

1. There is a significant conservation outcome in this western part of the St Marys Site, with more than 60% of the total land area and more than 98% of the land with high archaeological sensitivity being excluded from the developable lands.
2. The basic precepts of the strategic management model are achieved by the planning process with this Precinct.
3. Seven areas within the Western Precinct and the fauna fenceline along the road between the West and Central Precincts are identified as requiring archaeological salvage prior to development taking place (Table 9).
4. Depending on the timing of the proposed works programme, the Proponent should apply to the DECC NSW for a s87 / s90 Consent with Salvage for the entire Precinct to undertake these works.
5. One copy of this final report (each) should be sent to:

Mr. Frank Vincent
Chairperson
Deerubbin LALC
PO BOX V184
MT DRUITT VILLAGE NSW 2770.

Ms. Sandra Lee
Darug Tribal Aboriginal Corporation
PO Box 441
BLACKTOWN NSW 2148

Mrs. Leanne Watson
Darug Custodian Aboriginal Corporation
PO Box 36
KELLYVILLE NSW 2155

Mr Gordon Morton
Darug Cultural Heritage Assessments
28 Calala St
MT DRUITT NSW 2770

Mr Gordon Workman
Darug Land Observations
PO Box 571
PLUMPTON NSW 2761

6. Three copies of this report should be sent to:

Ms Lou Ewins
Manager Cultural Heritage Division
Sydney Zone DECC
PO Box 668
PARRAMATTA NSW 2124

9. REFERENCES

- AMBS Consulting 2000 Mungerie Town Centre: Archaeological salvage excavations near Kellyville Cumberland Plain, NSW. Report to Department of Urban Affairs and Planning.
- Attenbrow, V. 2002 *Sydney's Aboriginal Past: investigating the archaeological and historical records*. University of New South Wales Press Ltd.
- Benson, D. & Howell, J. 1990 Taken for Granted: The bushland of Sydney and its suburbs. Kangaroo Press (in assoc.) with the Royal Botanic Gardens, Sydney.
- Bonhomme Craib and Associates 1999 Archaeological salvage of site RS1 (NPWS # 45-5-982), Regentville, western Sydney. Report to TransGrid.
- Byrnes, J. 1982 Origin of silcrete in the Cumberland Basin. Unpub. Petrological report 87/17, Geological survey of NSW. Department of Mineral Resources.
- Byrnes, J. 1983 Notes on cobbles and boulders in the Saint Mary's formation at Echo Vale and Marsden Park. Unpub. Petrological report 82/68, Geological survey of NSW. Department of Mineral Resources.
- Corkill, T 1999 Here and There: Links between stone sources and Aboriginal archaeological sites in Sydney, Australia. Unpublished M. Phil Thesis, University of Sydney.
- Dominic Steele Consulting Archaeology 2001 Preliminary Archaeological Test excavation project: 3 sites (#45-6-1772, -1774 & -1777) within lands between Luddenham and Mamre Roads, Luddenham, NSW. Report to Camelot Grange Pty Ltd.
- EDAW & ERM Mitchell McCotter 1998 South and Ropes Creek corridors conservation and recreation strategy report. Report to ADI Joint Steering Committee.
- Jo McDonald CHM Pty Ltd 1997a Surface survey at the western end of the ADI Site, St Marys NSW: An initial attempt to groundtruth the proposed archaeological management strategy. Report prepared for ADI and Lend Lease Development.
- Jo McDonald CHM Pty Ltd 1997b Interim Heritage management report: ADI Site St Marys. Volume I: Text. Report to Lend Lease - ADI Joint Venture in response to the Section 22 Committee Interim Report.
- Jo McDonald CHM Pty Ltd 1997c ADI Site St Marys. Test Excavation of five sites. (2 Vols) Report to Lend Lease - ADI Joint Venture in response to the Section 22 Committee Interim Report.
- Jo McDonald CHM Pty Ltd 1999a Survey for archaeological sites: Proposed Rouse Hill Stage 2 Infrastructure Works at Rouse Hill, Parklea & Kellyville, NSW, for GHD on behalf of Rouse Hill Infrastructure Consortium.
- Jo McDonald CHM Pty Ltd 1999b Test excavation of PAD 5 (RH/SP9) and PAD 31 (RH/CC2) for the Rouse Hill (Stage 2) Infrastructure Project at Rouse Hill and Kellyville, NSW. Report to RHIC. Held at NSW NPWS.
- Jo McDonald CHM 2001 Salvage excavation of six sites along Caddies, Second Ponds, Smalls and Cattai Creeks in the Rouse Hill Development Area NSW. Report to Rouse Hill Infrastructure Consortium.
- Jo McDonald CHM Pty Ltd. 2002a Archaeological excavations at Windsor Road, Kellyville, NSW (Site RH/CD12: NPWS #45-5-962) Archaeological salvage programme prior to residential development. Report prepared for Australand Holdings Pty Ltd.

- Jo McDonald CHM Pty Ltd 2002b Salvage excavation of Site RH/SC5 on Smalls Creek, Kellyville. Relating to urban subdivision at Balfour Drive. Report to Mepstead & Associates on behalf of Bake Investments.
- Jo McDonald CHM Pty Ltd 2003a *Archaeological Salvage Excavations at the Proposed Xavier College: Site ADI 47+48 (NPWS# 45-5-1048), Ninth Avenue, Llandilo, NSW.* Report prepared for PMDL on behalf of the Catholic Education Office, Diocese of Parramatta, NSW.
- Jo McDonald CHM Pty Ltd 2003b Test excavations at the Old RTA Building, 109-113 George St, Parramatta, NSW. Report prepared for Landcom.
- Jo McDonald CHM Pty Ltd 2005a *Archaeological salvage excavation of eight archaeological landscapes in the Second Ponds Creek Valley Rouse Hill Development Area, NSW. Volume 1,* Report prepared for Rouse Hill Infrastructure Pty Ltd and Landcom.
- Jo McDonald CHM Pty Ltd 2005b *Archaeological salvage excavation of site CG1 (NPWS #45-5-2648), at the corner of Charles and George Streets, Parramatta, NSW.,* Report prepared for Meriton Apartments Pty Ltd.
- Jo McDonald CHM Pty Ltd 2005c *Archaeological Salvage Excavation of Site RTA-G1 109-113 George Street Parramatta, NSW,* Report to Landcom.
- Jo McDonald CHM Pty Ltd 2005d *Salvage Excavation of Human Skeletal Remains At Ocean and Octavia Streets, Narrabeen Site # 45-6-2747,* Report to Energy Australia.
- Jo McDonald CHM Pty Ltd 2006a *Salvage Excavation of Site RH/SP7 (AHIMS #45-5-906) Mile End Road, Rouse Hill, NSW,* Report to Bowdens for the Seventh Day Adventist Church.
- Jo McDonald CHM Pty Ltd 2006b *Archaeological salvage excavations at the St Marys project Eastern Precinct: Site ADI:EPI (NPWS #45-5-2994).* Report prepared for Lend Lease.
- Jo McDonald CHM Pty Ltd 2006c *Archaeological Salvage Excavation of the Colebee Release Area, Schofields, NSW.* Report to Medallist Golf Holdings.
- Jo McDonald CHM Pty Ltd 2006d *Archaeological survey for Indigenous Heritage along the proposed Fauna Fence at the former ADI Site, St Marys.* Report to Lend Lease.
- Jo McDonald CHM Pty Ltd 2006e *Salvage Excavation of Six Sites along Caddies, Second Ponds, Smalls and Cattai Creeks in the Rouse Hill Development Area, NSW. AACAI Consultancy Monograph Series No. 1.*
- Jo McDonald CHM Pty Ltd 2008a *Archaeological Salvage at ADI-FF22: The ADI Eastern Precinct Fauna Fence, St Marys.* Report to Delfin Lend Lease.
- Jo McDonald CHM Pty Ltd 2008b *Archaeological assessment of Indigenous Heritage values in the Central Precinct of the St Marys Development Site.* Report to Delfin Lend Lease.
- Koettig, M. 1980 *Eraring-Kemps Creek transmission line (southern section): Aboriginal and historic site survey.* Report to Electricity Commission.
- Kohen, J. 1986 *An Archaeological study of Aboriginal Sites within the City of Blacktown.* Report to Blacktown City Council.
- Kohen, J. 1997 *The Darug and their Neighbours: the traditional Aboriginal owners of the Sydney region.* Darug Link in assoc. with Blacktown and District Historical Society.
- Kinhill 1994 *Archaeological assessment which was part of the Regional Environmental Study (RES) of the site undertaken by Koettig, K, P. Hughes, R. Silcox, and M. Sullivan, and detailed in the RES Technical Report No. 4 - Characteristics of the Site.*

- Liston, Carol 1986 'Thematic History, Blacktown Heritage Study', for Jonathan Falk Planning in association with Rodney Jensen and Associates Pty Ltd.
- McDonald, J.J. 1986 Preliminary archaeological reconnaissance of the proposed Schofields Regional Depot, Plumpton, NSW. Report to MWDA.
- McDonald, J. 1996 The conservation of landscapes: a strategic approach to cultural heritage management. *Tempus*, 6:113-121.
- McDonald, J. and Mitchell, P. 1994 An assessment of the archaeological context, land use history and management requirements for Aboriginal Archaeology in the Australian Defence Industries Site, St Marys, NSW. Report to ADI Ltd, NSW Property Group.
- McDonald, J.J. and Rich, E. 1993a Archaeological Investigations for the RHIP (Stage 1) Works along Caddies, Smalls and Second Ponds Creeks, Rouse Hill and Parklea. Final report on test excavation programme . Report to RH (Stage 1) P/L. Report held by NSW NPWS.
- McDonald, J., Rich, E., and Barton, H. 1994 The Rouse Hill Infrastructure Project (Stage 1) on the Cumberland Plain, western Sydney. In M.E. Sullivan et al. (eds.), *Archaeology in the North: Proceedings of the 1993 Australian Archaeological Association Conference*, pp. 259-293. Darwin: North Australian Research Unit, Australian National University.
- Nelson, M. 1991 "The study of technological organization" pp.57-100. (In) M. B. Schiffer (ed.) *Archaeological Method and Theory Vol.3*. University of Arizona Press, Tucson.
- NPWS NSW 1998 Report Writing Guidelines (Draft).
- Smith, L. 1989 Aboriginal site planning study in the Sydney Basin: the Cumberland Plain. Stage I. Report to NPWS.
- White, E. 1999 From artefacts to the actions of people in prehistory: a behavioural study of the W2 stone artefact assemblage, Hunter Valley, NSW. Master of Philosophy Thesis (submitted June 1999), University of Sydney.
- Witter, D. 1992 Regions and resources. Unpublished PhD Thesis, Department of Prehistory, Research School of Pacific Studies, ANU, Canberra.

Appendix I

Reports from DLALC, DTAC, DCAC, DACHA and DLO

(those received by 18th July 2008)



Darug Tribal Aboriginal Corporation

PO Box 441 Blacktown NSW 2148

PH: (02) 9622 4081

Mobile 0431 343 021

Fax: (02) 9622 4081

Email: darug_tribal@live.com.au

ABN: 77 184 151 969

Thursday, July 17, 2008

Dear Sandra

Re: Western Precinct St Marys Draft-Aboriginal Archaeological & Cultural Test Excavation

After reading the draft and doing the survey we at DTAC who are representing the local Darug community and are the Traditional Custodians believe the site reviewed has a very high heritage, cultural and spiritual significance to the Darug people: e.g. Hunting grounds and meeting places. The site is of importance to us to teach our young people how important their spiritual ties are to this land. The artifacts found are remembrance of important social and spiritual roles of our ancestors.

The scientific value of this is of importance resource because a lot of these areas were tool making areas and the site gives knowledge of our history for future generations.

The Aesthetic value of the site is on a ground were Elders could watch the younger ones, hold meetings and our community like to have a representative for the Darug community involved in all aspects of this project.

We are also pleased with the preparation draft report in all aspects and support the applications for s87 permit and s90 consents.

Hugs & Smiles
Sandra Lee
Secretary DTAC

Darugs
The Traditional & Spiritual Custodians of Darug land

Darug Aboriginal Cultural Heritage Assessments

ABN 51734106483

Gordon Morton & Associates
28 Calala St., Mt. Derritt, 2770
Ph. 9625 0005
Mob: 0422 865 831
Fax: 45 677 421

Celestine Everingham
90 Heritage Rd., Kurrajong Hills, 2758
Ph/Fax: 45677 421
Mob: 0432 528 896

2.7.08

Attention

to Mr Donald

re Central and Western Precincts of the
St Mary's Development Site - Darrug land.

As within the Western Precinct the development
impact will totally destroy any Darrug sites
DACA support extensive sub-surface investigations
We wish to be involved in all discussions held
before any sub-surface testing and prior to
management recommendations being made.
When earth works start at a later date we also
wish to monitor so as to salvage Darrug artefacts
before they are destroyed. This area is well
known to the Darrug people and my own family
has had a long association over time. I am
a Native Title Claimant and this region has
been recognised as part of our base claim.
Yours Sincerely,
Gordon Morton

Cultural Heritage - Building respect for the past and Conservation for the future

DARUG CUSTODIAN ABORIGINAL
CORPORATION

PO BOX 81 WINDSOR 2756
PH: 45775181 FAX: 45775098 MOB: 0415770163
ABN: 81935722930
mulgokiwiz@aol.com

30th June 2008.

Attention: Sandra Wallace.

SUBJECT: Archaeological Assessment of Indigenous Heritage values in the Western precinct of St Marys Development site.

Dear Sandra,

The Darug Custodian Aboriginal Corporation have received and read the draft report for the Western precinct in the St Marys Development site. We support the Archaeological recommendations, our group has not yet surveyed all of the Western precinct and cannot comment on the s90 permit until we have. We are pleased with the conservation outcomes within the St Marys Development site although we are concerned with the long term conservation within the regional park and would like further consultation on the management plan for this area, as playing fields and places of this nature destroy Aboriginal sites. We would also recommend signage on Darug history of this area be displayed within the regional park.

Our group would like to recommend that materials from the excavation works be dated in an appropriate area that would give us the most accurate dates. We also recommend that when the comparable study is carried out a plain English report appropriate for local schools and libraries be written about the Darug history and the Archaeological findings in conjunction with the central precinct with input from the traditional owners.

All assessment for Cultural Heritage should have a traditional owner present to identify sites, trees and all other Darug areas. Our group would like to participate in all works carried out in regards to Cultural Heritage as these are Darug sites and it is culturally appropriate for experienced Darug people to carry out these works.

We recommend that the earthworks in the areas that are zone 1, 2 and 3 be monitored and the correct permits are requested for collection of Aboriginal cultural Heritage materials to be relocated on site after works in a conservation area or in an area as a display for educational purposes.

We look forward to working with you on this project.

Regards


Leanne Watson

DARUG LAND OBSERVATIONS

ABN 87239202455

E-MAIL: gordow51@bigpond.net.au

PO BOX: 571 Plumpton: NSW 2761

PHONE 029831 8868 OR 0415 663 763

16th July 2008

Ms. Sandra Wallace

Project Archaeologist

Re: Central & Western precinct in the ADI site.

As in your report about theses recommendations for both Central
& Western areas we are in agreement.

But we all know the whole of ADI is one great big heritage pad.

With Thanks

Gordon Workman



D.L.O

Site's Officer

0415 663 763