5.0 Site survey, archaeological potential and sensitivity

5.1. Introduction

The site survey was conducted in three phases to accommodate changes in the concept design of the project.

The site surveys for phases 1-3 took place on the following days;

- Phase 1 - Quakers to Vineyard rail corridor & proposed Vineyard station and car park sites, conducted on the 11th and 12th February 2008;
- Phase 2 – Proposed Schofields station site, conducted on 8th and 9th April 2008; and
- Phase 3 – Expansion of the Quakers to Vineyard rail corridor, conducted on 1st, 4th and 8th September, and 5th November 2008.

In attendance were:

- Gordon Morton (DACHA) 11th February, 9th April and 4th September
- Celestine Everingham (DACHA) 1st September
- Dennis Hardy (DTAC) 1st and 4th September
- Gordon Workman (DTAC) 11th February
- Ron Workman (DTAC) 11th February
- Justine Coplin (DCAC) 11th February, 9th April, 1st and 4th September
- Phil Khan (DLALC) 12th February, 8th April, 1st and 8th September
- Gordon Workman (DLO) 9th April and 5th November
- Ron Workman (DLO) 5th November
- Jamie Workman (DLO) 9th April
- Cornelia de Rochefort (Heritage Concepts), 11th and 12th February, 8th and 9th April, and 1st 4th and 8th September
- Meg Withers (Heritage Concepts) 11th and 12th February, 4th and 8th September
- Geordie Oakes (Heritage Concepts) 8th April and 1st September
- Peter Howard (Heritage Concepts) 9th April.

Written permission has been obtained from the individuals mentioned above to include their names in this report. Copies of these permissions are held by Heritage Concepts.

Due to unforseen circumstances a DTAC representative was unable to attend phase 2 of the site inspection.

5.2. Methods

The fieldwork methodology was driven by the requirement to identify any extant archaeological artefacts, PADs, sites or features, and assess the archaeological sensitivity (potential) of the study area. The survey method targeted areas marked for development situated outside the existing rail corridor. The survey strategy employed was transect-based, whereby team members are spread approximately five to twenty metres apart, depending on ground conditions, and then move in a line together across a transect.

The active rail corridor was not physically surveyed. Discussions were held on site with the Aboriginal stakeholders regarding the high level of impact that had taken place within the rail corridor over the 144 years since the rail line was established in 1864. It was agreed that there was no possibility for intact Aboriginal sites to be located within the rail corridor and that surveying it would not provide any new information. It is for this reason that survey zone 4 is not included in table 5-1, section 5.2.1.

Recording was undertaken using a combination of descriptive, drawn and photographic media. Description of transect areas concentrated on identifying landform units, slope forms, dominant landscape processes (i.e. erosional, depositional or stable soil geomorphology), disturbance, type of vegetation cover, detectibility (see Sections 5.1.1 and 5.1.2), nature of ground exposures (if any), identification of suitable raw materials for artefact production and the presence of archaeological material.

5.2.1. Ground surface visibility rating

Surface surveys for archaeological material require that transects or areas designated for surveys are assessed for surface visibility. Ground surface visibility, in this case, is used to define the degree to which the surface of the ground can be observed. Visibility can be influenced by natural processes, such as the nature and type of vegetation cover, erosion, or land use practices (e.g. ploughing or grading). Visibility is expressed in terms of percentage of the surface of the ground visible for an observer on foot. An assessment of the surface visibility is useful in describing the general condition of the area surveyed.

Obtrusiveness is used to describe how conspicuous a site is within a landscape, and thus the chances of finding a particular site. For example, an artefact scatter is generally not obtrusive, especially in areas of high vegetation or scrub cover, yet a scar tree is.

Table 5-1 provides a guide to the assessment of ground surface visibility based on a percentage rating. It is by no means an objective method of assessment, and it is open to the assessment and interpretation of the field observer. However, it can be regarded as simply a guide to describing the ground surface visibility in a standard format.

Table 5.1 Ground surface visibility explanations and percentage rating.

Ground surface visibility	Percentage rating
Very poor — heavy vegetation, scrub, foliage or debris cover, dense tree or scrub cover, soil surface difficult to see	0-9% ground surface visible
Poor — moderate level of vegetation, scrub, and/or tree cover, some small patches of soil surface visible (in the form of animal tracks, erosion, scalds, blowouts etc.), in isolated patches, soil surface visible in random patches	10-29% ground surface visible
Fair — moderate levels of vegetation, scrub and/or tree cover, moderate sized patches of soil surface visible (possibly associated with animal /stock tracks, unsealed walking tracks, erosion, blow outs etc.), soil surface visible as moderate to small patches, across a larger section of the study area	30-49% ground surface visible
Good — moderate to low level of vegetation, tree or scrub cover, greater amount of areas of soil surface visible in the form of erosion, scalds, blowouts, recent ploughing, grading or clearing	50-69% ground surface visible
Very good — low levels of vegetation/scrub cover, greater area of soil surface visible due to past or recent land-use practices such as ploughing, grading, mining	70-89% ground surface visible
Excellent — very low to non-existent levels of vegetation/scrub cover, high soil surface visibility due to past or recent land use practices, such as ploughing, grading, mining	90-100% ground surface visible

5.2.2. Effective survey coverage

The effective survey coverage represents an estimate of the area of ground surface visually examined during the field survey. It can be estimated by dividing the amount of area actually surveyed by the estimated ground surface visibility rating. It does not reflect the amount of the area that was surveyed, but represents an estimate of the area in which the ground could be examined. The effective survey coverage for the current study is presented in Table 5-2. The tabulated size of the survey area presented in the table below is approximate only and does not represent the size of the actual development impact.

Table 5.2 Estimate of effective survey coverage and summary of survey results determined for the study area

Study area	Ground surface visibility rating	Approximate size of the study area (m^2)	Approximate size of the area surveyed (m^2)	Effective survey coverage (m^2)	Summary of survey results
Survey Zone 1	10-29%	123,125	86,187.5	8618.7-24,994.23	Four Aboriginal finds and seven PADs
Survey Zone 2	10-29%	76,250	53,375	5337.5-15,479	No Aboriginal heritage items
Survey Zone 3	10-29%	130,625	91,437.75	9143.75-26,516.8	Three Aboriginal finds and three PADs

5.3. Site Inspection

Four broad survey zones were defined according to the location of the proposed development. These are;

- Survey Zone 1-Upgrades to the rail corridor between Quakers Hill station and Schofields Road (Figure 5-1). This survey section includes phase 2 of the assessment process which constituted the proposed location for the new Schofields station site;
- Survey Zone 2 - Upgrades to the rail corridor between Schofields Road and Riverstone station (Figure 5-1);
- Survey Zone 3 - Upgrades to the rail corridor between Riverstone and Vineyard stations (Figure 5-1). This survey zone includes phase 1 of the assessment process which included the proposed location for the new Vineyard station site and Vineyard station car park site.
- Survey Zone 4 - The existing rail corridor between Quakers Hill and Vineyard train stations formed a part of phase 1 of the assessment process and is included in all three survey zones identified above (Figure 5-1).

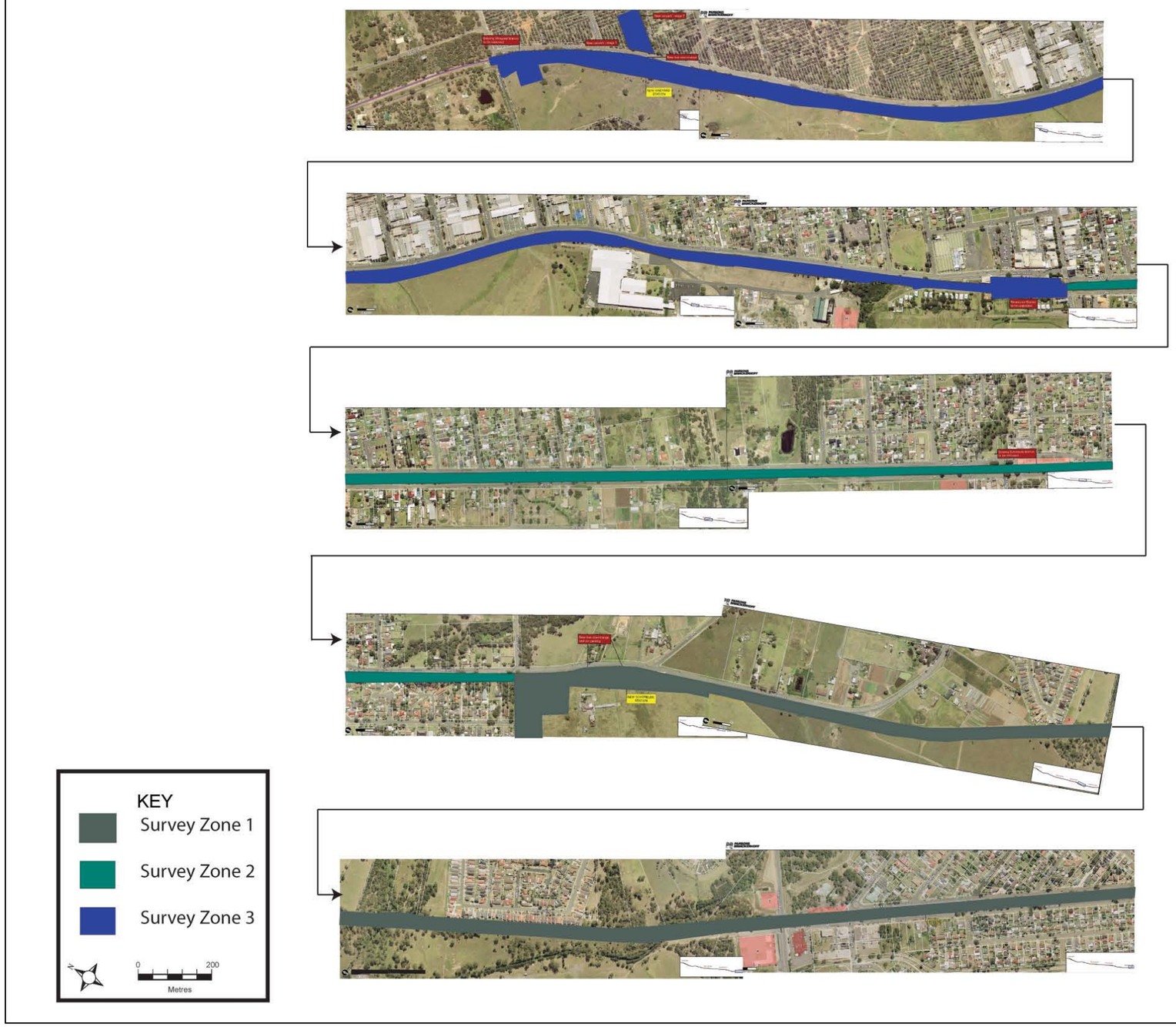

Figure 5- 1 Survey Zones

5.3.1. Survey Zone 1: Quakers Hill station to Schofields Road

The proposed development of the rail corridor within this survey section comprises an approximate 10m wide expansion to the east of the rail corridor between the Parkway Overpass, through Oppy Reserve at Quakers Hill, and west of the rail corridor between Quakers Hill and Schofields Road. This survey unit also includes the proposed Schofields station site, which is situated along the western side of the rail corridor, approximately 180m south of Schofields Road.

The proposed development within this survey zone is predominantly situated along the Eastern Creek floodplain and low rise hilly terrain of the South Creek and Blacktown soil landscapes. A first order tributary of Eastern Creek crosses the rail corridor from the east at Oppy Reserve and runs parallel to the rail corridor for 300m before turning north west away from the rail line (Plate 5-1). Vegetation comprised open pasture land with some stands of both regrowth and mature woodland. The terrain is generally flat and swampy along the southern end of the rail corridor at Quakers Hill and visibility was generally poor, with ground surface exposure limited to dirt tracks (Plates 5-2 and 5-3). The southern section of Survey Zone 1, and the tributary creek line and associated creek flats are associated with the South Creek soil landscape.

Plate 5- 1 View facing south east of tributary creek line crossing the rail corridor at Quakers Hill.

Plate 5- 2 View facing north west of flat swampy terrain along the southern end of the rail corridor in Survey Zone 1.

Plate 5- 3 View facing west of southern most end of Survey Zone 1. Visibility along the alluvial flats was restricted to dirt tracks.

Plate 5- 4 View facing south east showing area in which archaeological testing has taken place.

The swampy terrain of the South Creek soils gives way to higher ground of the Blacktown soil landscape further north towards Schofields Road and is characterised by gently undulating, open pasture terrain east of the valley flats along Eastern Creek (Plate 5-5). Ground surface visibility was generally poor with surface exposures limited to erosion scours and dirt tracks (Plate 5-6). Ground disturbance within this area appeared to be limited to historic tree clearance and farming practices. The soils along the western and eastern boundary of the rail corridor are predominantly comprised of the Blacktown soil landscape.

There are two areas within survey zone 1 which have undergone land use impacts which are significant enough to have either altered or removed sub surface archaeological material. These areas constitute landscapes which have undergone significant urban development, or constitute modified natural landscapes with the construction of earthen embankments. Both the western and eastern boundary of the rail corridor between Quakers Hill train station and the Parkway overpass, and between Reycroft Avenue and Burdekin Road, along the eastern side of the rail corridor, constitute such environments (Plate 5-7).

Four artefact scatters and isolated finds were identified within the vicinity of Survey Zone 1. (see section 5.4). Furthermore, owing to the potential for both the Blacktown and South Creek soils to retain sub surface deposits, seven areas of PAD have been identified in areas of minimal urban development (see section 5.5).

Plate 5- 5 View of gently undulating open pasture land facing west north west towards Eastern Creek.

Plate 5- 6 View facing north west of ground surface exposure along the northern end of Survey Zone 1.

Plate 5- 7 View facing south toward Quakers Hill train station, from Parkway Overpass.

5.3.2. Survey Zone 2: Schofields Road to Riverstone Station

The proposed development of the rail corridor within this survey section comprises an approximate 10m wide expansion of the rail corridor between Schofields Road and Riverstone station. Survey zone 2 comprises highly modified earthen embankments situated between bitumen roadways and the existing rail corridor (**Plates 5- 8** and **5- 9**). Impacts from the existing road, utility services and the rail corridor mean that the potential for both surface and sub surface artefactual material are low. No archaeological artefacts or PADs were identified in survey zone 2.

Plate 5- 8 View facing south east of Survey Zone 2; Riverstone.

Plate 5- 9 View facing south east of Survey Zone 2; Schofields.

5.3.3. Survey Zone 3: Riverstone Station to Vineyard Station

Survey zone 3 is predominantly situated along a series of north-south trending, gently undulating hills that dip down into the valley flats to the west of the rail corridor towards Eastern Creek. It predominantly comprises open pasture land with isolated patches of regrowth woodland (Plate 5-10). The survey unit essentially consists of two areas, which are defined according to land use impacts. In the northern section along the western boundary of the rail corridor from the Riverstone Meatworks to Vineyard station, existing land use impacts are limited to vegetation clearance, historic farming practices, and the establishment of dirt access roads and linear utility installations such as electricity easements (Plate 5-11 and 5-12). This section of survey unit 3 is composed of the Blacktown soil landscape with occurrences of the alluvial South Creek and Berkshire Park soil landscapes along the northern most extent of the survey zone at Vineyard.

The proposed Vineyard station car park site is also located in an area of minimal land use impact. The proposed site is located in a heavily vegetated area that appears to have undergone relatively minor ground disturbance (Plate 5-13). Vegetation at this site retains structural characteristics of the pre- European equivalent and is thought to have changed little over time (Parsons Brinkerhoff 2008). The soils along the eastern boundary of the rail corridor are of the Blacktown soil landscape.

Plate 5- 10 View facing north of gently undulating pasture land adjacent to the rail corridor.

Plate 5- 11 View facing south east detailing land use impacts including vegetation clearance and the establishment of earthen tracks and power lines.

Plate 5- 12 View facing south east of localised disturbance.

Plate 5- 13 Looking north- east through the woodland and regrowth scrubland to the north of the proposed car park.

The remainder of Survey zone 3 is comprised of areas which have undergone significant land use impacts. The western boundary of the rail corridor from the Riverstone Meatworks to Riverstone Station, has been significantly altered through urban development, with the establishment of the Meatworks facility and the construction of an artificial earthen embankment adjacent to the existing rail corridor (Plate 5-14 and 5-15). Land use impacts in these areas will have served to significantly alter or remove sub surface archaeological deposits.

Ground surface visibility across the entire survey unit was generally poor with surface exposures confined to dirt tracks and erosion scours. Erosion across the survey unit occurs in isolated patches and is focused along the steeper slopes (5-16).

Three isolated finds and three areas of PAD are situated within Survey unit 3 (see sections 5.4 and 5.5)

Plate 5- 14 **View of Riverstone Meatworks facing north west.**

Plate 5- 15 **Detail of artificial earthen embankment adjacent to the rail corridor at Riverstone.**

Plate 5- 16 **View facing west of localised erosion scours along the steeper slopes of the study.**

5.3.4. Survey Zone 4: Quakers Hill to Vineyard Rail Corridor

The Quakers Hill to Vineyard rail corridor runs in a north-west to south-east direction, through gently undulating terrain in a built urban and semi rural environment. The vegetation clearance and installation and on-going maintenance of the rail corridor means that any surface and/or sub-surface Aboriginal archaeological material is likely to have been severely compromised. Rail embankments have either cut into the existing ground surface or comprise built, earthen embankments (plates 5-17 to 5-20). Ground conditions comprise low grass and weed cover with evidence of erosion along maintenance tracks (Plate 5-21).

Plate 5- 17 Looking south- east towards the rail corridor from immediately north-west of Quakers Hill Station.

Plate 5- 18 Looking west- north- west to the rail corridor from south- east of Schofields Station.

Plate 5- 19 Looking north- west to the rail corridor from north- west of Schofields Station.

Plate 5- 20 Looking south- south- west from north of Riverstone Station.

Plate 5- 21 Looking south- east towards the existing Vineyard Station; note ground conditions in the foreground.

Several small creek lines cross the rail corridor, in the past these may have functioned as a focus of activity or area of resource procurement for Aboriginal people. The majority of these creek lines have been heavily modified through the installation of culverts associated with the rail corridor (Plate 5-22). Creek banks that may have contained archaeological surface and/or sub-surface material are likely to be highly disturbed. Similarly, a swamp-like drainage depression located to the east of the former Schofields aerodrome site would have provided resource opportunity for Aboriginal people; however, the integrity of this landscape was altered significantly within the rail corridor, with the original clearance and excavation

associated with the installation of the railway line and subsequent drainage control measures (Plate 5-23). The rail corridor in its entirety is considered to have low archaeological potential for both surface and sub-surface Aboriginal archaeological material due to the high level of impact associated with construction and maintenance of the railway line.

Plate 5- 22 Looking west- south- west towards the culvert located north- west of Schofields Station.

Plate 5- 23 Looking south towards a drainage depression along the eastern border of the rail corridor near the former Schofields aerodrome.

5.4. Aboriginal Heritage Items

A total of four archaeological sites and seven PADs were identified in survey zone 1, while three sites and three PADs were located within survey zone 3. No archaeological sites or PADs were found in survey zones 2 and 4. Table 5-3 summarises the sites and PADs identified throughout the course of the survey for phases 1 to 3 of the Project, while the location of the identified sites and PADs are displayed in figures 5-2 to 5-4 and 5-6 to 5-8, respectively.

Table 5.3 List of Aboriginal archaeological sites and PADs identified according to landform elements.

Survey Zone	Site ID		Landform Element	Site Type
Survey Zone 1	QV- Complex	QV 1	Upper slope	Isolated find
		QV 2	Upper slope	Isolated find
		QVP	Upper slope	PAD
	QV 3		Creek flat	Isolated find
	QV 4		Creek flat	Three isolated finds
	Q1		Creek flat	PAD
	Q2		Alluvial terrace	PAD
	Q3		Creek flat	PAD
	Q4		Ridge line/upper slope	PAD
	S1		Ridge line Upper Slope	PAD
	S2		Low rise hill	PAD
Survey Zone 3	QV 5		Lower slope	Two possible isolated finds
	QV 6		Hill top	Isolated find
	QV 7		Hill top	Three isolated finds
	V1		Hill top	PAD
	V2		Hill top	PAD
	V3		Creek flat	PAD

5.5. Aboriginal sites

Site Name: QV1	Site Type: Isolated find
Grid Coordinates; Datum: Aus 84	Zone 56
Easting: 303071	Northing:6267712
QV1 comprises a red silcrete flaked piece, measuring 2.9 x1.6 x 0.3cm (Plate 5-24). This find was situated to the west of the rail corridor, along a dirt track within survey zone 1(Plate 5-25). This site forms part of the QV-Complex which also includes site QV2 and PAD QVP. The QV-Complex is also likely to be associated with previously recorded artefact scatter sites 45-5-0503, 45-5-0497 and 45-5-0471. Note- archaeological sites 45-5-0503, 45-5-0497 and 45-5-0471 are not situated within the bounds of the current development proposal, however on site observations indicated that both QV1 and QV2 formed part of a wider artefact scatter. AHIMS sites 45-5-0503, 45-5-0497 and 45-5-0471 were not revisited as access to Commonwealth land was restricted to the current development proposal.	

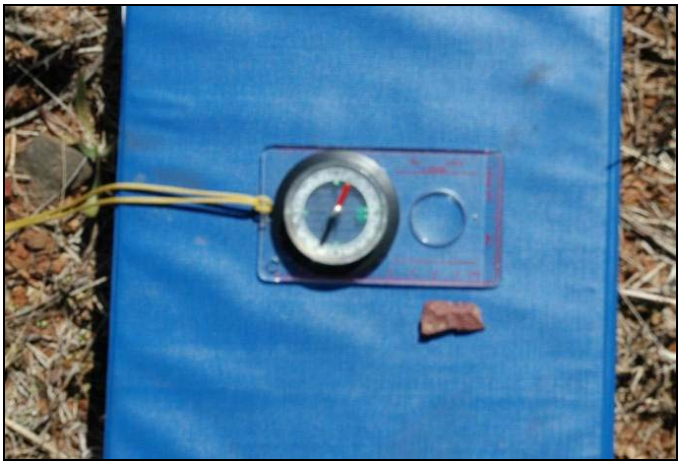

Plate 5- 24 Detail of red silcrete flaked piece; QV1.

Plate 5- 25 View facing south east of location where QV1 was found.

Site Name: QV2	Site Type: Isolated find
Grid Coordinates; Datum: Aus 84	Zone 56
Easting: 303007	Northing:6267738
QV2 comprises a red silcrete flaked piece, measuring 2.2 x 1.1 x 0.4cm (Plate 5-26). This find was situated to the west of the rail corridor, along an erosion scour within survey zone 1(Plate 5-27). It is associated with PAD QVP and is likely to form a part of a wider scatter which includes QV1 and 45-5-0503.	

Plate 5- 26 Detail of red silcrete flaked piece; QV2.

Plate 5- 27 Detail of erosion scour along hill crest, where QV2 is located.

Site Name: QV3	Site Type: Isolated finds
Grid Coordinates; Datum: Aus 84	Zone 56
Easting: 303726	Northing:6266350
QV3 comprises a yellow silcrete broken retouched flake, measuring 1.8 x 1.1 x 0.1cm (Plate 5-34). This find is situated east of the rail corridor on a dirt track, along the alluvial flats of Eastern Creek. (Plate 5-35). This find is located within survey zone 1.	

Plate 5- 28 Detail of broken retouched flake, QV3.

Plate 5- 29 Location shot of QV3, facing north.

Site Name: QV4	Site Type: Artefact Scatter
Grid Coordinates; Datum: Aus 84	Zone 56
Easting: 303771	Northing:6266285
QV4 comprises three red silcrete debitage flakes, measuring 1.2 x 0.5. x 0.2cm, 1.4 x 0.6 x 0.4cm and 1.0 x 0.5 x 0.1cm, two red and brown silcrete flaked pieces measuring, 2.8 x 2.0 x 0.7cm and 1.8 x 1.1 x 0.6cm, and one red silcrete complete flake, measuring 1.7 x1.4 x 0.2cm. (Plate 5-36). These finds are situated east of the rail corridor on a dirt track, along the alluvial flats of Eastern Creek. (Plate 5-37). These finds are located within survey zone 1.	

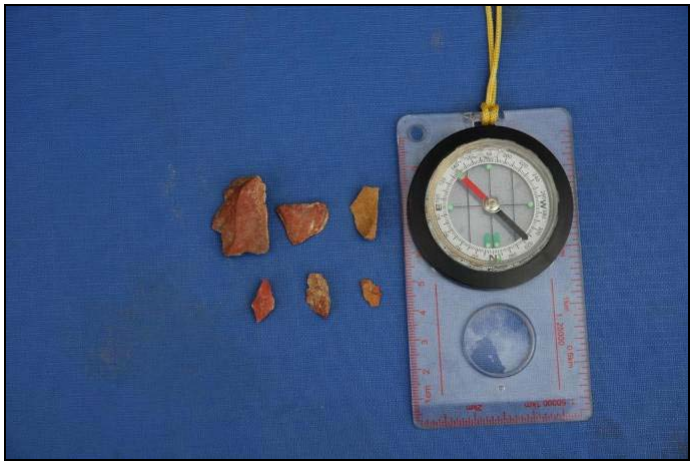

Plate 5- 30 Detail of QV4, comprising flakes, flaked pieces and debitage.

Plate 5- 31 Location shot of QV4, facing north east.

Site Name: QV5	Site Type: Isolated find
Grid Coordinates; Datum: Aus 84	Zone 56
Easting: 303732	Northing:6273274
QV5 comprises one red silcrete flaked piece, measuring 1.6 x 1.7 x 0.5cm (Plate 5-38). This find is situated west of the rail corridor within an erosion scour, along a lower slope of the alluvial flats of Eastern Creek. (Plate 5-39). This find is located within survey zone 3.	

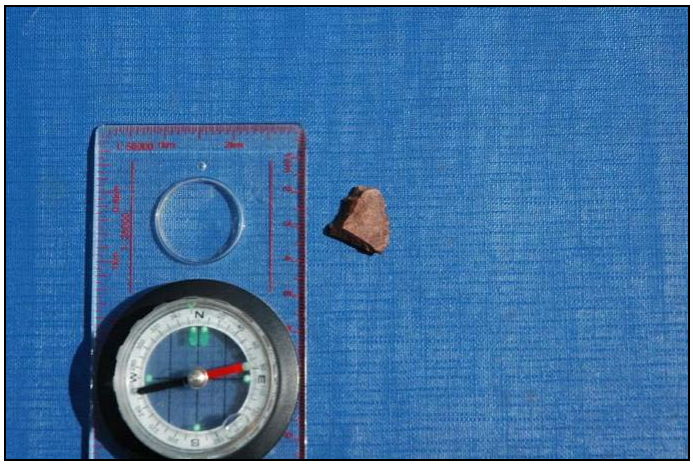

Plate 5- 32 Detail of red silcrete flaked piece; QV5.

Plate 5- 33 Context shot of QV5, facing south east.

Site Name: QV6	Site Type: Isolated Find
Grid Coordinates; Datum: Aus 84	Zone 56
Easting: 300666	Northing:6274165
QV6 comprises a broken hammer stone made from a grey cryptocrystalline river cobble, measuring 9.5 x 6.0 x6.5cm (Plate 5-30). This find is situated west of the rail corridor adjacent to a dirt track, along a gentle hill crest above the Eastern Creek floodplains (Plate 5-31). This find is located within survey zone 3.	

Plate 5- 34 Detail of broken hammerstone; QV6.

Plate 5- 35 Location shot of QV6, facing north west.

Site Name: QV7	Site Type: Three isolated finds
Grid Coordinates; Datum: Aus 84	Zone 56
Easting: 300703	Northing:6273810
QV7 comprises one orange chert flake, measuring 1.5 x 1.6 x 0.5cm, and two orange chert flaked pieces measuring, 1.7 x 1.1 x 0.4cm and 2.1 x 1.9 x 1.2cm (Plate 5-32). These finds are situated west of the rail corridor along a dirt track, situated on a gentle hill crest above the Eastern Creek floodplains (Plate 5-33). These finds are located within survey zone 3, and are potentially associated with PAD V2.	

Plate 5- 36 Detail of isolated finds QV7.

Plate 5- 37 Context shot of QV7, facing south east.