

#### 4.6.6 Management and Mitigation Measures

The following Aboriginal heritage mitigation measures and management procedures would be implemented throughout the life of the Project.

- Sites GT OS1 & GT OS2 would be re-identified in the field with the assistance of a suitably qualified archaeologist and community representative(s). An appropriate fence on all sides of the site would be erected, access to the fenced area would be restricted and appropriate signage would be displayed.
- All other sites would be identified on plans held by the Environmental Manager and Mine Surveyor and activities in the vicinity of those sites would be prohibited. Those sites would not be fenced to limit the potential for inappropriate identification and disturbance of the sites.
- If items of suspected Aboriginal heritage significance are identified throughout the life of the Project, the following procedures would be implemented.
  - **Step 1** - No further earth disturbing works would be undertaken in the vicinity of the suspected item of Aboriginal heritage significance.
  - **Step 2** - A buffer of 20m x 20m would be established around the suspected item of Aboriginal heritage significance. No unauthorised entry or earth disturbance would be allowed with this buffer zone until the area has been assessed.
  - **Step 3** - A qualified archaeologist or the DECCW would be contacted to make an assessment of the discovery. Mitigation procedures would then be developed and implemented based on the assessment.
- If, throughout the life of the Project, suspected human remains are identified, the following procedures would be implemented.
  - **Step 1** - the suspected skeletal remains would not be touched or disturbed.
  - **Step 2** - A buffer zone of 50m x 50m would be established around the suspected remains and all work in the vicinity of the suspected remains would be suspended until the area has been assessed.
  - **Step 3** - The NSW Police and the DECCW would be contacted to make an assessment of the discovery. If appropriate, mitigation procedures would then be developed in consultation with the registered stakeholders.

#### 4.6.7 Impact Assessment

The likelihood of adverse Project-related impacts on Aboriginal sites or items of cultural heritage significance within the Project Site is considered to be negligible for the following reasons.

- The field survey did not identify any Aboriginal sites or items of cultural heritage significance within sections of the Project Site that would be disturbed.
- The mitigation measures and management procedures identified in Section 4.6.6 would ensure that any identified Aboriginal sites or items of cultural heritage significance would be appropriately protected.



As indicated in Section 4.6.2.2 the registered stakeholders were provided with a draft of ASR (2010a) on 2 August 2010 and were requested to respond to the draft by 1 September 2010. Responses were received from three organisations. The responses indicated that each group agree with the recommendations of the ASR (2010a). In addition, the following recommendations/comments were made.

- Should additional sites be identified then the relevant stakeholders should be consulted prior to any ground disturbing activities. The Proponent agrees with this recommendation.
- The Buru Ngunawal Aboriginal Corporation requested that subsurface testing should be undertaken at sites to be disturbed. As none of the identified sites would be disturbed, the Proponent contends that there is no requirement for subsurface test work.
- The Buru Ngunawal Aboriginal Corporation requested that sites officers be present during or prior to any ground disturbing activities. Given the density of sites identified, the Proponent contends that this is not justified.

## 4.7 NON-ABORIGINAL HERITAGE

### 4.7.1 Introduction

The DGRs issued by the Department of Planning require that the *Environmental Assessment* include an assessment of “*Heritage – both Aboriginal and non-Aboriginal*”.

Based on the risk assessment undertaken for the Project (see Section 3.3), specific non-Aboriginal heritage-related impacts that may result as a consequence of the Project (without the implementation of the safeguards, controls and mitigation measures presented in this section) include loss or destruction of items of heritage significance.

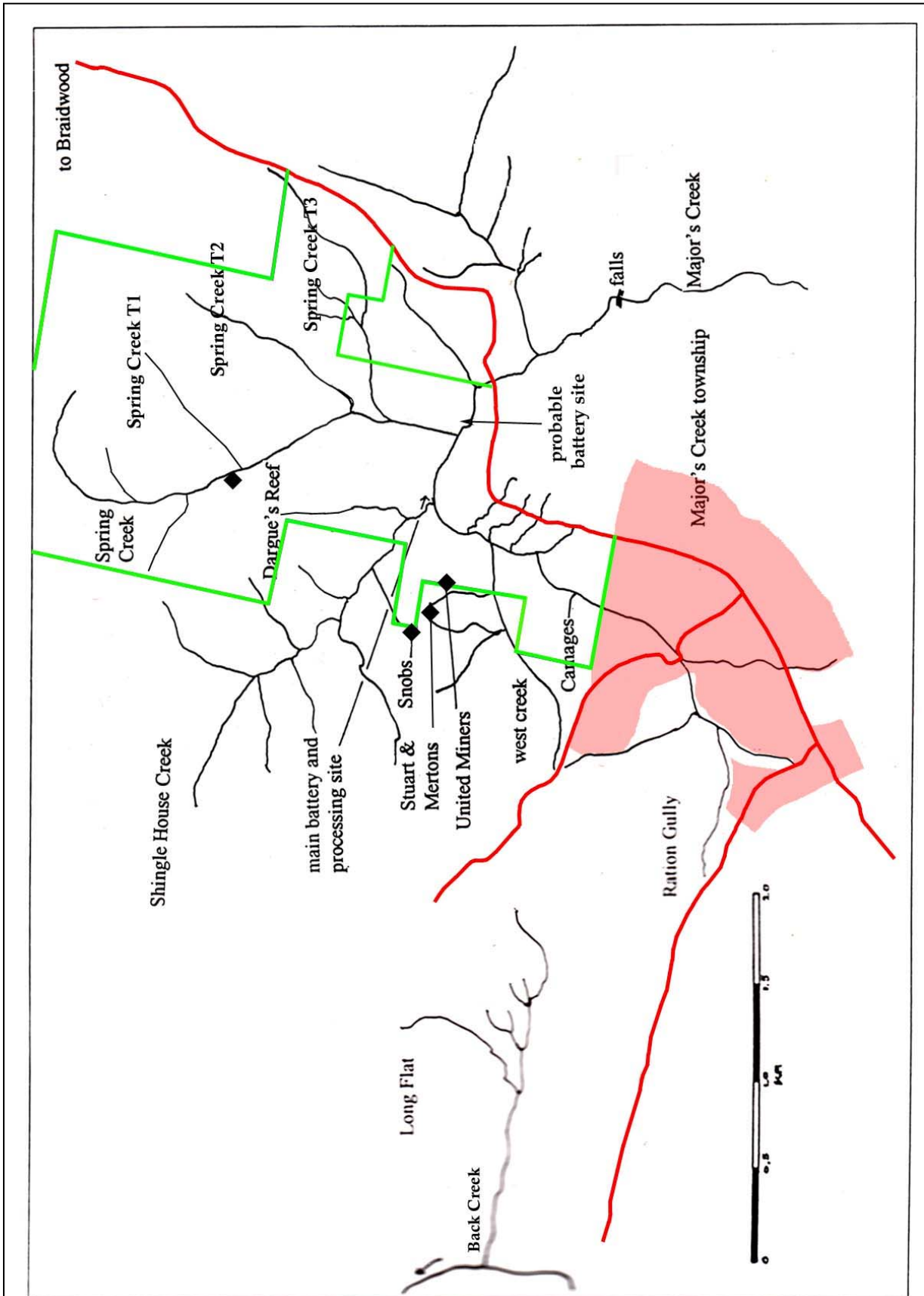
A non-Aboriginal Heritage Impact Assessment has been completed by Mr John Appleton (BA (Hons)) of Archaeological Surveys & Reports Pty Ltd to address the DGRs and assess the impact of the Project on items of non-Aboriginal heritage significance. That report, which is referred to hereafter as ASR (2010b) is presented in full as Part 5b (Volume 2) of the *Specialist Consultant Studies Compendium*. This section of the *Environmental Assessment* provides a summary of that report. It is noted that Mr Appleton also undertook the Aboriginal Heritage Assessment (ASR, 2010a) which is discussed in detail in Section 4.6.

### 4.7.2 Recorded History of the Project Site

Section 3 of ASR (2010b) presents a summary of the background to the discovery of gold in Australia and more specifically in the vicinity of the Project Site. In addition, that section also provides a detailed chronology of the non-Aboriginal history of the Majors Creek Goldfield. **Table 4.27** provides a brief overview of that chronology. It is noted that in establishing the chronology, ASR (2010b) relied heavily on Dunshea (1997), McGowan (2000), McGowan (undated) and Pearson and McGowan (undated).

It is noted that the term “Majors Creek Goldfield” is a collective name for the area in which a number of mining operations were undertaken over a period of over eighty years from 1851 to the late 1930s. During that time, the number of operations, style of mining undertaken and population within the vicinity of the Project Site varied depending on availability of water, changes in mining technology and economic circumstances. **Figure 4.30** presents a plan showing the approximate location of a number of the historic mining operations.





Source: ASR (2010b) – Figure 5

Figure 4.30  
Historic Mining Areas – Majors Creek Goldfield



**Table 4.27**  
**Majors Creek Goldfield Chronology Summary**

<b>Date</b>	<b>Majors Creek Population</b>	<b>Event</b>
Feb 1851	?	First payable gold in Australia discovered at Ophir.
Oct 1851	600-700	Gold is found by Mrs Baxter of "Irish Corner". By the end of 1851, there were between 600 and 700 people living in Majors Creek.
Feb 1853	?	Dry diggings towards head of the Majors Creek with several deep shafts and tunnelling. Panning and cradling principal mining methods.
1854 to 1856	123 to 250	Rain and cold weather resulted in reduced mining activity.
1857 to 1861	?	Chinese miners arrive. Increased mining activity, principally using panning, cradling, sluices, long toms (a 3m to 5m long cradle) and puddling (a circular drum or hole in the ground used to mix water and alluvial ore).
1865-1866	200	Pillar Company dug 30m tunnel with tramway into Red Hill. Focus of mining activity moves to Araluen.
1869 to 1872	?	Start of hard rock mining, with crusher batteries installed in Majors Creek and shafts dug in a number of locations. Some issues with refractory ore (ore that is not amenable to processing using gravity methods). Alluvial mining principally undertaken by Chinese. Hard rock mining largely abandoned by 1872.
1877	171	Dargues Reef worked by a party of 24 working shareholders, plus 8 or 10 hired hands. Sluicing and limited hard rock mining only mining activities.
1880	?	A crushing mill, furnaces and arastras (large rock used to crush smaller rocks) constructed. Processing operations not successful.
1883	66	Limited mining operations, with only two miners extracting hard rock ore.
1888 to 1890	?	A stone cracker, centrifugal roller, quartz mill, two Frue vanners concentrators (a gravity-type concentrator) and a steam engine installed at Dargues Reef and 600 tons of ore extracted. A chlorination plant to refine refractory ore was also constructed but the site was closed by 1890.
1893 to 1900	?	Limited mining operations, principally sluicing.
1901 to 1905	?	Hard rock mining operations undertaken at Dargues Reef, United Miners and Thompsons Blow. There is a suggestion that cyanide leaching was undertaken.
1906 to 1916	?	Gradual decline in hard rock mining.
1916 to 1926	?	Limited alluvial mining.
1930's	?	Government subsidies encourages limited alluvial and hard rock mining. Mining operations ceased by 1940s.

Source: ASR (2010b) – After Section 3.

### 4.7.3 Registered Sites of Heritage Significance

Searches of the following were made on 26 June 2010 to identify registered sites of heritage significance.

- *Tallaganda Local Environment Plan 1991* – Schedule 1.
- NSW Heritage Branch - State Heritage Inventory listing of places of heritage significance.
- National Trust listing of places of heritage interest.

No registered sites were identified within the Project Site.



#### 4.7.4 Survey Methodology

Items of heritage significance were originally identified during the Aboriginal heritage assessment and their location identified for later follow up. Mr Appleton returned to the identified sites following completion of the Aboriginal heritage survey to photograph and assess the structures, items and places for their heritage significance.

#### 4.7.5 Survey Results

Section 5 of ASR (2010b) presents a detailed description of the artefacts, including photographs, identified during the non-Aboriginal heritage survey. The following presents an overview of that description.

- Ceramic fragments – two ceramic and other glass fragments were identified in the vicinity of Gamage’s claim (**Figure 4.30**). These could not be placed into a historical context.
- Dargues Reef railway – ore material was transported from the Dargues Reef Mine to stamp batteries in Majors Creek by rail. A second rail line transported ore from Snobs Mine to Majors Creek, joining the Dargues Reef line. These lines are now preserved as a series of shallow cuttings, depressions and eroding causeways. A rail-truck bogie was identified in the vicinity of the rail line, as were two twisted lengths of track protruding from rabbit warrens. Measurements from the rail bogie indicate that the rail line had an indicative inner track width of approximately 60cm.
- Stamp battery – the foundations and a shoe from a stamp battery were located adjacent to piles of uncrushed ore near the junction of Spring and Majors Creeks.
- Dredge shelves or buckets– three dredge shelves were located midway between the confluence of Majors and Spring Creeks and the Majors Creek Road bridge. ASR (2010b) note that McGowan (2000 and undated) do not mention the use of dredges at Majors Creek.
- Puddling holes – ASR (2010b) states that a number of depressions observed within the Project Site may be associated with puddling, particularly by Chinese miners.
- Magazine – A small explosives magazine was constructed in the western bank of a tributary to Spring Creek.
- Shaft cage – A shaft cage was identified in the vicinity of the Dargues Reef shaft.
- Water Races – Finally, ASR (2010b) notes that water races are a common feature of the landscape within the Project Site. These races may have been constructed by small scale or larger miners to divert surface water flows to the active mining areas. Alternatively, some may have been constructed or converted to support agricultural operations.



#### **4.7.6 Management and Mitigation Measures**

As noted in Section 4.7.7, ASR (2010b) note that the Project would not result in disturbance to any of the identified artefacts. As a result, the Proponent would implement the following management and mitigation measures to minimise the potential for inadvertent impacts to items of potential heritage significance.

- Identify on plans held by the Environmental Manager and Mine Surveyor, where relevant, all identified sites and ensure that activities in the vicinity of those sites are appropriately managed.
- If items of suspected non-Aboriginal heritage significance are identified throughout the life of the Project, the following procedures would be implemented.
  - **Step 1** - No further earth disturbing works would be undertaken in the vicinity of the suspected item of non-Aboriginal heritage significance.
  - **Step 2** - A buffer of 20m x 20m would be established around the suspected artefact. No unauthorised entry or earth disturbance would be allowed within this buffer zone until the area has been assessed.
  - **Step 3** - A qualified archaeologist would be contacted to make an assessment of the discovery. Mitigation procedures would then be developed and implemented based on the assessment.

#### **4.7.7 Impact Assessment**

ASR (2010b) undertook an assessment of the significance of the identified artefacts in accordance with the NSW Heritage Council criteria for heritage assessment. These are as follows.

- Criterion (a) an item is important in the course, or pattern, of NSW's Cultural or natural history (or the local area).
- Criterion (b) an item has strong or special association with the life or works of a person, or group of persons, of importance in NSW's cultural or natural history (or the local area).
- Criterion (c) an item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW (or the local area).
- Criterion (d) an item has strong or special association with a particular community or cultural group in NSW for social, cultural or spiritual reasons (or the local area).
- Criterion (e) an item has potential to yield information that will contribute to an understanding of NSW's cultural or natural history (or the local area).
- Criterion (f) an item possesses uncommon, rare or endangered aspects of NSW's cultural or natural history (or the local area).
- Criterion (g) an item is important in demonstrating the principal characteristics of a class of NSW's cultural or natural places or cultural or natural environments (or the local area).



ASR (2010b), based on Pearson and McGowan (undated), state that the following attributes are likely to result in an alluvial or hard rock mining site having historical significance. These are consistent with the NSW Heritage Council-identified criteria above.

- Clear evidence of mine workings.
- Clear evidence of machinery and equipment.
- Clear evidence of a processing site with substantial evidence.
- Clear evidence of settlement or habitation.
- Evidence of ethnicity.

ASR (2010b) notes that the Majors Creek Goldfield has witnessed over eighty years of mining, including simple pan and cradle sluicing, Long Toms, puddling, hydraulic sluicing, reef mining, and possibly dredging. However, very little remains of any one clearly identifiable discrete mining activity or of datable layers of mining activities or temporal markers. As a consequence, while there is widespread evidence of the combined activities and impacts from mining, there are very few artefacts that may be temporally placed in context with the recorded history of Project Site.

ASR (2010b) notes that, while the Project Site does have clear evidence of mine workings, it does not have clear evidence of machinery or equipment, a processing site, habitation or ethnicity of those work worked within the Project Site. In addition, the mine workings visible today represent a overlay of many mining events overprinted one over the top of another, with no clear evidence of activities at a particular point in time. As a result, ASR (2010b) states that the Project Site does not have the attributes that warrant its assessment as being of heritage significance.

Finally, with the exception of a number of water races within the footprint of the tailings storage facility and the Processing Plant, the proposed activities would not disturb the identified items of heritage significance. The water races that would be disturbed are not considered to be significant and extensive examples of such races would remain within the Project Site.

As a consequence, ASR (2010b) conclude that the Project Site contains no structures, relics or items of heritage significance and, as a result, the Project would not result in any significant adverse impacts on items of non-Aboriginal heritage significance.

## **4.8 BUSHFIRE**

### **4.8.1 Introduction**

Based on the risk assessment undertaken for the Project (see Section 3.3), specific bushfire related impacts that may result as a consequence of the Project (without the implementation of the safeguards, controls and mitigation measures presented in this section) include the following.

- Initiation of fire leading to impacts on the Project Site.
- Initiation of fire leading to impacts beyond the Project Site.



This section identifies the dominant vegetation type(s) within the Project Site and surrounding landholdings in order to determine the potential bushfire hazard associated with the Project. In identifying the bushfire hazard, the document “*Planning for Bushfire Protection*” produced by NSW Rural Fire Service in consultation with the then Planning NSW (now Department of Planning) in 2001 (RFS, 2001). RFS (2001) forms the basis of the identification of bushfire hazard. It is noted that information required for this assessment was drawn from the Ecology Assessment (Gaia, 2010).

The Bushfire Assessment was prepared by R.W. Corkery & Co. Pty Ltd based, in part, on information provided in Gaia (2010).

## **4.8.2 Existing Environment – Assessment of Bushfire Hazard**

### **4.8.2.1 Vegetation**

As identified in Section 4.3, significant sections of the Project Site have been cleared of large trees and shrubs, with those areas now supporting grasslands, regenerating wattles, woody weeds or limited vegetation. Vegetated areas that remain are, predominantly along Spring Majors Creeks and their tributaries. **Figure 4.31** provides an interpretation of the vegetation within and surrounding the Project Site and surrounding land based on the classifications provided by RFS (2001). The classifications of RFS (2001) have been designated to provide some indication of flammability and therefore bushfire hazard and are broadly grouped, from most flammable to least, as follows.

- Group 1 - forest;
- Group 2 - woodlands and heath; and
- Group 3 - rainforests, shrubland, open woodlands, mallee, grassland.

Within each group, RFS (2001) assigns classes to describe the various vegetation types within these broader groups. The Project Site vegetation is classified as follows (see **Figure 4.31**).

- Group 2, Class 6. Categorized as woodland with trees of 10m to 30m high, foliage cover of 10% to 30% and understorey of low trees, tall shrubs and/or grasses. This classification includes Communities 1 and 2 of Gaia (2010) (see Section 4.3.4.3). A maximum fuel load of 25t/ha is assigned to this vegetation type by RFS (2001).
- Group 2, Class 13. Categorized as open scrub with trees of greater than 2m in height, foliage cover of 10% to 30% and a mixed understorey. This classification includes Communities 3 and 4 of Gaia (2010) (Section 4.3.4.3). A maximum fuel load of 15t/ha is assigned to this vegetation type by RFS (2001).
- Group 2 (no class). Categorized as exotic tree plantation. This classification includes Community 5 as described in Gaia (2010) (see Section 4.3.4.3). A maximum fuel load of 15t/ha is assigned to this vegetation type by RFS (2001).

















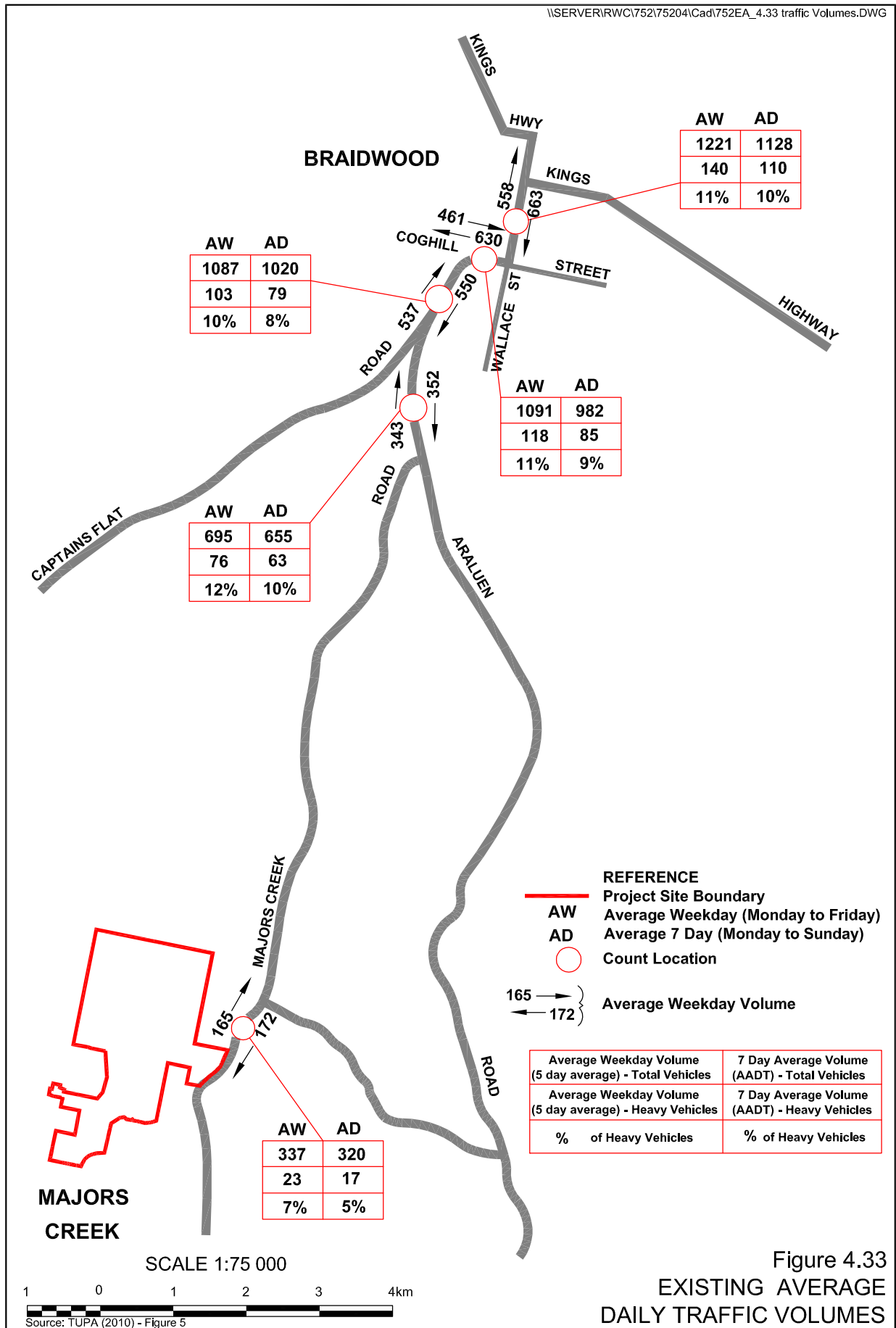


Figure 4.33  
 EXISTING AVERAGE  
 DAILY TRAFFIC VOLUMES

