Figure 1.2: Site Details

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\\UBMC\CONSULTANCY\<JOB FOLDER>\Mapping\<MAP TITLE>.mxd

1.2.1 Physical Environment

The physical characteristics of the Study Area and environs are summarised in Table 1.2 below.

Table 1.2: Physical Features of the Subject Property & Environs

FEATURE	DESCRIPTION
Soil Landscape Unit	The Subject Property and Study Area are based on the **Hawkesbury (ha)** Soil Landscape Unit (Bannerman and Hazelton 1990).
Geology	The underlying geology is **Hawkesbury Sandstone,** which consists of medium to course grained quartz sandstone with minor shale and laminate lenses. Sandstones are either massive or cross-bedded sheet facies with vertical or sub-vertical joint sets. The combination of bedding plans and widely spaced joints gives sandstone outcrops a distinctive blocky appearance (Bannerman and Hazelton 1990). Sandstone outcrops on the slopes below the Subject Property and bedrock in nearby Cattai Creek were noted to occur.
Soils	**Hawkesbury SLU soils** are generally acid, shallow and stony. The soils are infertile and have a poor water holding capacity. They are highly erodible. Characteristically interrupted by sandstone outcrops and floaters. Limitations of this soil type include moderately reactive highly plastic subsoil, low fertility and poor drainage (Bannerman and Hazelton 1990).
Topography	Flat ground to moderate slopes
Local Hydrology	Cattai Creek flows north through the STP to the east of the Subject Property. A minor drainage line flows downslope into the STP and then into Cattai Creek. This ephemeral drainage line is located in the far eastern corner of the Property.
Climate Details	Rainfall in the Region is summer dominant, with the highest average rainfall recorded in January and March @ 109.9 mm. July is the driest month with an average rainfall of 54.3 mm. December is the warmest month, with an average maximum temperature of 28.4°C and an average minimum of 15.4°C. July is the coolest, recording an average maximum temperature of 17.45°C and average minimum temperature of 4.5°C. Prevailing winds are east to south-easterly and prevailing winter winds are north-westerly (Bureau of Meteorology 2009 Seven Hills Meteorological Station #067026).

1.2.2 Vegetation

Recent vegetation mapping by the NSW Department of Environment, Climate Change and Water[2] (**'DECCW'**) (Tozer *et al.* 2006), describes the vegetation the eastern slopes of the Property and along Cattai Creek as **Hinterland Sandstone Gully Forest**'; however recent past (2008-2009) and recent studies (this Report) by UBM have more accurately identified the vegetation community as **Sydney Hinterland Transition Woodland ('SHTW')** (see Section 2 for a discussion of survey results).

Neither of these communities is listed as 'endangered' under the Schedules of the NSW *TSC Act* or Commonwealth *EPBC Act*.

Plate 1: Looking down the south-western boundary with native canopy trees

[2] Previously DECC, and prior DEC

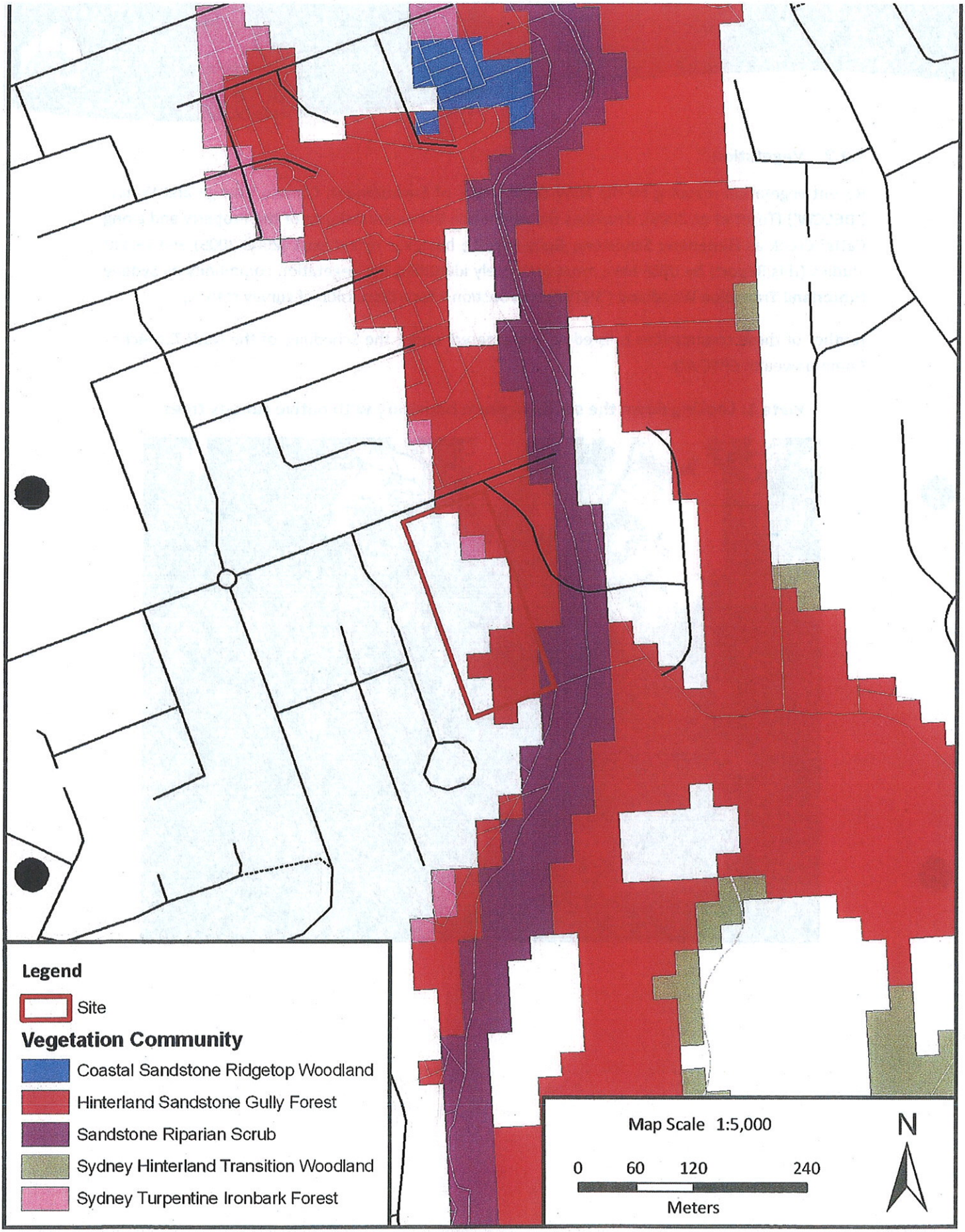

Figure 1.3: Native vegetation communities for the Locality (Tozer et al. 2006)

1.3 LEGISLATIVE CONTEXT

Comments and assessments presented in this Report are based on the requirements of the *Environmental Planning and Assessment Act 1979* – with consideration given to the principals of Ecologically Sustainable Development, NSW *Threatened Species Conservation Act 1995* (**'TSC Act'**), and Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* ***('EPBC Act')***.

The aim of undertaking any Assessment of Significance is to improve the standard of consideration and protection afforded to threatened species (including populations and ecological communities) and their habitats in the planning and assessment process.

The outcome of any assessment involving threatened species or Endangered Ecological Communities (**'EECs'**) should be that development or activities are undertaken in an environmentally sensitive manner, and that appropriate measures are undertaken to minimise adverse effects on threatened species, populations and ecological communities, or their habitats. Where this cannot be achieved, a development or activity should not proceed until the likely effects of the Proposal can be ameliorated (NSW NPWS 1996).

Accordingly, where any threatened entity is recorded in the Study Area as the result of the field survey, an Assessment of Significance has been undertaken (see Sections 2.4 (for a) and 3.4 (fauna). This Assessment is commonly referred to as **'the Seven Part Test'**.

Table 1.2: Summary of Policies, Local Planning & Legislative Requirements

GOVERNMENT LEVEL	RELEVANT POLICY /LEGISLATION	RELEVANCE TO SUBJECT SITE
Local	*Baulkham Hills Shire Local Environment Plan 2005*	The Proposal must comply with zoning provisions of the LEP. The majority of the land in the Subject Property is zoned as Rural 1(c), with a small area of Residential 2(b) also occurring. Adjoining properties to the west are zoned Residential 2(b). Castle Hill STP is zoned 5(a) Special Uses and is owned and managed by Sydney Water Corporation.
Regional	*Regional Environmental Plan 20 – Hawkesbury/Nepean River Catchment*	Cattai Creek is a tributary of the Hawkesbury River and is included under the provisions of the *Hawkesbury/Nepean River Catchment Regional Environmental Plan* (**'REP-20'**). The purpose of REP-20 is to provide a regional context within which planning decisions can be made that will not result in further degradation of the river system. The Proposal is required to take the objectives of REP-20 into consideration.

GOVERNMENT LEVEL	RELEVANT POLICY /LEGISLATION	RELEVANCE TO SUBJECT SITE
	Threatened Species Conservation Act 1995	No endangered ecological communities occur within the Study Area. NO threatened flora species or populations listed under this *Act* were recorded within the Study Area. However a threatened shrub *Epacris purpurascens var. purpurascens* has previously (UBM 2009) been located in STP bushland in proximity to the far south-eastern property boundary. Four (4) threatened fauna species listed under this *Act* were detected during the field survey, and a others are known to occur within the Region (see Section 3.1.1).
	State Environmental Planning Policy No 19 – Bushland in Urban Area	The requirements of SEPP-19 apply only to land zoned Public Open Space (6a). No such land occurs in the Study Area, although land zoned Open Space 6(a) is located to the south of the Subject Property.
	Noxious Weeds Act 1993 (Amended 2005)	There were eight (8) noxious weed species recorded for the Study Area (see Section 2.2.2). The landowner has a legal responsibility to control noxious plants and to prevent their spread to adjoining land. Hawkesbury River County Council is the single purpose weed control authority charged with enforcement of the *Act* in its four (4) constituent councils, of which The Hills Shire is one such member.
	State Environmental Planning Policy No 44 – Koala Habitat Protection	The Hills Shire is not listed under Schedule 1 of SEPP-44. Therefore, despite the presence of koala feed trees in the Study Area and locality, the requirements of the SEPP do not apply to land within the Shire.
	Water Management Act 2000 (replacing the River and Foreshores Improvement Act 1948)	Construction undertaken within 40 metres of a waterway is designated as a 'controlled activity'*, which means that development would require a permit from the NSW. The proposed subdivision does not occur within 40 metres of Cattai Creek: therefore the Act does not apply. * Works which may obstruct, or detrimentally affect the flow
Commonwealth	*Environment Protection and Biodiversity Conservation Act*	NO endangered ecological communities occur within the Study Area. NO threatened flora species or populations listed under this *Act* were

GOVERNMENT LEVEL	RELEVANT POLICY /LEGISLATION	RELEVANCE TO SUBJECT SITE
	1999	recorded within the Study Area. One (1) threatened fauna species listed under this *Act* was detected during the field survey – the Grey-headed Flying-Fox (see Section 3.2.2).

Other relevant NSW State government legislation includes:

- *Crown Lands Act 1989;*
- *Rural Fires Act 1997*
- *Heritage Act 1977;*
- *National Parks and Wildlife Act 1974;*
- *Roads Act 1993;*
- *Soil Conservation Act 1938;*
- *Rural Lands Protection Act 1998;*
- *Pesticides Act 1999;*
- *Occupational Health & Safety Act 1983;*
- *Waste Minimisation and Management Act 1995;*
- *Protection of the Environment Administration Act 1991;*
- *Protection of the Environment Operations Act 1997; and*

2 FLORA ASSESSMENT

The flora assessment was undertaken to determine the vegetation communities occurring within the Study Area and to describe the current status of the indigenous vascular vegetation present. The conservation value of the vegetation in the National, State and regional context has been considered in relation to vegetation community types and the flora species present.

2.1 METHODOLOGY

2.1.1 Literature Review

During the preparation of this Report, Council databases and other relevant reports and documents were accessed, previous studies and investigations for the locality, and local history sources were also consulted.

The main documents referenced were:

- Western Sydney: Urban Bushland Biodiversity Survey (NSW NPWS 1997);
- *Native vegetation of southeast NSW: a revised classification and map for the coast and eastern tablelands*. Version 1.0 (Tozer *et al.* for DECCW, 2006); and
- Flora and Fauna Survey for the Castle Hill STP (UBM 2009).

In addition, the Environment Protection and Biodiversity Conservation Act Online Database (DEWHA 2008; search area five (5) km radius around the Study Area @ Easting 313034 Northing 6267884), the NPWS Atlas of New South Wales Wildlife Database (DECCW 2009a; search area 10 km x 10 km centred on the Study Area) and BioNet Database (BioNet 2008; search area 10 km x 10 km centred on the Study Area) were accessed to identify previous recordings of flora and fauna species of conservation significance within the Region.

Plant identifications were made according to nomenclature in Plantnet (Plant Information Network System of Botanic Gardens Trust, Sydney). Stands of vegetation were described by their structural and floristic characteristics according to Specht (1981) and Tozer *et al.* (2006). Threatened ecological communities were classified and named according to NSW Scientific Committee's Final and Preliminary Determinations (various dates). Collected flora specimens will be lodged with the Janet Cosh Herbarium, University of Wollongong, as appropriate.

The conservation significance of individual species, populations and ecological communities recorded was confirmed with reference to the Commonwealth *EPBC Act* and NSW *TSC Act*, in the National and State context. The regional significance of the vegetation was established with reference to Western Sydney: Urban Bushland Biodiversity Survey (NSW NPWS 1997).

2.1.2 Flora Field Survey

Belinda Pellow (Dip. App. SC. Ag.) and Peter Fallon (BEnvSci) carried out a botanical survey of the Study Area on 8th April 2010. Supplementary investigations were undertaken by Judith Rawling (BA,DipEd,DipEnvStud,MEnvSt) on several occasions in early April 2010.

The entire Study Area was surveyed; with search efforts targeting plant species of conservation significance and dominant species to allow for the determination of vegetation assemblages. Approximately five (5) hours were spent actively surveying the Study Area, plus another two (2) hours for laboratory analysis of specimens.

The Study Area was traversed on foot using the **Random Meander Method** described by Cropper (1993). The use of this Method ensures that all vegetation communities are thoroughly investigated. This Method is considered the most effective for detecting plant species of conservation significance, and involves walking randomly throughout the Study Area recording every plant species observed.

The condition of bushland was assessed based on the estimated percentage off exotic species in each of four (4) strata: canopy, small tree, shrub, and ground cover layers. This was intended to assist future management by clearly showing where the main weed problems occurred. Three (3) different categories of weed infestation were used in the condition map in order to provide predictability of the types of weeds likely to occur in any mapped zone. These have been represented graphically (see Figure 2.1).

Limitations of Survey

The survey was conducted during two (2) main visits in early April 2010. At the time of the survey the weather conditions had been favourable for plant growth and production of features required for identification of most species.

However, owing to the size of the survey area and lack of clearly defined property boundaries (particularly on the eastern slopes) it is unlikely that all species present have been recorded. Despite this, it is considered that the great majority of species have been recorded, and that issues including conservation significance of the flora, condition and viability of bushland, and likely impact of the Proposal on native vegetation have been able to be satisfactorily assessed for the locations surveyed.

The boundaries of vegetation communities were marked on an aerial photograph, or logged with a GPS unit (Garmin 60CSx), which provides for an accuracy of 3.5 metres in good conditions.

The dense Privet thickets on the slopes along the eastern boundary limited access to some sections of the site.

The diversity of the species recorded during the current survey is expected to be influenced by seasonal factors, with some species likely to be inconspicuous, or absent from the above ground population during particular times of the year. This is particularly true of terrestrial orchids, which can persist for extended periods as dormant underground tubers. Other species (especially those growing in areas of long grass) can be difficult to find unless they are experiencing a period of new

growth or they are flowering. For these reasons, survey results can always be improved by extending the time allowed to provide an investigation in all seasons.

2.2 RESULTS

This flora investigation recorded and described the following:

- Significant (rare/threatened species) flora , as per current environmental legislation;
- Plants communities, including dominant species in each stratum, and strata density;
- Plant populations or communities of State or National conservation significance;
- Species of regional conservation significance; and
- Noxious and significant (keystone) environmental weed infestations.

An explanation of the methods used in the survey has been provided in Chapter 2.1 of this Report.

2.2.1 Indigenous Flora Species

A list of plant species recorded within the Study Area is provided in Appendix 1. This is not intended to be a comprehensive list of all species present within the Study Area, and represents only those species that were recorded for determination of vegetation communities and while undertaking searches for native species of National or State conservation significance known for, or expected to occur in the Region.

A total of 43 indigenous flora species were recorded during the field survey. These species were recorded in three (3) different areas or zones: the house and garden, the open grassland and trees along the western boundary, and the bushland on the eastern slopes.

Four (4) species recorded in the Study Area are considered to be 'regionally significant' for Western Sydney (NPWS 1997). All these species were recorded in the bushland on the eastern slopes. These four (4) species are listed in Table 2.1. None are classified as ROTAPs[3]. See Appendix 1 for a list of indigenous flora species recorded within this site.

Table 2.1: Regionally Significant/ROTAP listed Flora Species Recorded for the Study Area

SPECIES	COMMON NAME	STATUS*	ROTAP LISTING
Austrodanthonia caespitosa	Ringed Wallaby Grass	V1	
Leucopogon juniperinus	Prickly Beard-heath	V3	
Micrantheum ericoides		V3	
Oxalis perennans		V3	

*Key for Status
V1 = All regionally significant taxa and/or rare (5 or less records).
V2= Vulnerable taxa which are uncommon (6-10 records).
V3 = Common to widespread taxa (>10 records) (NPWS 1997).

[3] Rare or Threatened Australian Species (Leigh & Briggs)