

## 6. PRECEDENT STUDY

### POST INDUSTRIAL SITES

Park/Facility name	The Coal Loader
Location	Waverton Peninsula, North Sydney
Park size (Ha)	15 Ha
Park designers	CLOUSTON Associates (Master Plan) HASSEL (Detailed Design and Documentation)
Construction budget	4.9 million
Description	<p>The project's challenge was to preserve the site's timeless quality, to resist the temptation to embellish the structure with artifice and to ensure that the place became a viable recreation resource for the local community.</p> <p>The site has high natural and cultural heritage significance, formerly operating as a bunkering and distribution point for coal since the early 1900's and for bulk oil storage since the 1950's. The whole site has been adaptively reused to provide settings for an array of new activities. It is a host for festivals and functions, the offices have been upgraded, a new café established, and the caretaker's cottage has been developed as a local sustainability learning centre.</p> <p>In particular, the new Sustainability Learning Centre is an initiative of North Sydney Council that will offer solutions for sustainable living by direct example and through Council run environmental programs.</p>
Major features/facilities	Sustainability Learning Centre, amphitheatre, community garden and nursery, Aboriginal bush foods garden, chook run, meeting rooms, Sydney Harbour foreshore park and walks, studio space, coal loading tunnels
Recreation activities	Picnics, festivals/performances, bushwalking, jogging
Relevance to study site	Adaptive re-use of post industrial buildings for wider community benefit Surrounding mixed residential density Level changes and potential views Bushland setting
Information source	<a href="http://www.northsydney.nsw.gov.au/Waste_Environment/The_Coal Loader/The_Coal Loader_its_Features">http://www.northsydney.nsw.gov.au/Waste_Environment/The_Coal Loader/The_Coal Loader_its_Features</a>



Environment Centre and amphitheatre



Bushland setting

## 6. PRECEDENT STUDY

Park name	Landschaftspark Duisburg Nord
Location	Duisburg, Germany
Park size (Ha)	230
Park designers	Latz + Partner
Construction budget	15mil Euros (1990)
Description	<p>Landschaftspark is a public park located in Duisburg Nord, Germany. It was designed in 1991 by Latz + Partner with the intention to reveal the site's industrial past - a coal and steel production plant (abandoned in 1985, leaving the area significantly polluted) and the agricultural land it had been prior to the mid 19th century.</p> <p>The park is divided into four main parks with 'play points' throughout which utilise old industrial structures that are adapted for imaginative play. Within the main complex, Latz emphasized specific programmatic elements: the concrete bunkers create a space for a series of intimate gardens, old gas tanks have become pools for scuba divers, concrete walls are used by rock climbers, and one of the most central places of the factory, the middle of the former steel mill, has been made into a piazza.</p> <p>The site was designed with the idea that a grandfather, who might have worked at the plant, could walk with his grandchildren, explaining what he used to do and what the machinery had been used for. At Landschaftspark, memory was central to the design.</p>
Major features	Water park
Recreation activities	Variety of passive and active activities (excluding formal sport) Events (up to 50,000 people)
Relevance to study site	Use of industrial buildings and structures as features in the landscape to tell the story of the site Use of water Rehabilitation of a contaminated site Imaginative play
Information source	<a href="http://www.landezine.com/index.php/2011/08/post-industrial-landscape-architecture/">http://www.landezine.com/index.php/2011/08/post-industrial-landscape-architecture/</a> <a href="http://en.wikipedia.org/wiki/Landschaftspark_Duisburg-Nord">http://en.wikipedia.org/wiki/Landschaftspark_Duisburg-Nord</a>



Old water pools



Industrial buildings in situ and new gardens

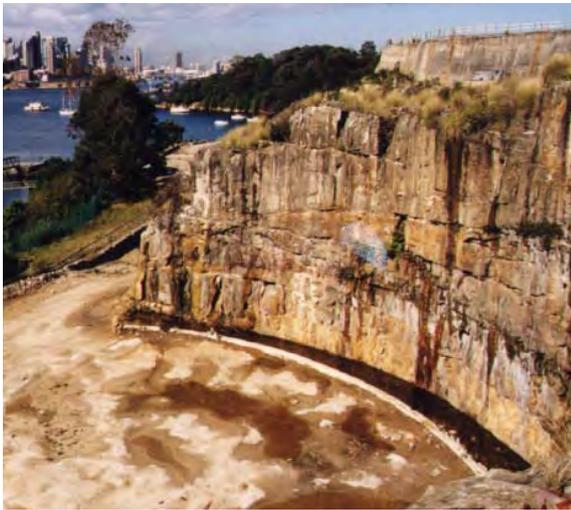
## 6. PRECEDENT STUDY

### OLD STRUCTURES

#### Waverton Peninsula and BP Site, Sydney

The Waverton Peninsula Masterplan established a robust design framework for the future development of the Coal Loader, establishment of a new working harbourside waterfront and the conversion of the former BP site into a public parkland.

At the heart of this scheme was the retention of the dramatic circular cliffs left from the tank farm, retention of concrete walls, exposure of the cliff top sandstone and new revegetation works linked by a series of industrial inspired elevated metal walkways, lookouts and pathways.



Stone walls to accommodate old tanks



CLOSUTON Associates sketch of adaptive reuse of site

### NEW STRUCTURES

#### Brick Pit, Homebush, Sydney

The Ring Walk around the Brickpit 'pond' is 18.5 metres high, allowing visitors a birds eye view of the sensitive habitat of the threatened species, the Green and Golden Bell Frog. Designed to protect the species the ring walk excludes access to the base of the brick pit. Interpretive panels along the 550-metre walk provide further details of the history of the area.



Stone walls to accommodate old tanks



CLOSUTON Associates sketch of adaptive reuse of site

## 6. PRECEDENT STUDY

### Ørnesvingen Viewpoint by 3RW Arkitekter

'Ørnesvingen is the most spectacular viewpoint along the Ørne (eagle)-road, a zig-zag road along the steep valley sides of Geiranger-fjord in Møre and Romsdal in Norway. The platform consists of three overlapping white concrete slabs overhanging the edge of a 600 meter vertical drop, enabling the observer to step out into the airspace. The river on site is guided over a glazed front, forming a waterfall on the very edge of the viewpoint. Information boards in glass explain specific locations in the scenery.'

<http://www.landezine.com/index.php/2010/10/%c3%b8rnesvingen/>



Viewing platform with cascading water



Viewing platform

### IMAGINATIVE PLAY

#### Adventure playground in Parc de Belleville, Paris

Located within the 4.5Ha Parc de Belleville, this playground is situated at the top of a steep slope. The natural slope has been retained and the playground has been designed to take advantage of the existing height and scale of the site. Existing vegetation is retained to provide shade and shelter.

The main element is a large playhouse which children can imagine to be a variety of things such as a tree house or a fort. The playground also features a climbing course with different inclinations for different abilities and different age groups. The climbing area can also be used as a 'hang out' space for older children.

<http://www.landezine.com/index.php/2011/01/playground-in-belleville-park-by-base-landscape-architecture/>  
<http://a-a-ah.com/belleville-playground-base>



Ropes and sloping ground taking advantage of the site's topography



Terraced play space

7. RECREATION POTENTIAL



*Old Mans Valley mountain bike trail*

## 7. RECREATION POTENTIAL

### 7.1 ADVENTURE RECREATION

#### Quarry characteristics

As stated previously the landscape character of the site lends itself well to the provision of adventure style recreation activities. The bushland setting, changes in height, water body and rock walls could be utilised for a variety of activities that are not on offer within the Shire.

This would provide a unique recreation experience for residents and also has the potential to provide an income to Council for the future maintenance and development of the site.

This section discusses the definition and different types of adventure recreation activities and where they could occur within the site.

#### Definition

The Outdoor Recreation Industry Council of NSW (ORIC) is a member driven organisation, recognised nationally and by government, as the Peak Industry Body representing the interests of Outdoor Recreation users in NSW, and assisting the outdoor recreation and education community by providing representation, information, services, resources and training.

The ORIC have published Adventure Activity Standards for the following outdoor adventure activities:

- Abseiling
- Bushwalking
- Canoeing and Kayaking
- Challenge Ropes Course
- Mountain Biking
- Rock Climbing

The above activities, and adventure recreation/activities in general are closely linked to educational sites and institutions. For instance school children may engage in the above activities during a school camp or excursion.

#### Suitable Adventure activities

It could be possible to accommodate the above adventure activities within the study area. In addition the following activities could also be considered:

- **BMX** - Bicycle motocross or BMX is the sport of racing bicycles in motocross style on dirt tracks which use an inline start and have obstacles. BMX also extends to stunt riding (<http://en.wikipedia.org/wiki/Bmx>).
- **Cyclo Cross** - races consist of many laps of a short (2.5–3.5 km) course featuring pavement, wooded trails, grass, steep hills and obstacles requiring the rider to quickly dismount, carry the bike while navigating the obstruction and remount (<http://en.wikipedia.org/wiki/Cyclo-cross>).
- **Parkour** - is a holistic training discipline using movement developed from obstacle course training. Practitioners aim to quickly and efficiently overcome obstacles in their environment, using only their bodies and their surroundings to propel



High/Challenge Ropes course



Abseiling on natural or man made structures



Rock climbing

## 7. RECREATION POTENTIAL



'Tough Mudder'



Zorbing



Summer sledding



Mountain biking in Old Mans Valley

themselves. Parkour can include running, climbing, swinging, vaulting, jumping, rolling. Parkour is non-competitive. It may be performed on an obstacle course, but is usually practiced in a creative, and sometimes playful, reinterpretation or subversion of urban spaces. The popularity of the site for this kind of activity may depend on the type/amount of man made infrastructure introduced into the quarry site (<http://en.wikipedia.org/wiki/Parkour>).

- Commando courses such as 'Tough Mudder' could be introduced to the site.
- Triathlon - providing the site is able to cater for swimming, running and cycling and also for the marshalling of large groups the site could be used for this type of sport.
- Summer sledding - downhill tobogganing on slightly raised track.
- Zip line - consists of a pulley suspended on a cable mounted on an incline. It is designed to enable a user propelled by gravity to travel from the top to the bottom of the inclined cable by holding on to, or attaching to, the freely moving pulley. Zip line tours are becoming popular vacation activities, found at outdoor adventure camps where they may be an element on a larger challenge or ropes course ([http://en.wikipedia.org/wiki/Zip\\_line](http://en.wikipedia.org/wiki/Zip_line)).
- Ropes course - a ropes course is a challenging outdoor personal development and team building activity which usually consists of high and/or low elements. Low elements take place on the ground or only a few feet above the ground. High elements are usually constructed in trees or made of utility poles and require a belay for safety. Ropes courses are referred to using several different names, including Challenge Courses, Ropes Challenge Courses, Teams Course and Low Ropes ([http://en.wikipedia.org/wiki/Ropes\\_course](http://en.wikipedia.org/wiki/Ropes_course)). Alternatively, 'Adventure Ropes Courses' are usually designed for a larger volume of visitors. They do not follow a specific educational concept, but see the individual, physical and mental challenge as a predominantly recreational activity. Neither climbing techniques nor special/specific physical fitness experience are necessary ([http://en.wikipedia.org/wiki/Aerial\\_Adventure\\_Park](http://en.wikipedia.org/wiki/Aerial_Adventure_Park)).
- Zorbing - also known as globe-riding, sphereing or orbing is the recreation or sport of rolling downhill inside an orb, generally made of transparent plastic. Zorbing is generally performed on a gentle slope, but can also be done on a level surface or water permitting more rider control. In the absence of hills some operators have constructed inflatable, wooden or metal ramps (<http://en.wikipedia.org/wiki/Zorbing>).
- Geocaching - an outdoor recreational activity, in which the participants use a Global Positioning System receiver or mobile device and other navigational techniques to hide and seek containers, called "geocaches" or "caches", anywhere in the world.

### Extreme Sports

Extreme sports is popular term for certain activities perceived as having a high level of inherent danger which often involves speed, height and a high level of physical exertion ([http://en.wikipedia.org/wiki/Extreme\\_sport](http://en.wikipedia.org/wiki/Extreme_sport)).

## 7. RECREATION POTENTIAL

Whilst it is recommended that the development of the study area does not promote extreme sports there is potential for the site to be regarded (and potentially used) as a popular place for some types of extreme sports due to the level differences, water body lake (if retained) and exposed rock walls. If any parts of the site are identified to be suitable for extreme sports they would be subject to the required risk assessment.

### Mountain Bike Trails in Hornsby Park Bushland Reserve and Old Mans Valley

An existing cross-country mountain bike trail winds through Hornsby Park Bushland Reserve and Old Mans Valley. It is approximately 3.25 kilometres long and an additional second stage of 2.5km is being developed at the site in 2014. The single track mountain bike trail is a combination of narrow handmade bushland trails and flowing one-metre-wide machine-made trails.

Current visitation/usage information provided by HSC includes:

- High levels of use and major rain events have not led to any significant deterioration.
- 33 000 laps (November 2012 to August 2013) on blue intermediate MTB trail
- Average of 3 laps are ridden per visit

There is a committed team of trail care volunteers whose voluntary work has equated to 590 hours of maintenance in the last 12 months.

### 7.2 POTENTIAL LIST OF RECREATION ACTIVITIES

Based on the zones identified in HSC's Landform Design Options (see section 8) a list of potential recreation activities has been developed:

#### Useable Open Space - Speciality Park, Level areas, Parkland, Informal parkland

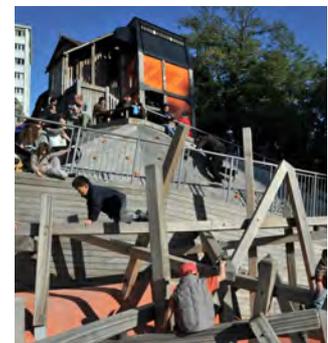
- Passive recreation
  - Picnic/Barbecue
  - Sitting
  - Amphitheatre for events/festivals
  - Play (adventure, imaginative, adventure, fixed equipment)
  - Youth spaces
- Active recreation
  - Informal ball games
  - Multi-purpose hard-court
  - Outdoor fitness/exercise equipment
  - Walking/jogging, boardwalks
  - Dog walking (include Dog off leash)
  - BMX pump track (or track with potential for competition)



Zip line



BMX Pump track



Adventure play



Bushwalking

## 7. RECREATION POTENTIAL

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Guided bushwalk



AFL



Events



Club cricket

- Other
  - Café/kiosk/coffee cart
  - Weddings
  - Small to large events including corporate functions, music festivals (all of which would need to be planned and executed carefully and be approved by Council)

### 1:3 Accessible Revegetated Steep Slope

- Active recreation
  - Bushwalking
  - Guided walks (tourism/income potential)
  - Education/interpretation
  - Mountain biking - extension of tracks
  - Zip line
  - High ropes
  - Viewing platforms/lookouts
  - Summer sledding

### EEC Community - Bluegum Diatreme Forest

- Active recreation
  - Bushwalking
  - Guided walks (tourism/income potential)
  - Education/interpretation
  - Mountain biking
  - Zip line
  - High ropes
  - Tree tops walk
  - Viewing platforms/lookouts

### Sportsfield/ Village Green - Oval, Sportsground

- Active
  - Soccer
  - Australian Football League (AFL)
  - Rugby league
  - Rugby union
  - Cricket
  - Athletics
  - Touch football

## 7. RECREATION POTENTIAL

- Other
  - Club house/community building - meeting rooms, community use
  - Host to A grade sports
  - Events/festivals such as Tough mudder marshalling or set up area

### Lake

- Active
  - Swimming/paddling in water body
  - Fishing
  - Education/interpretation
  - Kayak/canoe/rafting
  - Scuba diving training
  - Zorbing
  - Triathlon
  - Bird watching



Swimming



Rafting

### Existing Quarry Face/ Fill Area To Be Retained

- Abseiling - managed, natural and man made structures
- Rock climbing - managed, natural and man made structures



Kayaking

### Old Crusher Plant Zone

- Indoor climbing centre
- Interpretation centre/museum/gallery/cultural centre
- Environment centre
- Community nursery/garden/orchards (these types of facilities could also be located in other locations within the site)
- Café/restaurant



Indoor climbing

### Diatreme

- Abseiling - managed through constructed features
- Rock climbing - managed through constructed features

### Other Activities

- Parkour
- Photography
- Cemetery access/ tours
- Geocaching/orienteering
- Camping

8. LANDFORM DESIGN OPTIONS



## 8. LANDFORM DESIGN OPTIONS

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### 8.1 LANDFORM DESIGN OPTION REVIEW

As part of the Recreation Potential Study HSC have prepared a series of Landform Design options. Each option has been reviewed under the following headings:

1. Usable Open Space - type, total amount and accessible space that can be used for recreation.
2. Local community needs - open space for residential areas to the north and south of the site focusing on passive recreation (picnics, walking, bushwalking, play) and active recreation (informal ball games, outdoor exercise).
3. Regional attraction - facilities/activities within the site that could attract visitors from all over Sydney (and beyond). The approach should be to cater for a 'day out' with complimentary activities and services provided on site. The site should also be designed and promoted in such a way that it encourages repeat visitation.
4. Mix and range of recreation activities - cater for a wide range of groups. The 45Ha site could accommodate a range and mix of activities. However the range and mix should be complimentary and make the most of the unique location and characteristics of the site.
5. Specialised recreation potential - focusing on one particular recreation activity could exclude a large group of potential visitors. As with the mix and range of activities above, any specialised recreation activities should be chosen because of their appropriateness to the site. For instance adventure activities won't be for everyone. However being able to watch others participating in them, take in site views, have lunch, go for a walk etc. will appeal to the average person/family.
6. Overall site experience - unique qualities (remoteness, wilderness, cultural heritage and quarry walls and structures) are retained and enhanced.
7. Existing environment - Endangered Ecological Communities are retained, protected and enhanced where appropriate.
8. Potential financial gain - ability to generate income for Council and enhance the local economy.

As HSC continue to develop and refine landform design options these headings can be used to assess the options and determine the recreational value of each option.

The options in the following pages show a range of preliminary landforms that demonstrate solutions if Council chooses to accept either (see Appendix E Early Design Options for other options developed during the study):

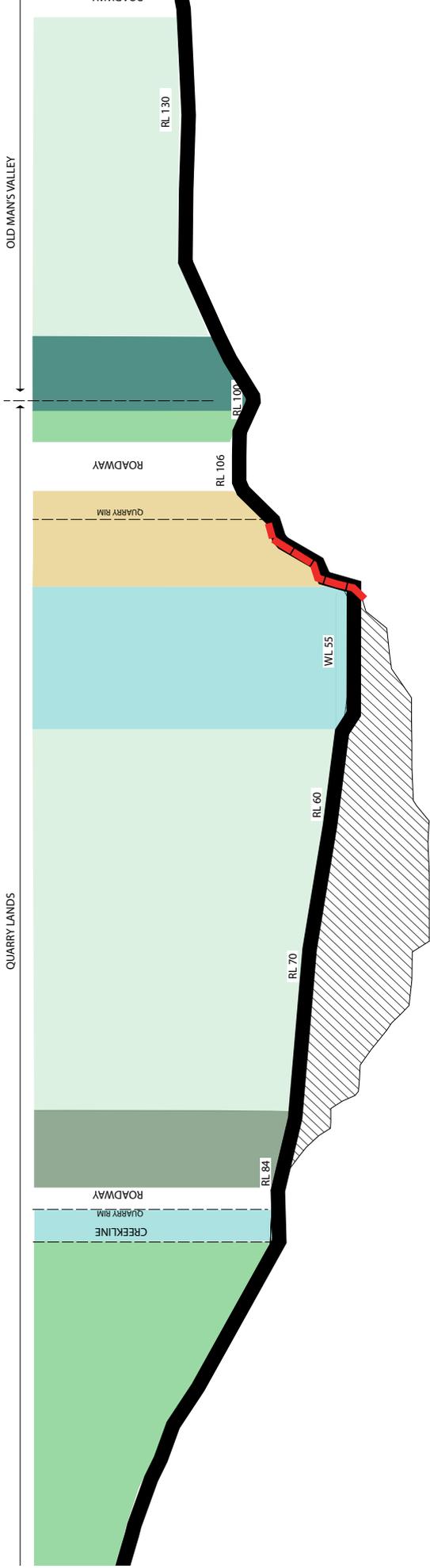
- 1 million m<sup>3</sup> of external fill (Option 1). We have assumed OMV would be largely unchanged and will be landformed as a balanced proposition, without any significant volume of material brought in or taken away. This option would also involve moving site won material from the South West corner of the site and the northern and sides of the quarry.
- 400,000 m<sup>3</sup> of external fill (Option 2). This option would take 600,000m<sup>3</sup> from OMV as well as utilising material from around the quarry as described in Option 1.
- zero volume of external fill (Option 3). This option would take 600,000m<sup>3</sup> from OMV and material from around the quarry as described in Option 1. It will produce steeper landforms in the quarry, that would limit its flexibility.



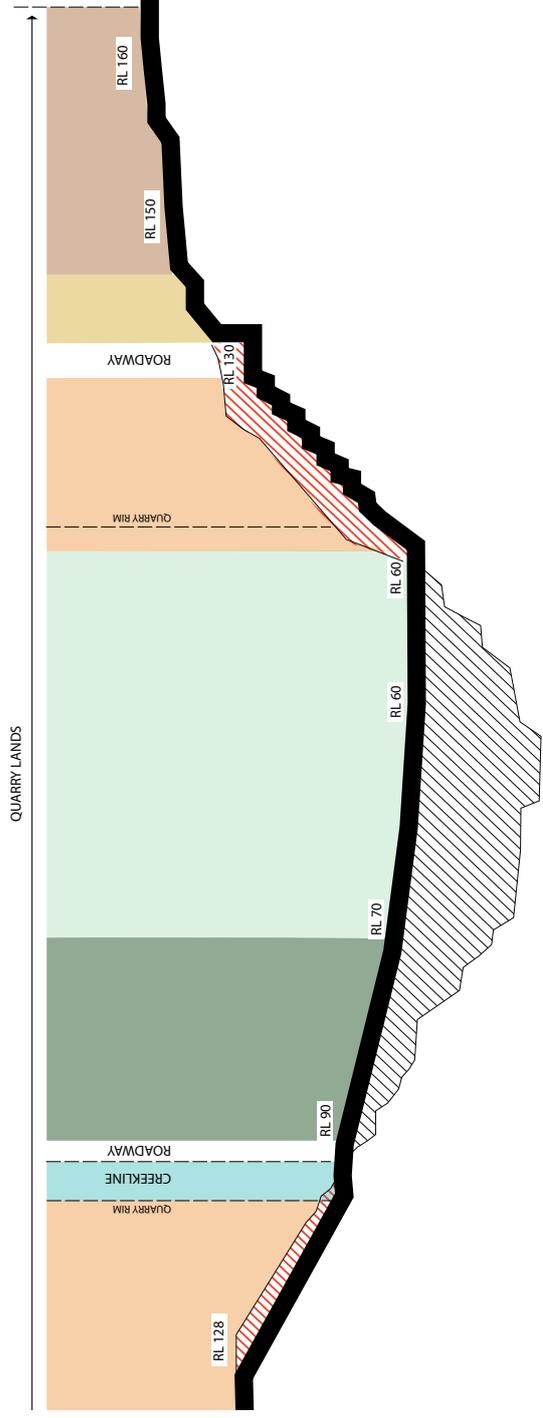
## 8. LANDFORM DESIGN OPTIONS

<p><b>Option 1: 1 million m3 imported fill</b></p>	<p>Option 1 retains the diatrema, a smaller lake footprint (when compared to the existing size of the lake and Option 3) and provides an opportunity for an amphitheatre or terraced/sloping landscape to the west. It has a cascading waterscape stepping down from the upper level of the creek to the lake in the base of the amphitheatre. A 1:1.2 cut slope on the southern side of the quarry maximises usable open space and opportunities for adventure recreation and is also in close proximity to the crusher plant. A 1:1.2 cut slope is also proposed on the northern side for trail and adventure recreation opportunities.</p>
<p><b>Usable Open Space</b> (as shown in opposite map)</p>	<p><i>Types of open space and potential activities</i></p> <ul style="list-style-type: none"> <li>• 5Ha - OMV (Oval/ Specialty Park) - active sports, one off events, play space</li> <li>• 4Ha - Quarry Parklands - adventure play, amphitheatre, lake boardwalks, picnics, barbecues, events, some lake activities (kayaking/canoeing, foreshore paddling)</li> <li>• 1Ha - Old Crusher Plant - rock climbing, abseiling, community facility</li> <li>• 2.5Ha - South western area - a new level space available for a wide range of recreation pursuits.</li> <li>• 0.5Ha - Northern/southern slopes - available for limited use due to steep slopes. May accommodate rock climbing, abseiling, high ropes/tree top walk and/or mountain biking (1:3 slope near Quarry Road)</li> <li>• 13Ha - Total usable space</li> </ul> <p><i>Accessibility:</i></p> <ul style="list-style-type: none"> <li>• Walking into and around the site will involve some steep inclines and declines. It may not be possible to design Disability Discrimination Act (DDA) compliant paths throughout the site. However access to major facilities such as the Crusher Plant, Oval and Specialty Park should be provided. It may be appropriate to consider the use of an inclinator.</li> <li>• The Oval and Specialty Park located within OMV are the most accessible spaces within the overall site i.e. they are situated at a reasonably level area above the quarry. Both spaces could be accessed from Quarry Road or an upgraded Bridge Street fire trail to the north of the TAFE building. For the purposes of open space for local community needs it may be sensible to focus on this area.</li> <li>• Car parking provided near the Oval and Specialty park will provide a natural focus or starting point for the site.</li> <li>• Access roads around the site and into the western lower level of the Quarry area will provide access to the majority of the site. A series of accessible paths within the Quarry Parklands should be linked to disabled car parking spaces.</li> </ul>
<p><b>Local community needs</b></p>	<ul style="list-style-type: none"> <li>• Local community passive open space needs would be met through the provision of adventure play, boardwalks, picnic and barbecue areas, kick-about spaces etc.</li> <li>• The opening up of the site for public recreation would be a vast improvement on the quantity of existing local provision of open space in the Hornsby area.</li> <li>• However access into the site, especially the lower western side will need to be carefully considered to allow residents to walk or cycle to the site. In reality some local residents may choose to drive to the site.</li> <li>• Local residents may also find that they are sharing 'their local park' with many 'outsiders' and some of the spaces may lack the intimacy of a smaller local park, such as the terraced/sloping land west of the lake.</li> <li>• Overall the introduction of new areas of usable open space for passive recreation activities would meet the needs of the local community. The introduction of an additional 13Ha would have a positive impact on local open space provision.</li> </ul>

# OPTION 1 - 1 MIL M3 IMPORTED



SECTION - EAST - WEST



SECTION - NORTH - SOUTH

- USEABLE OPEN SPACE
- 1:3 ACCESSIBLE REVEGETATED STEEP SLOPE (FILL)
- 1:1.2 EXPOSED ROCK WALL (CUT)
- EEC COMMUNITY - BLUEGUM DIATREME FOREST
- EXISTING BLACKBUTT GULLY FOREST
- LAKE
- EXISTING QUARRY FACE/ FILL AREA TO BE RETAINED
- OLD CRUSHER PLANT ZONE
- DIATREME



## 8. LANDFORM DESIGN OPTIONS

<p><b>Regional attraction</b></p>	<ul style="list-style-type: none"> <li>The following facilities (assuming they are of a high standard and offer an unique experience, closely linked to the site's unique characteristics) could attract visitors from all over Sydney (and possibly beyond): Zip line; High Ropes and Tree top walk; Lake; Retained (and expanded) mountain biking. The creation of an amphitheatre that takes advantage of the sloping land could become a site for cultural events.</li> </ul>
<p><b>Existing environment</b></p>	<ul style="list-style-type: none"> <li>Loss of vegetation on northern side to create 1:1.2 and 1:3 slopes</li> <li>EEC retained near OMV. However potential uses such as high ropes and tree top walk could be a point of conflict. Construction of OMV oval near EEC areas would need careful consideration to avoid compaction.</li> </ul>
<p><b>Mix and range of recreation activities</b></p>	<ul style="list-style-type: none"> <li>Land based activities could focus on those listed previously in this table.</li> <li>Retention of a lake provides a variety of activities that are largely not provided in the rest of the Shire (apart from river environments). However the lake is not as large as the lake proposed in Option 3 and therefore the potential water-based activities could be limited.</li> <li>Adventure recreation would be suited to specific areas within the old Quarry such as the 1:3 slope on the northern side, 1:1.2 slopes on the northern and southern sides, EEC zones (for high ropes/tree top walk) and the crusher plant. With access from Quarry Road the western side of the park, especially the northern and south western zones could be a focused adventure recreation zone with Old Mans Valley and the central part of the quarry providing other activities. The level difference could be a natural device for separating the activities.</li> <li>Options for the Old Crusher Zone could take advantage of an existing building and tall man made structures for activities such as rock climbing and abseiling (indoor and/or outdoor). The level area around the old building could be used for passive recreation activities allowing visitors to view the quarry without venturing too far from Dural Street/ Quarry Road. It could also be used for on site car parking.</li> </ul>
<p><b>Overall site experience</b></p>	<ul style="list-style-type: none"> <li>The Quarry void would be filled to RL 80 on the western side but allow for retention of the diatreme on the eastern side to a depth of RL 55. The existing feelings of depth and being within the 'old quarry hole' could be diminished however much of the quarry character will be retained.</li> <li>The cutting of the southern and northern faces of the quarry would add to the quarry story of the site and enhance the unique setting.</li> <li>The introduction of a limited range of recreation activities on the northern, southern and western face, could be seen to be enhancing the overall experience, by opening up unusable space for adventure activities.</li> <li>The retention of a lake on site also enhances the overall experience. However the reduced size will not have the same impact as the existing lake. The overall size of the lake could be made larger or smaller. A decision around this aspect could be made at a later date when the design of the park is further developed.</li> </ul>
<p><b>Potential financial gain</b></p>	<ul style="list-style-type: none"> <li>Management/lease arrangements associated with Zip line; High Ropes and Tree top walk; Abseiling, Rock climbing, Cafe, Nursery etc.</li> <li>Local private operators such as accommodation, food outlets and adventure based retail could also benefit from some of the above uses for the site.</li> </ul>

## 8. LANDFORM DESIGN OPTIONS

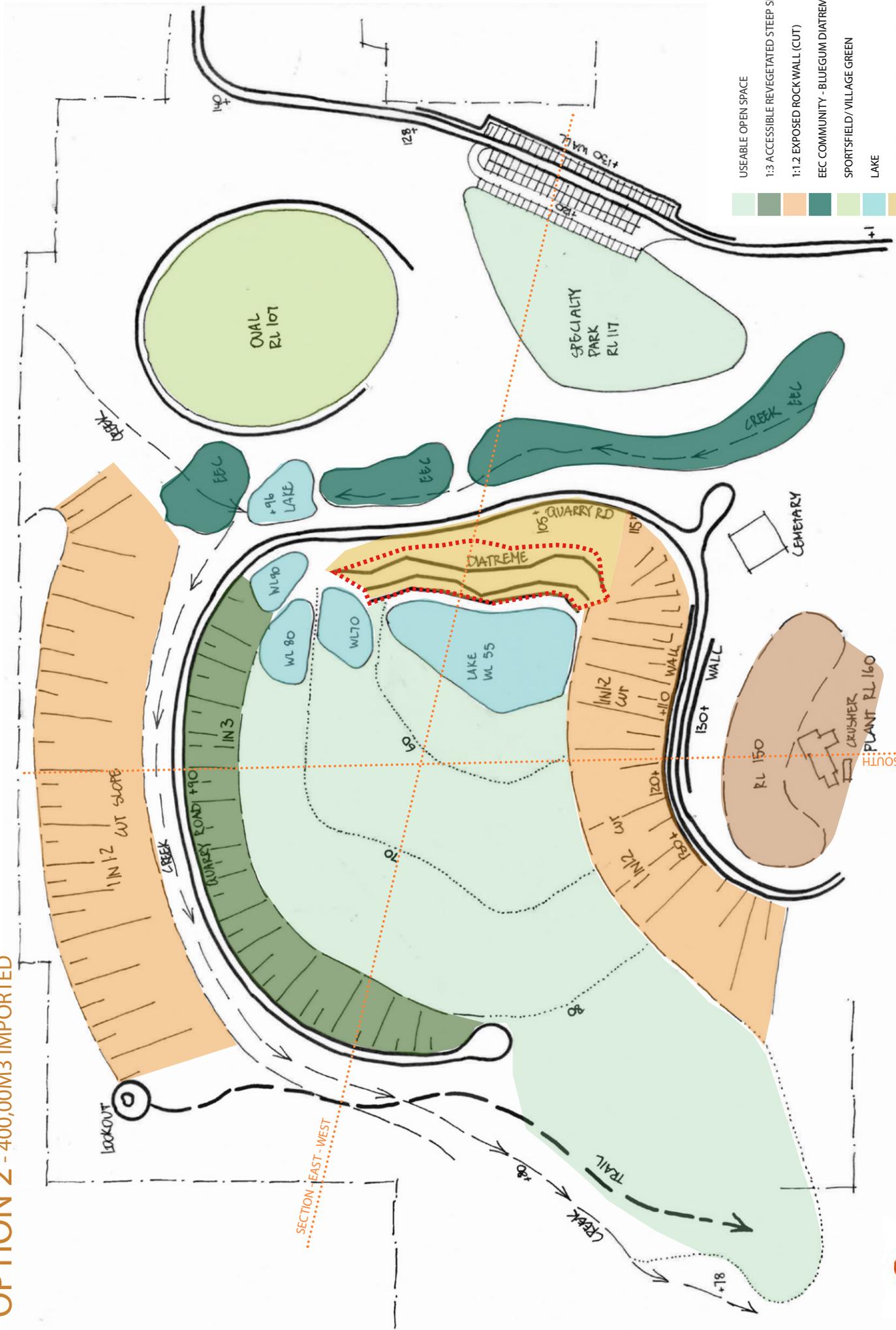
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### Key questions:

1. Does this option provide sufficient usable open space to cater for the needs of the local community or do we need additional open space?
  - Based on the open space hierarchy provided in Appendix A a local park should be between 0.2 and 0.5 Ha in size and a neighbourhood park should be between 0.5 and 1 Ha in size. Therefore it is expected that the new facilities and passive recreation activities within Old Mans Valley Lands will meet the needs of the local community.
2. Are we able to accommodate a mix and range of activities or do we think that a specialised recreation approach is more suitable? Does providing a specialised recreation approach for the quarry limits its potential?
  - A mix and range of activities will need to have a focus, rather than a long wish list of unrelated activities. A specialised recreation use for this particular site does not necessarily exclude other users, for instance lookouts, viewing platforms, cafes, picnic areas overlooking the adventure activities/lake/summer sledding would allow visitors to watch the activities without having to participate.
  - A specialised recreation approach needs to be linked to the quarry character and should not limit its potential. The topography and natural setting seem to lend themselves well to an adventure specialised park. The creation of a large sloped area/amphitheatre also provides a site for cultural events/performances.
3. Is this type of provision sufficient to cater for the needs of the local community?
  - Other passive uses such as picnic and barbecue areas, play spaces, walking trails should be provided alongside a specialised use. In this way the local community can utilise the site for their basic open space needs.
4. Does filling the hole to RL 50 reduce the overall experience of the site?
  - Filling the quarry hole to RL 50 would not necessarily reduce the overall experience of the site. The filling of the void reduces the unique, scale, characteristics and feel of wilderness and remoteness that is experienced in the quarry void. However a large face of cut rock is expected to remain on most sides, contributing to the distinctness of the place.



# OPTION 2 - 400,000M3 IMPORTED

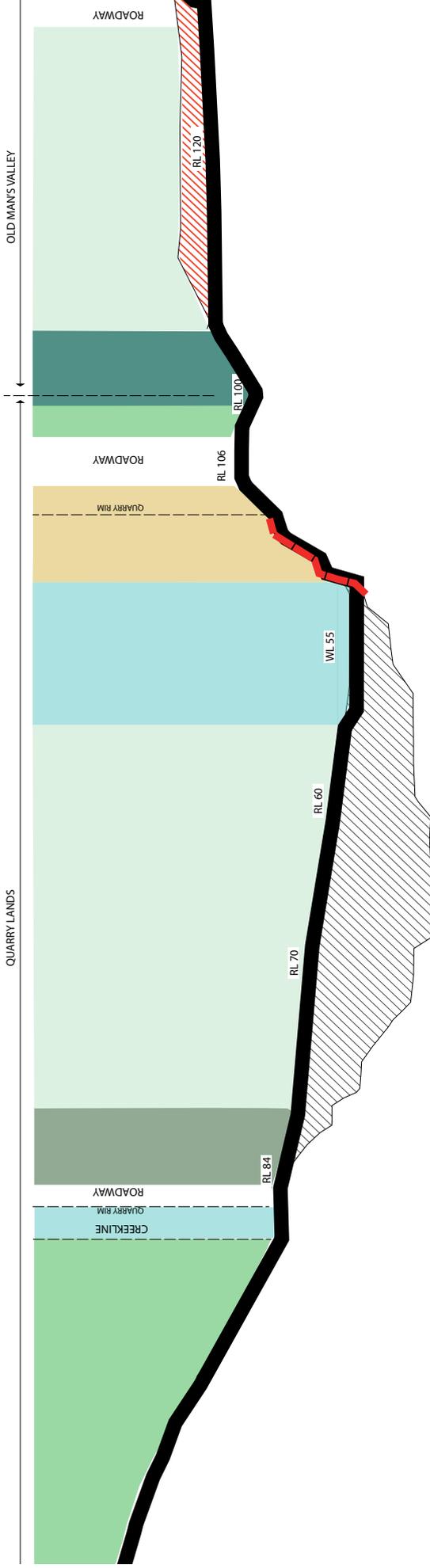


- USEABLE OPEN SPACE
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- 1:1.2 EXPOSED ROCK WALL (CUT)
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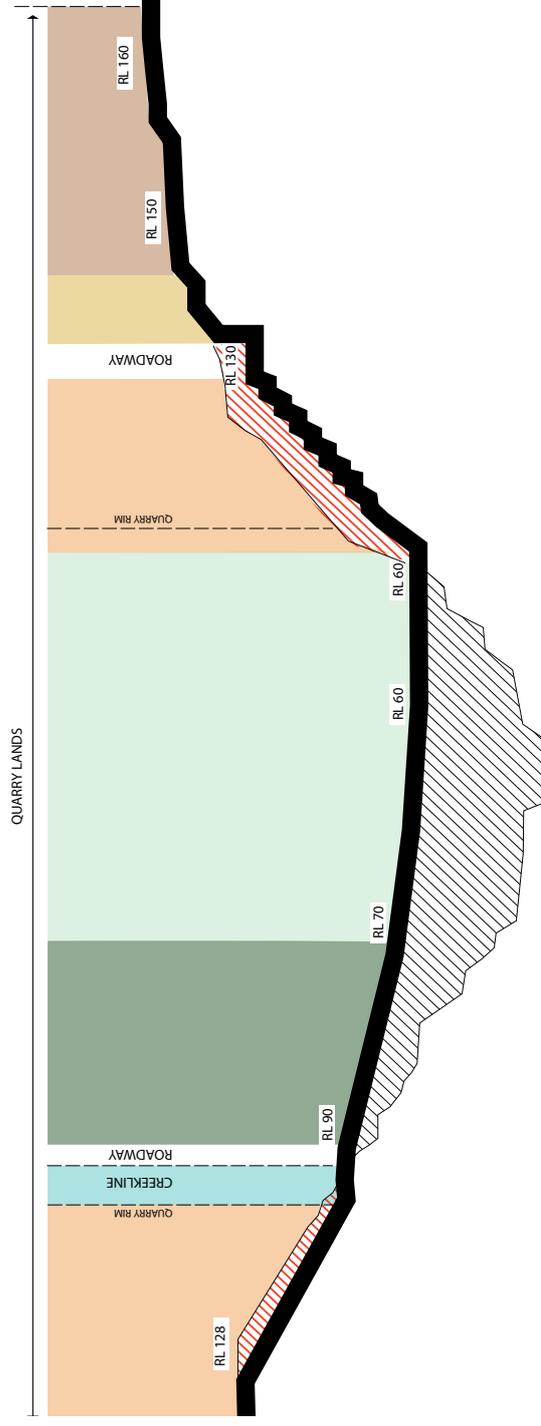
## 8. LANDFORM DESIGN OPTIONS

<p><b>Option 2: 400,000 m3 external fill and 600,000m3 from OMV</b></p>	<p>The eastern part of Option 2 (Old Mans Valley Oval and the Specialty Park) are altered to provide 600,000m3 of fill for the quarry part of the site. This dramatically changes the levels in Old Mans Valley. When compared to Option 1 the Oval and Specialty Park will be 13m lower. A series of retaining walls are required which will have an impact on existing Mountain Biking trails and require them to be re-routed.</p> <p>The diatreme is retained with a small lake (the same as Option 1). It has a cascading waterscape stepping down from the upper level of the creek to the lake in the base of the amphitheatre. A 1:1.2 cut slope on the southern side of the quarry maximises usable open space and opportunities for adventure recreation and is also in close proximity to the crusher plant. A 1:1.2 cut slope is also proposed on the northern side for trail and adventure recreation opportunities.</p>
<p><b>Usable Open Space</b> (as shown in opposite map)</p>	<p><i>Types of open space and potential activities</i></p> <ul style="list-style-type: none"> <li>• 4.5Ha - OMV (Oval/ Specialty Park) - active sports, one off events, play space</li> <li>• 4Ha - Quarry Parklands - adventure play, amphitheatre, lake boardwalks, picnics, barbecues, events, lake activities (kayaking/canoeing, foreshore paddling)</li> <li>• 1Ha - Old Crusher Plant - rock climbing, abseiling, community facility</li> <li>• 2.5Ha - South western area - a new level space available for a wide range of recreation pursuits.</li> <li>• 0.5Ha - Northern/southern slopes - available for limited use due to steep slopes. May accommodate rock climbing, abseiling, high ropes/tree top walk and/or mountain biking (1:3 slope near Quarry Road)</li> <li>• 12.5Ha - Total usable space</li> </ul> <p><i>Accessibility:</i></p> <ul style="list-style-type: none"> <li>• Walking into and around the site will involve some steep inclines and declines. It may not be possible to design Disability Discrimination Act (DDA) compliant paths throughout the site. It may be appropriate to consider use of an inclinator.</li> <li>• Access to major facilities such as the Crusher Plant, Oval and Specialty Park should be provided.</li> <li>• Car parking provided near the Specialty park will provide a natural focus or starting point for the site. Access around retaining walls etc. will need to be carefully designed to overcome major level difference.</li> <li>• Access roads around the site and into the western lower level of the Quarry area will provide access to the majority of the site. A series of accessible paths within the Quarry Parklands should be linked to disabled car parking spaces.</li> <li>• When compared to Option 1 access between OMV and the quarry is changed as the oval is set to a level closer to the adjacent quarry access road. There is however a significant level difference within OMV that will need to be carefully designed. Vehicle access is limited due to the inability to link the two internal roads (Quarry Road and new road around the Oval and Specialty Park).</li> </ul>
<p><b>Local community needs</b></p>	<ul style="list-style-type: none"> <li>• Similar to Option 1 except that the overall landform of OMV will be substantially altered from the existing arrangement.</li> <li>• Overall the introduction of new areas of usable open space for passive recreation activities would meet the needs of the local community. The introduction of an additional 12.5Ha would have a positive impact on local open space provision.</li> </ul>

# OPTION 2 - 400,000M3 IMPORTED



SECTION - EAST - WEST



SECTION - NORTH - SOUTH

- USEABLE OPEN SPACE
- 1:3 ACCESSIBLE REVEGETATED STEEP SLOPE (FILL)
- 1:1.2 EXPOSED ROCK WALL (CUT)
- EEC COMMUNITY - BLUEGUM DIATREME FOREST
- EXISTING BLACKBUTT GULLY FOREST
- LAKE
- EXISTING QUARRY FACE/ FILL AREA TO BE RETAINED
- OLD CRUSHER PLANT ZONE
- DIATREME



## 8. LANDFORM DESIGN OPTIONS

<b>Regional attraction</b>	<ul style="list-style-type: none"> <li>The following facilities (assuming they are of a high standard and offer an unique experience, closely linked to the site's unique characteristics) could attract visitors from all over Sydney (and possibly beyond): Zip line; High Ropes and Tree top walk; Lake; Retained (and expanded) mountain biking.</li> </ul>
<b>Existing environment</b>	<ul style="list-style-type: none"> <li>Loss of vegetation on northern side to create 1:1.2 and 1:3 slopes</li> <li>EEC retained near OMV. However potential uses such as high ropes and tree top walk could be a point of conflict and level difference between the Oval and EEC areas would need careful consideration.</li> </ul>
<b>Mix and range of recreation activities</b>	<ul style="list-style-type: none"> <li>Land based activities could focus on those listed previously in this table.</li> <li>Retention of a lake provides a variety of activities that are largely not provided in the rest of the Shire (apart from river environments). However the lake is not as large as the lake proposed in Option 3 and therefore the potential water-based activities could be limited.</li> <li>Adventure recreation would be suited to specific areas within the old Quarry such as the 1:3 slope on the northern side, 1:1.2 slopes on the northern and southern sides, EEC zones (for high ropes/tree top walk) and the crusher plant. With access from Quarry Road the western side of the park, especially the northern and south western zones could be a focused adventure recreation zone with Old Mans Valley and the central part of the quarry providing other activities. The level difference could be a natural device for separating the activities.</li> <li>Options for the Old Crusher Zone could take advantage of an existing building and tall man made structures for activities such as rock climbing and abseiling (indoor and/or outdoor). The level area around the old building could be used for passive recreation activities allowing visitors to view the quarry without venturing too far from Dural Street/ Quarry Road. It could also be used for on site car parking.</li> </ul>
<b>Overall site experience</b>	<ul style="list-style-type: none"> <li>The Quarry void would be filled to RL 80 on the western side but allow for retention of the diatreme on the eastern side to a depth of RL55. The feeling of depth and being within the 'old quarry hole' could be lost.</li> <li>The cutting of the southern and western faces of the quarry would add to the quarry story of the site and enhance the unique setting.</li> <li>The introduction of a limited range of recreation activities on the northern, southern and western faces could be seen to be enhancing the overall experience, by opening up unusable space for adventure activities.</li> <li>The retention of a lake on site also enhances the overall experience. However the reduced size will not have the same impact as the existing lake. The overall size of the lake could be made larger or smaller. A decision around this aspect could be made at a later date when the design of the park is further developed.</li> </ul>
<b>Potential financial gain</b>	<ul style="list-style-type: none"> <li>Management/lease arrangements associated with Zip line; High Ropes and Tree top walk; Abseiling, Rock climbing, Cafe, Nursery etc.</li> <li>Local private operators such as accommodation, food outlets and adventure based retail could also benefit from some of the above uses for the site.</li> </ul>

### Key Questions (See questions 1 to 4 for Option 1 also)

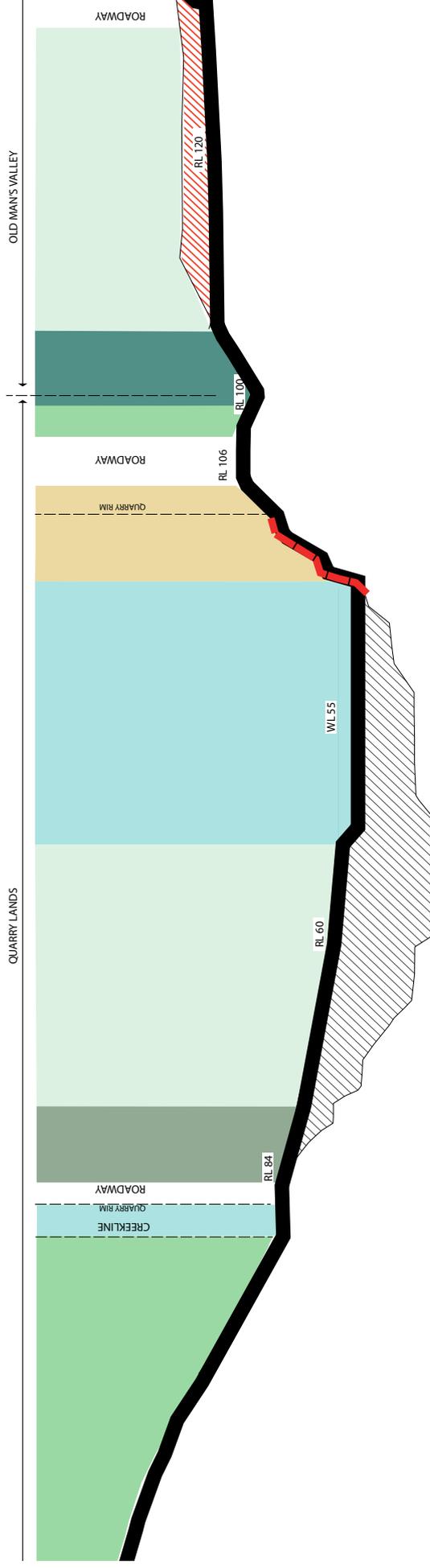
- Does the removal of material from OMV impact negatively on the overall experience of the site?
  - OMV is a disturbed site. The potential greatest impact is on the existing Mountain Bike Trail.
  - Remediation of OMV is crucial. The design of roads, paths, retaining walls, new mountain bike trails and landscape areas are critical to the overall enjoyment, aesthetic qualities and ease of access around the site.
  - However there is also potential to create new views and vistas from OMV to the Quarry as the lower level could create a better connection between the upper and lower levels of the site.



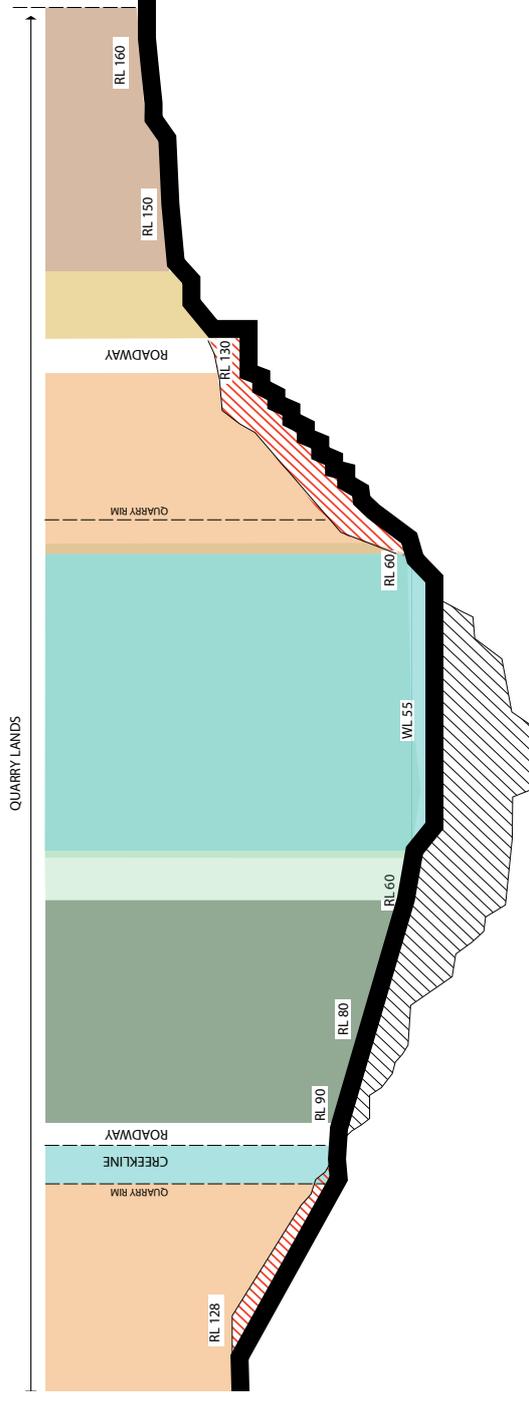
## 8. LANDFORM DESIGN OPTIONS

<p><b>Option 3: No external fill (600,000m<sup>3</sup> material from OMV)</b></p>	<p>This option explores the opportunity of creating a unique public space without relying on fill from external sources. Creation of parkland on the western (quarry) side of the site is limited due to the creation of 1:3, 1:4 and 1:6 slopes. However the dramatic landscape and 'quarriiness' is retained with a larger lake (when compared to Option 1 and 2).</p>
<p><b>Usable Open Space</b></p>	<p><i>Types of open space and potential activities</i></p> <ul style="list-style-type: none"> <li>• 4.5Ha - OMV (Oval/ Specialty Park) - active sports, one off events, play space</li> <li>• 3Ha - Quarry Parklands - amphitheatre; entirely reliant on some level areas being created within the sloped landscape for limited adventure play, amphitheatre, lake boardwalks, picnics, barbecues, events. However the larger lake could include more activities (kayaking/canoeing, foreshore paddling, swimming, zorbing)</li> <li>• 1Ha - Old Crusher Plant - rock climbing, abseiling, community facility</li> <li>• 2.5Ha - South western area - a new level area available for a wide range of recreation pursuits.</li> <li>• 0.5Ha - Northern/southern slopes - available for limited use due to steep slopes. May accommodate rock climbing, abseiling, high ropes/tree top walk and/or mountain biking (1:3 slope near Quarry Road)</li> <li>• 11.5Ha - Total usable space</li> </ul> <p><i>Accessibility:</i></p> <ul style="list-style-type: none"> <li>• Access is similar to Option 2 where there is no proposed road link between the Quarry and OMV roads.</li> <li>• Access to the lake is limited due to the sloped areas. Accessible paths would need to be provided to the lake edge and would be difficult to achieve given the steep gradients.</li> </ul>
<p><b>Local community needs</b></p>	<ul style="list-style-type: none"> <li>• Local community passive open space needs would be met through the provision of the oval and specialty park with the possibility of creating adventure play, picnic and barbecue areas, kick-about spaces etc. in Old Mans Valley.</li> <li>• The opening up of the site for public recreation would be a vast improvement on the current arrangements where access to the quarry is restricted.</li> <li>• The retention of the quarry structure/void and lake and also the sloping land reduces the amount of useable space in the quarry.</li> <li>• Local residents may also find that they are sharing 'their local park' with many 'outsiders' and some of the spaces may lack the intimacy of a smaller local park. Overall the introduction of new areas of open space for passive recreation would meet the needs of the local community. The introduction of an additional 11.5 Ha would have a positive impact on local open space provision.</li> </ul>
<p><b>Regional attraction</b></p>	<ul style="list-style-type: none"> <li>• It is assumed the following activities could be allowed for in this option - Zip line; High Ropes and Tree top walk; retained mountain biking.</li> <li>• The creation of an amphitheatre that takes advantage of the sloping land could become a site for cultural events. The steeper slopes of the amphitheatre area could however limit its availability for this use.</li> </ul>

# OPTION 3 - NO EXTERNAL FILL



## SECTION - EAST - WEST



## SECTION - NORTH - SOUTH

- USEABLE OPEN SPACE
- 1:3 ACCESSIBLE REVEGETATED STEEP SLOPE (FILL)
- 1:1.2 EXPOSED ROCK WALL (CUT)
- EEC COMMUNITY - BLUEGUM DIATREME FOREST
- EXISTING BLACKBUTT GULLY FOREST
- LAKE
- EXISTING QUARRY FACE/ FILL-AREA TO BE RETAINED
- OLD CRUSHER PLANT ZONE
- DIATREME



## 8. LANDFORM DESIGN OPTIONS

<p><b>Existing environment</b></p>	<ul style="list-style-type: none"> <li>• Loss of vegetation on northern side to create 1:1.2 slopes.</li> <li>• Loss of vegetation on southern side to create 1:1.2 cut slopes.</li> <li>• EEC retained near OMV. However potential uses such as high ropes and tree top walk could be a point of conflict and reduced levels around the proposed Oval may impact on EEC.</li> <li>• Reduction in broader environmental issues of transporting fill from elsewhere</li> <li>• Larger sized lake could provide a water recreation resource and potential for irrigation and fire fighting uses</li> </ul>
<p><b>Mix and range of recreation activities</b></p>	<ul style="list-style-type: none"> <li>• Retention of a large lake (largest of the three options) provides the opportunity for a range of water based activities. However the sloping ground adjacent to the lake is limiting to its use for recreation pursuits.</li> <li>• The 1:1.2 cut slopes on the southern and northern side provide for a variety of adventure activities. This sets up two adventure zones with different experiences on either side of the quarry. This could lead to duplication of facilities. The southern side could focus on abseiling and rock climbing and the northern side could focus on high ropes and tree top walk (this approach could also be used for Option 1 and 2).</li> </ul>
<p><b>Overall site experience</b></p>	<ul style="list-style-type: none"> <li>• The retention of the larger sized lake adds to the overall site experience and retains a stronger reference to the existing unique character of the site.</li> <li>• The depth of the quarry void is greater than options 1 and 2 due to steeper sloping land. This can be expected to limit the recreation potential but may or may not detract from the quarry experience, depending on the end uses chosen for the sloping land.</li> </ul>
<p><b>Potential financial gain</b></p>	<ul style="list-style-type: none"> <li>• Management/lease arrangements associated with Zip line; High Ropes and Tree top walk; Abseiling, Rock climbing, Cafe, Nursery etc.</li> <li>• Local private operators such as accommodation, food outlets and adventure based retail could also benefit from some of the above uses for the site.</li> </ul>

### Key Questions

1. Does this option provide sufficient usable open space to cater for the needs of the local community or do we need additional open space?
  - Based on the open space hierarchy provided in Appendix A a local park should be between 0.2 and 0.5 Ha in size and a neighbourhood park should be between 0.5 and 1 Ha in size. Therefore it is expected that the new facilities and passive recreation activities within Old Mans Valley Lands will meet the needs of the local community.
  - The amount of usable open space on the western side of the site is more limited. The sloping land will reduce the amount of space for informal activities such as kickabout, picnics, play etc.
2. Are we able to accommodate a mix and range of activities?
  - Despite the sloping land in the quarry, a mix of uses is still achievable on the site. The adventure recreation activities could be provided on the northern and southern slopes and the lake could be a focus for water based activities.
  - As previously stated for Option 1 and 2 a mix and range of activities will need to have a focus, rather than a long wish list of unrelated activities. This is especially relevant for this option where flat/level land on the western side is limited around the lake. Passive open space for informal activities is limited in the quarry.
3. Does filling the hole to RL 50 reduce the overall experience of the site?
  - Filling the quarry hole to RL 50 would not necessarily reduce the overall experience of the site. The filling of the void, especially with sloping ground reduces the unique scale characteristics and feel of wilderness and remoteness that is experienced in the quarry void. However a large face of cut rock is expected to remain on most sides, contributing to the distinctness of the place

## 8. LANDFORM DESIGN OPTIONS

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### 8.2 MULTI-CRITERIA ASSESSMENT

A multi-criteria assessment is a technique that provides an overall ordering or ranking of options, from the most preferred to the least preferred option.

The options may differ in the extent to which they achieve several objectives, and in some instances no one option will be obviously best in achieving all objectives. Multi-criteria assessment uses a scoring system and applies weightings for different categories in an attempt to avoid this.

The preparation of the goal achievement matrix has been developed based on a series of objectives and assumptions.

#### Project objectives

- Create a park that builds on the distinctive quarry character
- Create a publicly accessible park that accommodates a wide range and mix of recreation activities
- Find a solution that is cost effective and reduces financial liability to Council

#### Assumptions

All options:

##### *Environment and heritage*

- Promotes or supports environmental sustainability:
  - improving wildlife linkages and restores bushland
  - restoring and improving water courses
  - minimises impact on wildlife and ecology
- Retain existing EEC vegetation communities
- Deliver improved outcomes for the hydrology of the site
- Allow for adaptive reuse of existing industrial buildings
- Maximises opportunities for site interpretation and education (more elements to interpret)
- Landform evokes site history and retains elements of the existing quarry wall, quarry void and lake, etc.
- Retains diatreme (depth and length)
- Improves visual quality and distinct identity of the site (visual interest)

##### *Management and safety*

- Aim to meet minimum public safety risk standards while opening the site to general public access
- Meets all bushland and fire management requirements
- Meets all water management and safety requirements

## 8. LANDFORM DESIGN OPTIONS

### Connections

- Improve linkages to town centre and surrounding residential areas
- Cater for vehicle access and parking, pedestrian and cycle access and other needs of visitors such as amenity facilities

### Open space provision

- Comply with open space zoning for recreation use
- Allow for a regional level facility to be provided
- Allow for immersion or interaction with the environment/bushland experience
- Create opportunities for a distinctive or unusual recreation experience
- Provides level ground for traditional sportsgrounds (min 2 ovals)

Financial aspects shall be assessed separately to these assumptions.

### Criteria

The following criteria have been developed with HSC over four iterations. Raw scores are based on a scale of 1 to 3 where a score of 3 meets the criteria well, scaling down to a score of 1 where the criteria is met, but could be improved.

Category	Sub-category	No.	Criteria	Weight	Option 1		Option 2		Option 3	
					Raw	Calc	Raw	Calc	Raw	Calc
Social	Recreation	1	Maximises range and mix of recreation activities to meet present and future community needs (spatial diversity)	3	3	9	2	6	1	3
		2	Allows for water based recreation activities	1	2	2	2	2	3	3
		3	Provides for passive recreation activities	3	2	6	2	6	1	3
	Adventure	4	Allows for adventure recreation beyond existing activities (vertical drops)	3	2	6	2	6	3	9
	Cultural Events	5	Maximises opportunities for community and cultural events and programming	2	3	6	3	6	2	4
	Visual quality	6	Maximises views and vistas across the site	1	3	3	2	2	2	2
	Boundaries	7	Lowest impacts on amenity of neighbours including noise, traffic and security	1	1	1	2	2	3	3
Retains Quarry character 'Quarriness'	Unique landscape	8	Most complementary to site topography, bushland and visual character	3	3	9	2	6	2	6
Technical	Construction	9	Allows for ease of construction to create final landform	3	3	9	1	3	1	3
	Connections	10	Maximises connectivity to and from the site as well as across the site	3	3	9	2	6	2	6
<b>TOTALS</b>					<b>25</b>	<b>60</b>	<b>20</b>	<b>45</b>	<b>20</b>	<b>42</b>

9. CONCLUSION SNA RECOMMENDATIONS



*Existing vegetation in Hornsby Quarry*

## 9. CONCLUSIONS AND RECOMMENDATIONS

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### 9.1 CONCLUSIONS

#### Overall conclusions

- The old quarry provides a unique and interesting landscape setting in such close proximity to Hornsby CBD. This is created by the dramatic level changes, exposed rock walls and water body. A feeling of remoteness is experienced in the lower parts of the quarry where it is very quiet, and no built form can be seen. The quarry has its own microclimate and bushland backdrop that reinforces the remoteness and distinctiveness of the overall site experience. It is considered that as much of this experience should be retained as possible to create a unique landscape and recreation experience for future users of the site.
- Review of the landform design options and early design options (see Appendix E) reveals that there are a range of landform and recreation possibilities for the Old Mans Valley and Hornsby Quarry site.
- The landform options indicate desirable outcomes. However they involve complex fill and construction scenarios and each option will have a different impact on the local community and environmental values of the site. These factors need to be carefully considered as part of the next phase of the project.
- The analysis of adventure recreation opportunities included in Montemare's report (see Appendix D) shows distinct possibilities for part of the site to become a focus for adventure recreation. If opened up and successfully developed for public access the site will become a regional attraction. As part of the Adventure Tourism Scoping Study discussions with adventure recreation operators revealed certain key factors that increase the site's appeal and could lead to the potential success of the site:
  - Proximity to Hornsby train station, Pacific Highway, metropolitan Sydney and the Central Coast.
  - Unique landscape consisting of steep gradients and level differences, bushland and water which were all seen as highly appealing for the development of multiple adventure recreation 'products'
  - Existing Mountain Biking is seen as a positive existing public use and an important part of the overall public use of the site.
- Other factors relating to the potential success of part of the site to be developed for adventure recreation include:
  - No commercial adventure sport operations of significance were identified in the Hornsby area.
  - Limited outdoor adventure sport opportunities in the region. Up to four adventure parks in the capture region and recent investment in outdoor and indoor adventure facilities indicating growth and investment in the sector, mimicking international growth trends.
  - Discussions with National Parks and Wildlife and local tourism organisations indicates more mountain bike and horse riding product is coming on line within the next 2-3 years, and significant interest by commercial operators and events operators in adventure sport product in the region.

## 9. CONCLUSIONS AND RECOMMENDATIONS

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- There is room for further growth of this product in the immediate area provided the customer experience is highly differentiated. Discussions with the operators suggests that the Hornsby Quarry site offers the level of differentiation required due to site features.
- Montemare's report indicates the potential for HSC to raise revenue through the lease of parts of the site for particular functions or uses, such as adventure recreation and use of the old crusher plant building. The potential for open space alone to raise revenue is limited. It is therefore important to pursue this aspect of the site's potential as part of the next phase of the project.
- The site should also cater for local residents and their open space and recreation needs. Facilities such as lawn areas for informal ball games, play, picnic and barbecue areas should be provided within the site.

### Options comparison

- After review and assessment of all three options it is evident that a range of alternative landforms are possible for the site and that all the options can achieve a desirable recreation outcome, with opportunities for a distinctive recreation experience whilst revealing and protecting the site's cultural and environmental heritage.
- The option evaluations contained in this report assess the site and the option plans on social, environment and heritage, quarry character and other technical criteria. It does not evaluate economic or cost issues associated with the opening up of the site for recreation use.
- Based on the Multi-Criteria Assessment:
  - Option 1 was the highest scoring Option. This was mostly due to the fact that no excavation works within OMV were required ie. usable open space was maximised including substantial specialty park area. Also access options, cultural events and opportunities for community events programming were more favourable and the 'site story' was more intact.
  - Option 2 was the second highest scoring option. This option is very similar to Option 1. Whilst it does require excavation of OMV, reducing the potential of the specialty park, it produces better physical connections between OMV and the quarry. Additional earthworks would result in more complicated construction and greater disturbance of the site.
  - Option 3 was the lowest scoring option due to limited usable open space and limited access due to steep slopes in the quarry. It also requires excavation of OMV, resulting in more significant disturbance of the site and more complicated construction. Whilst the steep slopes limit the potential for passive recreation activities and community and cultural programming, these could however provide additional opportunities for adventure recreation and a larger lake provides great opportunities for water based activities. This option also provides the lowest impact on the amenity of properties through Hornsby, as no external fill is required to be brought into the site.

## 9. CONCLUSIONS AND RECOMMENDATIONS

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### 9.2 NEXT STEPS

#### Communications strategy

- Develop communications strategy for communicating vision and site potential for Councillors and community

#### Further site analysis and earthworks investigations

- Ensure and confirm landform(s) that provides for a flexible future use of the site that includes a range of adventure sport tourism & recreation pursuits. This includes cavernous nature of quarry, over water options, exposed rock face and natural landscape setting.
- Investigate and protect the landscape setting of the Quarry and OMV.

#### Vision and Masterplan

- Confirm site vision, Council objectives and parameters for the site's development.
- Develop concept masterplan for landform options indicating location of assets/ components/infrastructure
- Focus on three main thematic masterplans:
  - Adventure recreation
  - Culture and events
  - Bushland experience

#### Business model/plan

- Undertake feasibility study to identify:
  - Most feasible site stabilisation and fill scenarios,
  - Identify a range of priority development components/options that are responsive to the sites stabilisation and fill scenarios, vision and objectives.
  - The financial business case for priority development options, under each stabilisation and fill scenario, identifying operational and capex costs, governance and management model, funding and financing, project delivery strategy,
  - Community benefits and implications across the whole of life development.
- Prepare an Expression of Interest package that seeks submissions for the commercial use of the quarry for a range of adventure recreation pursuits (following confirmation of the landform of the site)

## 10. REFERENCES



*Inside the Crusher Plant*

## 10. REFERENCES

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APPENDICES



*Abandoned Quarry crusher plant*

## APPENDIX A: OPEN SPACE HIERARCHY

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Hierarchy and Objectives	Preferred Uses/Functions/Facilities	Accessibility	Preferred Size (Ha)
<b>Level 4: Local</b>			
<p>Local open spaces cater for passive recreation for residents within walking distance.</p> <p>These spaces also contribute to the character and identity of the local area.</p>	<ul style="list-style-type: none"> <li>• accessible to all residents within their immediate locality</li> <li>• passive un-irrigated area</li> <li>• low key planting</li> <li>• shade (trees, not shelters)</li> <li>• seating (natural or bench)</li> <li>• play equipment catering primarily for junior play opportunities (0-6yrs) and not all parks</li> <li>• paths only as required to access park and seats/play</li> <li>• no organised sport</li> </ul>	<p>Within a maximum of 400 metres actual walking distance or 10 minutes walking time.</p> <p>No on site parking</p>	<p>Min 0.2 Ha and usually up to 0.5Ha</p>
<b>Level 3: Neighbourhood</b>			
<p>Level 3 open space caters for broader population catchments and provides convenient access to passive and active recreation opportunities for local residents of all age groups.</p> <p>These open spaces attract a greater levels of use, encourage longer stays and contribute to the identity and character of the local area.</p>	<ul style="list-style-type: none"> <li>• play spaces</li> <li>• sports facilities that accommodate informal and or junior sport training with no permanent sports infrastructure nor floodlighting</li> <li>• picnic / low key BBQ facilities and shade/tables</li> <li>• informal active areas with passive elements for family recreation including kickabout</li> <li>• potentially toilets, but preferably these would be in adjoining building in street</li> <li>• other possible uses may include: <ul style="list-style-type: none"> <li>- community gardens</li> <li>- community / public art</li> <li>- dog off leash exercise areas</li> </ul> </li> </ul>	<p>1 km actual walk or 15-20 inutes walking time.</p> <p>No on site car parking but preferably close to public transport eg nearby bus stop</p>	<p>Min 0.5 Ha and preferably up to 1 Ha</p>
<b>Level 2: District</b>			
<p>Level 2 open spaces are larger and provide for a variety of active and passive recreation needs of the Hornsby Shire residents.</p> <p>These open spaces can accommodate large group activities, organized sports and offer opportunities for cultural expression and environmental education.</p>	<ul style="list-style-type: none"> <li>• play spaces for all ages</li> <li>• sports facilities that accommodate multiple sports and hard courts with supporting infrastructure such as floodlighting, seating, change rooms and canteens</li> <li>• cultural and civic spaces for events and or ceremonies</li> <li>• specific areas of interest including natural areas, bushland and beaches and riverside settings.</li> <li>• single and group picnic areas</li> <li>• park amenity buildings</li> <li>• other possible uses may include: <ul style="list-style-type: none"> <li>▪ community gardens and nursery</li> <li>▪ community / public art and other interpretative items</li> <li>▪ youth spaces including multi use areas and skate facilities</li> </ul> </li> </ul>	<p>Within 5kms or 10-15 min drive from all residents. Readily accessed by public transport and with some limited on site parking to reduce day-to-day impact on adjoining streets</p>	<p>Min 1.0 Ha and usually up to 2-5 Ha</p>

	<ul style="list-style-type: none"> <li>▪ dog off leash exercise areas</li> <li>▪ on and off street car parking areas</li> <li>▪ boat ramps, river jetties and access to river(s) for water sports</li> </ul>		
<b>Level 1: Regional</b>			
<p>Level 1 open space provides a variety of active and passive recreation opportunities for the residents of the Hornsby Shire and visitors to the Shire.</p> <p>These open spaces are commonly large in size and can accommodate large community activities, organized sports and offer opportunities for cultural expression and environmental education.</p> <p>These spaces may provide unique recreation opportunities or landscape settings that are considered a regional attraction. In some cases, especially where environmental or cultural heritage values are high, these spaces may not be large but may still be a regional drawcard.</p>	<ul style="list-style-type: none"> <li>• large children's play areas that may include adventure play and inclusive play</li> <li>• regional sports facilities that accommodate multiple sports and hard courts with supporting infrastructure such as floodlighting,</li> <li>• grandstands, change rooms and canteens.</li> <li>• cultural and civic spaces for large community events and or ceremonies</li> <li>• areas of natural significance</li> <li>• areas of open space for specific events that attract local and regional tourism.</li> <li>• single and group picnic areas</li> <li>• other possible uses may include: <ul style="list-style-type: none"> <li>▪ community and sports centres</li> <li>▪ food and beverage opportunities that may include kiosks, cafes and or restaurants</li> <li>▪ community / public art and other interpretative items</li> <li>▪ youth spaces including multi use areas and skate facilities</li> <li>▪ dog off leash exercise areas</li> <li>▪ on and off street car parking areas</li> <li>▪ boat ramps, river jetties and access to the River for water sports</li> </ul> </li> </ul>	Between 30 and 90 minutes travel by car or public transport. Access by public transport should be practical and site will contain significant on-site parking, often in more than one car park	Usually 10 Ha or more, but if a particular feature (eg. Heritage Property) could be much smaller

## APPENDIX B: DEMOGRAPHIC ANALYSIS

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**HORNSBY POPULATION AND DEMOGRAPHICS**

**Hornsby Shire**

The most recent population data provided by the Australian Bureau of Statistics (Census of Population and Housing 2006 and 2011 compiled and presented in profile.id) states the Estimated Resident Population (ERP) of the Hornsby Shire is 165,090 as of the 30th June 2012. This includes growth by 1,307 people since 2011.

**Hornsby, Asquith and Waitara Suburbs**

*Hornsby*

The suburb is bounded by the suburb of Hornsby Heights in the north, the suburb of Asquith and the Sydney-Newcastle Freeway in the east, the suburbs of Waitara, Normanhurst and Thornleigh in the south and Berowra Creek in the west.

*Asquith*

Asquith is bounded generally by Rupert Street, Royston Parade, Lord Street and the locality of Mount Colah in the north, Cockle Creek in the east, the suburb of Hornsby in the south and generally by Citrus Avenue, a line running between Lodge Street and Hyacinth Street, a line running between Orana Avenue and Hyacinth Street and Walls Gully Creek in the west.

*Waitara*

Waitara is bounded generally by Edgeworth David Avenue, Wentworth Avenue and Burdett Street in the north, generally by Palmerston Road and Myra Street in the east, Carden Avenue and the suburb of Wahroonga in the south and the suburb of Hornsby, the Pacific Highway, James Lane and Thomas Street in the west.

Suburb	Population	Suburb size (Ha)	Population Density (persons per Ha)
Hornsby Shire	165,090	46,230	3.57
Hornsby	20,446	840	24.34
Asquith	3,294	347	9.49
Waitara	4,901	77	63.90
TOTAL H,A,W	28,641	1,264	22.65

Table 01 Population summary

**Population**

The combined population for three suburbs is 28,641 people, as recorded in the 2011 census. There are slightly more females (51.2%) than males (48.2%) with an even percentage across all three suburbs.

*Hornsby*

From 2006 to 2011, Hornsby's population increased by 1,368 people (7.2%). This represents an average annual population change of 1.39% per year over the period.

*Asquith*

From 2006 to 2011, Asquith's population increased by 423 people (14.7%). This represents an average annual population change of 2.79% per year over the period.

*Waitara*

From 2006 to 2011, Waitara's population increased by 617 people (14.4%). This represents an average annual population change of 2.73% per year over the period.

	2011							
	Hornsby		Asquith		Waitara		Hornsby Shire (%)	Greater Sydney (%)
	Number	%	Number	%	Number	%		
Population	20,446	100.0	3,293	100.0	4,901	100.0	100.0	100.0
Males	9,986	48.8	1,630	49.5	2,361	48.2	48.7	49.2
Females	10,460	51.2	1,663	50.5	2,539	51.8	51.3	50.8
Australian citizens	15,388	75.3	2,872	87.2	3,248	66.3	85.8	82.5
Eligible Voters (citizens aged 18+)	11,889	58.1	2,154	65.4	2,590	52.8	64.5	62.4

	2006								Change 2006 to 2011		
	Hornsby		Asquith		Waitara		Hornsby Shire (%)	Greater Sydney (%)	Hornsby	Asquith	Waitara
	Number	%	Number	%	Number	%					
Population	19,087	100.0	2,870	100.0	4,293	100.0	100.0	100.0	+1,359	+423	+607
Males	9,355	49.0	1,399	48.8	2,043	47.6	48.5	49.3	+630	+231	+318
Females	9,731	51.0	1,470	51.2	2,250	52.4	51.5	50.7	+728	+192	+289
Australian citizens	14,978	78.5	2,545	88.7	3,037	70.7	86.4	82.7	+409	+327	+211
Eligible Voters (citizens aged 18+)	11,700	61.3	1,919	66.9	2,501	58.3	64.4	62.3	+188	+235	+88

Table 02 Population statistics for 2011, 2006 compared to Hornsby Shire and Greater Sydney

### Age Groups

The Age Structure of a suburb provides key insights into the level of demand for age based services and facilities such as child care. It is an indicator of Hornsby, Asquith and Waitara's residential role and function and how it is likely to change in the future.

Service age groups divide the population into age categories that reflect typical life-stages. They indicate the level of demand for services that target people at different stages in life and how that demand is changing.

#### Hornsby

Hornsby has a higher proportion of pre-schoolers and a lower proportion of people at post retirement age than Hornsby Shire. The largest changes in age structure in Hornsby between 2006 and 2011 were in the age groups:

- Parents and homebuilders (35 to 49) (+371 persons)
- Young workforce (25 to 34) (+337 persons)
- Older workers & pre-retirees (50 to 59) (+206 persons)

- Primary schoolers (5 to 11) (+201 persons)

Service age group (years)	2011								Change 2006 to 2011		
	Hornsby		Asquith		Waitara		Hornsby Shire %	Greater Sydney %	Hornsby	Asquith	Waitara
Babies and pre-schoolers (0 to 4)	1,478	7.2	217	6.6	383	7.8	6.1	6.8	+138	+52	+150
Primary schoolers (5 to 11)	1,622	7.9	301	9.1	398	8.1	9.1	8.7	+201	+50	+137
Secondary schoolers (12 to 17)	1,200	5.9	251	7.6	223	4.5	8.6	7.4	-59	+4	-17
Tertiary education (18 to 24)	1,707	8.4	296	9.0	303	6.2	9.2	9.5	-136	+38	-198
Young workforce (25 to 34)	3,783	18.5	342	10.4	1,205	24.6	10.7	15.4	+337	+34	+172
Parents and homebuilders (35 to 49)	4,996	24.4	738	22.4	1,141	23.3	22.5	21.9	+371	+78	+314
Older workers & pre-retirees (50 to 59)	2,387	11.7	477	14.5	394	8.0	13.8	12.2	+206	+43	+15
Empty nesters and retirees (60 to 69)	1,540	7.5	307	9.3	280	5.7	9.6	9	+150	+63	+51
Seniors (70 to 84)	1,319	6.5	281	8.5	410	8.4	7.9	7.2	+62	+23	+16
Elderly aged (85 and over)	409	2.0	85	2.6	164	3.3	2.4	1.8	+99	+39	-23
<b>Total population</b>	<b>20,446</b>	<b>100</b>	<b>3,293</b>	<b>100.0</b>	<b>4,901</b>	<b>100.0</b>	<b>100</b>	<b>100</b>	<b>+1,368</b>	<b>+423</b>	<b>+617</b>

Table 03 Hornsby age groups

**Asquith**

Asquith has the same proportion of pre-schoolers and a higher proportion of people at post retirement age than Greater Sydney. Analysis of the service age groups of Asquith in 2011 compared to Greater Sydney shows that there was a similar proportion of people in the younger age

groups (0 to 17 years) and a higher proportion of people in the older age groups (60+ years).

The largest changes in age structure in this area between 2006 and 2011 were in the age groups:

- Parents and homebuilders (35 to 49) (+78 persons)
- Empty nesters and retirees (60 to 69) (+63 persons)
- Babies and pre-schoolers (0 to 4) (+52 persons)
- Primary schoolers (5 to 11) (+50 persons)

#### *Waitara*

Waitara has a higher proportion of pre-schoolers and a lower proportion of people at post retirement age than Hornsby Shire. Analysis of the service age groups of Waitara in 2011 compared to Hornsby Shire shows that there was a lower proportion of people in the younger age groups (0 to 17 years) as well as a lower proportion of people in the older age groups (60+ years).

The largest changes in age structure in this area between 2006 and 2011 were in the age groups:

- Parents and homebuilders (35 to 49) (+314 persons)
- Tertiary education & independence (18 to 24) (-198 persons)
- Young workforce (25 to 34) (+172 persons)
- Babies and pre-schoolers (0 to 4) (+150 persons)

#### *Overall implications for the Recreation Potential Study*

- The Young workforce and Parents and homebuilders are the highest growing groups across all three suburbs.
- This age span is over 25 years and represents a variety of potential recreation needs.
- The types of dwellings that the Young workforce group are likely to live in will also dictate the types of open spaces that are in demand.
- Parents and homebuilders will generally have access to some private open space. Proximity to local parks for children's recreation could be an open space demand for this group.
- The decrease of Tertiary education residents in Hornsby and Waitara may change over time as more high density/affordable living options are provided in the three suburbs.
- The top three growth categories (highlighted as grey rows in Table 03) were consistent in each suburb.

#### **Households**

Hornsby's household and family structure is one of the most important demographic indicators. It reveals the area's residential role and function, era of settlement and provides key insights into the level of demand for services and facilities as most are related to age and household types.

#### *Hornsby*

In Hornsby, 32% of households are made up of couples with children compared with 44% in Hornsby Shire. The largest changes in family/household types in Hornsby between 2006 and 2011 were:

- Couples with children (+307 households)
- Couples without children (+104 households)

Households by type	2011								Change 2006 to 2011		
	Hornsby		Asquith		Waitara		Hornsby Shire %	Greater Sydney %	Hornsby	Asquith	Waitara
	Number	%	Number	%	Number	%					
Couples with children	2,651	32.4	492	42.6	620	29.3	44.4	34.8	+307	+61	+232
Couples without children	1,883	23.0	267	23.1	517	24.4	23.6	22.6	+104	+33	+24
One parent families	863	10.6	126	10.9	166	7.8	9.2	10.8	+17	+26	-3
Other families	121	1.5	20	1.7	21	1.0	1.0	1.4	-7	+3	-9
Group household	281	3.4	22	1.9	66	3.1	2.1	4.1	-48	+0	-29
Lone person	2,057	25.2	211	18.3	657	31.1	17.3	21.5	-15	+0	+18
Other not classifiable household	262	3.2	12	1.0	48	2.3	1.7	4.1	+5	+6	-66
Visitor only households	55	0.7	5	0.4	18	0.9	0.6	0.9	+1	-5	-11
<b>Total households</b>	<b>8,176</b>	<b>100.0</b>	<b>1,153</b>	<b>100.0</b>	<b>2,113</b>	<b>100.0</b>	<b>100.0</b>	<b>100</b>	<b>+364</b>	<b>+125</b>	<b>+155</b>

Table 04 Household and family characteristics

#### Asquith

In Asquith, 43% of households are made up of couples with children compared with 44% in Hornsby Shire. Analysis of the household/family types in Asquith in 2011 compared to Hornsby Shire shows that there was a lower proportion of couple families with child(ren) as well as a higher proportion of one-parent families. Overall, 42.6% of total families were couple families with child(ren), and 10.9% were one-parent families, compared with 44.4% and 9.2% respectively for Hornsby Shire.

There were a higher proportion of lone person households and a similar proportion of couples without children. Overall, the proportion of lone person households was 18.3% compared to 17.3% in Hornsby Shire while the proportion of couples without children was 23.1% compared to 23.6% in Hornsby Shire.

The number of households in Asquith increased by 125 between 2006 and 2011. The largest change in family/household types in Asquith between 2006 and 2011 was Couples with children (+61 households).

#### Waitara

In Waitara, 29% of households are made up of couples with children compared with 44% in Hornsby Shire. Analysis of the household/family types in Waitara in 2011 compared to Hornsby Shire shows that there was a lower proportion of couple families with child(ren) as well as a lower proportion of one-parent families.

Overall, 29.3% of total families were couple families with child(ren), and 7.8% were one-parent families, compared with 44.4% and 9.2% respectively for Hornsby Shire.

There were a higher proportion of lone person households and a higher proportion of couples without children. Overall, the proportion of lone person households was 31.1% compared to 17.3% in Hornsby Shire while the proportion of couples without children was 24.4% compared to 23.6% in Hornsby Shire.

The number of households in Waitara increased by 156 between 2006 and 2011. The largest change in family/household types in Waitara between 2006 and 2011 was Couples with children (+232 households).

*Overall implications for the Recreation Potential Study*

- Couples with children are the largest household group in the Shire, Greater Sydney and all three suburbs.
- The top three growth categories (highlighted as grey rows in Table 04) were consistent in each suburb.
- Play facilities, passive open space and also active open space for organised sports are generally thought to be in demand of Couples with children.
- Lone person households, typically high density smaller apartment style living and/or older persons living on their own in the original family home may rely on open space to meet a variety of exercise and social needs.

**Households with Children**

For Households with Children in Hornsby, life stage is based on the age of children in the household. The age of the parent(s) is not taken into account.

- Young children: Children aged under 15 only
- Mixed age children: One or more children under 15 and one or more children over 15 (must have 2 or more children)
- Older children: Children aged 15 and over only

*Hornsby*

Analysis of the families with children in Hornsby in 2011 compared to Hornsby Shire shows that there was a smaller proportion of couples with young children, as well as a smaller proportion of couples with older children. Overall, 20.4% of total households with children were couples with young children, and 8.6% were couples with older children, compared with 21.8% and 16.4% respectively for Hornsby Shire.

There were a larger proportion of single parent households with young children and a larger proportion of single parent households with older children. Overall, the proportion of single parent households with young children was 3.0% compared to 2.4% in Hornsby Shire while the proportion of single parent households with older children was 6.8% compared to 5.8% in Hornsby Shire.

Households with children	2011								Change 2006 to 2011		
	Hornsby		Asquith		Waitara		Hornsby Shire %	Greater Sydney %	Hornsby	Asquith	Waitara
	Number	%	Number	%	Number	%					
Couples with children	2,652	32.4	492	42.6	620	29.3	44.4	34.8	+307	+61	+232
Couples with young children	1,671	20.4	246	21.3	451	21.3	21.8	18.3	+253	+53	+179
Couples with mixed-age children	281	3.4	60	5.2	56	2.6	6.2	4.9	+23	-10	+18
Couples with older children	700	8.6	186	16.1	114	5.4	16.4	11.6	+31	+18	+35
Single parents with children	863	10.6	126	10.9	166	7.8	9.2	10.8	+17	+26	-3
Single parents with young children	247	3.0	34	2.9	68	3.2	2.4	3.7	+3	+6	+13
Single parents with mixed-age children	63	0.8	10	0.9	12	0.5	1.0	1.3	-16	-2	-0
Single parents with older children	553	6.8	82	7.1	86	4.1	5.8	5.8	+30	+22	-15
Total households with children	3,515	43.0	617	53.5	786	37.2	53.6	45.6	+324	+88	+229
Total households	8,176	100.0	1,153	100.0	2,113	100.0	100.0	100.0	+364	+125	+155

Table 05 Households with children

**Asquith**

There are 246 couples with young children in Asquith in 2011, comprising 21% of households. Analysis of the families with children in Asquith in 2011 compared to Hornsby Shire shows that there was a smaller proportion of couples with young children, and a similar proportion of couples with older children.

Overall, 21.3% of total households with children were couples with young children, and 16.1% were couples with older children, compared with 21.8% and 16.4% respectively for Hornsby Shire.

There were a larger proportion of single parent households with young children and a larger proportion of single parent households with older children. Overall, the proportion of single parent households with young children was 2.9% compared to 2.4% in Hornsby Shire while the proportion of single parent households with older children was 7.1% compared to 5.8% in Hornsby Shire.

Between 2006 and 2011, the number of households with children increased by 88 households or 16.6%. The largest change in households with children in this area between 2006 and 2011 was couples with young children (+53 households).

*Waitara*

There are 451 couples with young children in Waitara in 2011, comprising 21% of households. Analysis of the families with children in Waitara in 2011 compared to Hornsby Shire shows that there was a smaller proportion of couples with young children, as well as a smaller proportion of couples with older children.

Overall, 21.3% of total households with children were couples with young children, and 5.4% were couples with older children. There were a larger proportion of single parent households with young children and a smaller proportion of single parent households with older children. Overall, the proportion of single parent households with young children was 3.2% compared to 2.4% in Hornsby Shire while the proportion of single parent households with older children was 4.1% compared to 5.8% in Hornsby Shire.

Between 2006 and 2011, the number of households with children increased by 229 households or 41.1%. The largest change in households with children in this area between 2006 and 2011 was couples with young children (+179 households).

*Overall implications for the Recreation Potential Study*

- Couples with young children was the largest household group in the Shire, Greater Sydney and all three suburbs. The demands on open space for this group would range from younger children’s play areas through to organised sports fields, youth spaces, skateboard facilities etc.
- The top three growth categories (highlighted as grey rows in Table 04) were consistent in each suburb.

**Cultural Diversity**

Country of Birth data identifies where people were born and is indicative of the level of cultural diversity in Hornsby. The mix of Country of Birth groups is also indicative of historical settlement patterns, as source countries for Australia’s immigration program have varied significantly over time.

*Hornsby*

38% of people in Hornsby come from countries where English is not the first language. Between 2006 and 2011, the number of people born overseas increased by 1,536 or 19.3%, and the number of people from a non-English speaking background increased by 1,652 or 26.6%. The largest changes in birthplace countries of the population in this area between 2006 and 2011 were for those born in:

- China (+570 persons)
- India (+312 persons)
- Nepal (+218 persons)
- South Korea (+159 persons)

See table 06 overleaf for the largest changes in birthplace countries of the population in Hornsby, Asquith and Waitara between 2006 and 2011.

*Asquith*

21% of people in Asquith come from countries where English is not the first language. Between 2006 and 2011, the number of people born overseas increased by 241 or 32.0%, and the number of people from a non-English speaking background increased by 204 or 41.3%. The largest change in birthplace countries of the population in this area between 2006 and 2011 was for those born in India (+53 persons).

Birthplace	2011								Change 2006 to 2011		
	Hornsby		Asquith		Waitara		Hornsby Shire %	Greater Sydney %	Hornsby	Asquith	Waitara
	Number	%	Number	%	Number	%					
Total Overseas born	9,489	46.4	995	30.2	2,853	58.2	35.3	34.2	+1,535	+241	+963
Non-English speaking backgrounds	7,860	38.4	698	21.2	2,478	50.5	26.1	26.3	+1,652	+204	+1,005
Main English speaking countries	1,628	8.0	297	9.0	374	7.6	9.2	7.9	-117	+37	-42
Australia	9,923	48.5	2,208	67.0	1,859	37.9	61.5	59.9	-91	+195	-195
Not Stated	1,049	5.1	91	2.8	192	3.9	3.2	5.9	-72	-12	-157
Total Population	20,462	100.0	3,295	100.0	4,905	100.0	100.0	100.0	+1,372	+425	+610

Table 06 Origin of birth

**Waitara**

51% of people in Waitara come from countries where English is not the first language. The largest non-English speaking country of birth in Waitara was China, where 9.1% of the population, or 444 people, were born. Between 2006 and 2011, the number of people born overseas increased by 963 or 51.0%, and the number of people from a non-English speaking background increased by 1,004 or 68.1%.

The largest changes in birthplace countries of the population in this area between 2006 and 2011 were for those born in:

- India (+196 persons)
- China (+177 persons)
- South Korea (+157 persons)
- Iran (+141 persons)

**Overall implications for the Recreation Potential Study**

- The largest growing group born overseas in the three suburbs is from India.
- People born overseas born and from a Non-English speaking background are much higher contribute a large proportion of the total population.
- Overall, more research is required to determine if particular groups have particular open space needs that vary from the rest of the population.

**Indigenous population**

The Aboriginal and Torres Strait Islander Census population of the Hornsby Shire in 2011 was 565, living in 292 dwellings. Detailed information on Indigenous population is not provided for the individual suburbs.

**Mobility**

The ability of the population to access services and employment is strongly influenced by access to transport.

**Hornsby**

Analysis of the car ownership of the households in Hornsby in 2011 compared to Hornsby Shire shows that 79.1% of the households owned at least one car, while 15.4% did not, compared with 89.3% and 7.1% respectively in Hornsby Shire.

Of those that owned at least one vehicle, there was a larger proportion who owned just one car; a smaller proportion who owned two cars; and a smaller proportion who owned three cars or more.

Overall, 49.4% of the households owned one car; 23.2% owned two cars; and 6.5% owned three cars or more, compared with 35.5%; 37.9% and 15.9% respectively for Hornsby Shire. The largest changes in the household car ownership in Hornsby between 2006 and 2011 were:

- 1 motor vehicle (+310 households)
- 2 motor vehicles (+121 households)
- 3 or more motor vehicles (+65 households)

***Asquith***

46% of households in Asquith had access to two or more motor vehicles, compared to 54% in Hornsby Shire. Analysis of the car ownership of the households in Asquith in 2011 compared to Hornsby Shire shows that 88.1% of the households owned at least one car, while 8.8% did not, compared with 89.3% and 7.1% respectively in Hornsby Shire.

Of those that owned at least one vehicle, there was a larger proportion who owned just one car; a smaller proportion who owned two cars; and a smaller proportion who owned three cars or more.

Overall, 41.7% of the households owned one car; 33.7% owned two cars; and 12.7% owned three cars or more, compared with 35.5%; 37.9% and 15.9% respectively for Hornsby Shire. The largest changes in the household car ownership in Asquith between 2006 and 2011 were:

- 1 motor vehicle (+56 households)
- 2 motor vehicles (+55 households)

***Waitara***

18% of households in Waitara had access to two or more motor vehicles, compared to 54% in Hornsby Shire. Analysis of the car ownership of the households in Waitara in 2011 compared to Hornsby Shire shows that 76.9% of the households owned at least one car, while 18.5% did not, compared with 89.3% and 7.1% respectively in Hornsby Shire.

Of those that owned at least one vehicle, there was a larger proportion who owned just one car; a smaller proportion who owned two cars; and a smaller proportion who owned three cars or more.

Overall, 59.1% of the households owned one car; 14.8% owned two cars; and 3.1% owned three cars or more, compared with 35.5%; 37.9% and 15.9% respectively for Hornsby Shire. The largest change in the household car ownership in Waitara between 2006 and 2011 was 1 motor vehicle (+217 households).

***Overall implications for the Recreation Potential Study***

- Overall car ownership is high in all three suburbs.
- As a potential regional facility car parking will need to be provided on site. Travel by car will inevitably occur.
- For residents living closer to the site the option to live in new high density housing may reduce the number of cars in all three suburbs. Good connections, pedestrian and cycle paths to the study site will need to be developed to enable residents to use active transport links.

## APPENDIX C: LANDSCAPE ANALYSIS PLANS

---

# LOCAL CONTEXT



-  Hornsby Park
  -  Old Man's Valley
  -  Hornsby Quarry
  -  Old Crusher Plant
  -  South Western Fill Area
  -  Natural Bushland
-  1km radius from Hornsby Station

# EXISTING LANDUSE

-  Site Boundary
-  Crown Land
-  Creeklines
-  Community Land - Parks/ Bushland
-  Operational Land
-  1km radius from Hornsby Station
-  EEC Community - Blue Gum Diatreme Forest
-  National Park
-  Civic/ Council
-  Commercial Core
-  Mixed-Use
-  Business Development
-  High Density Residential
-  Medium Density Residential
-  Low Density Residential
-  Activity Generators
-  Active Station/ Mall Precinct
-  Low level of activity along Main Street



Source: Hornsby Local Environmental Plan, 2013  
HSC GIS Mapping

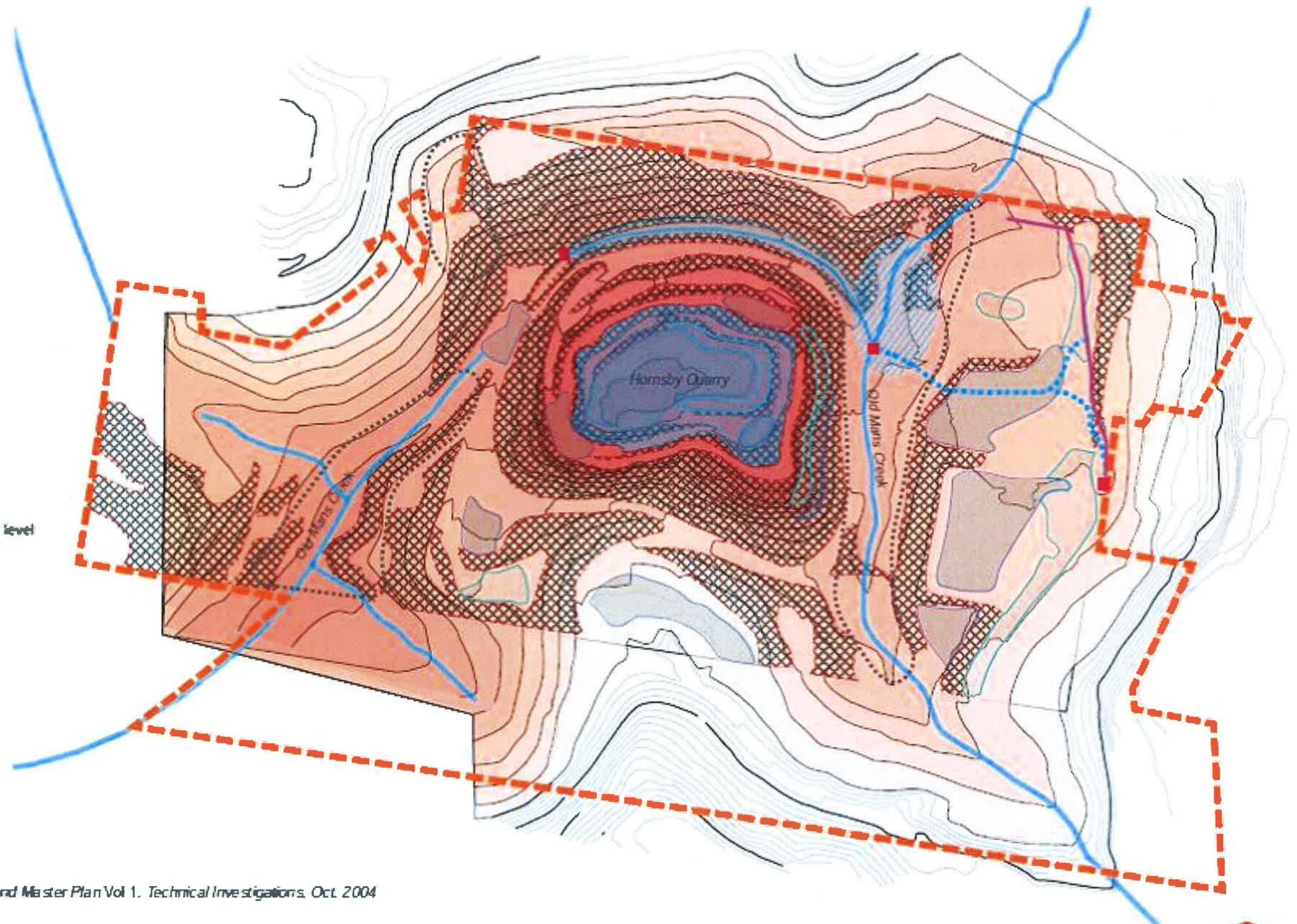
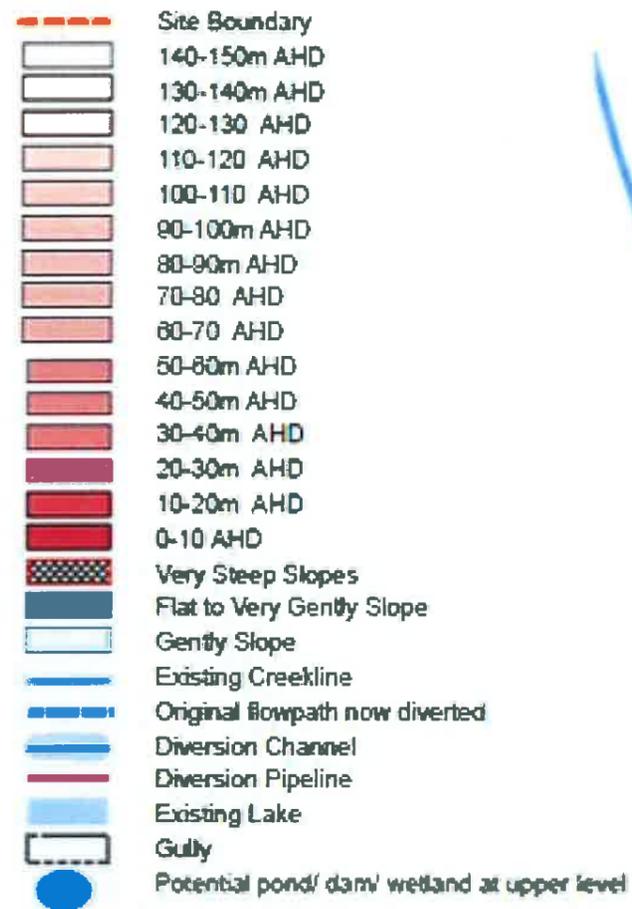
# MOVEMENT ANALYSIS - motorised and non motorised

- - - Site Boundary
- Major Arterial Road
- Creeklines
- Secondary Road
- Access Road into Quarry
- Former Access Road
- Great North Walk and signposted Walking Trails
- Fire Trail
- Informal access road
- Mountain Bike Track
- Proposed Mountain Bike Track (Stage 2)
- Hornsby Heritage Steps
- EEC Community - Blue Gum Diatreme Forest
- National Park
- Civic/ Council
- Commercial Core
- Mixed-Use
- Business Development
- High Density Residential
- Medium Density Residential
- Low Density Residential



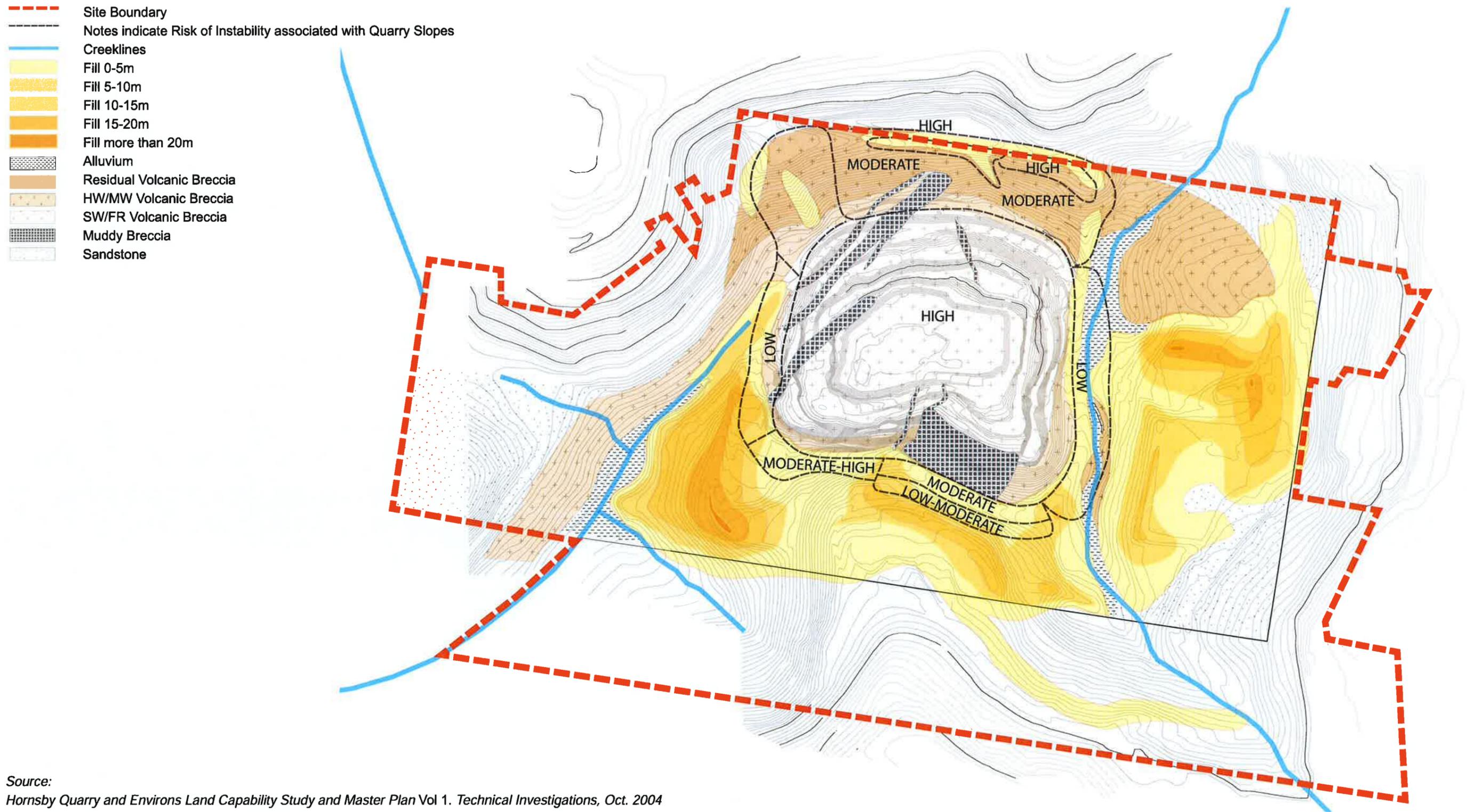
Sources:  
 Hornsby Local Environmental Plan, 2013  
 HSC GIS Mapping  
 Vegetation Assessment for Proposed Hornsby Mountain Bike Track, April 2012  
 REF Proposed Mountain Bike Trail, August 2011

# ENVIRONMENT - topography, drainage



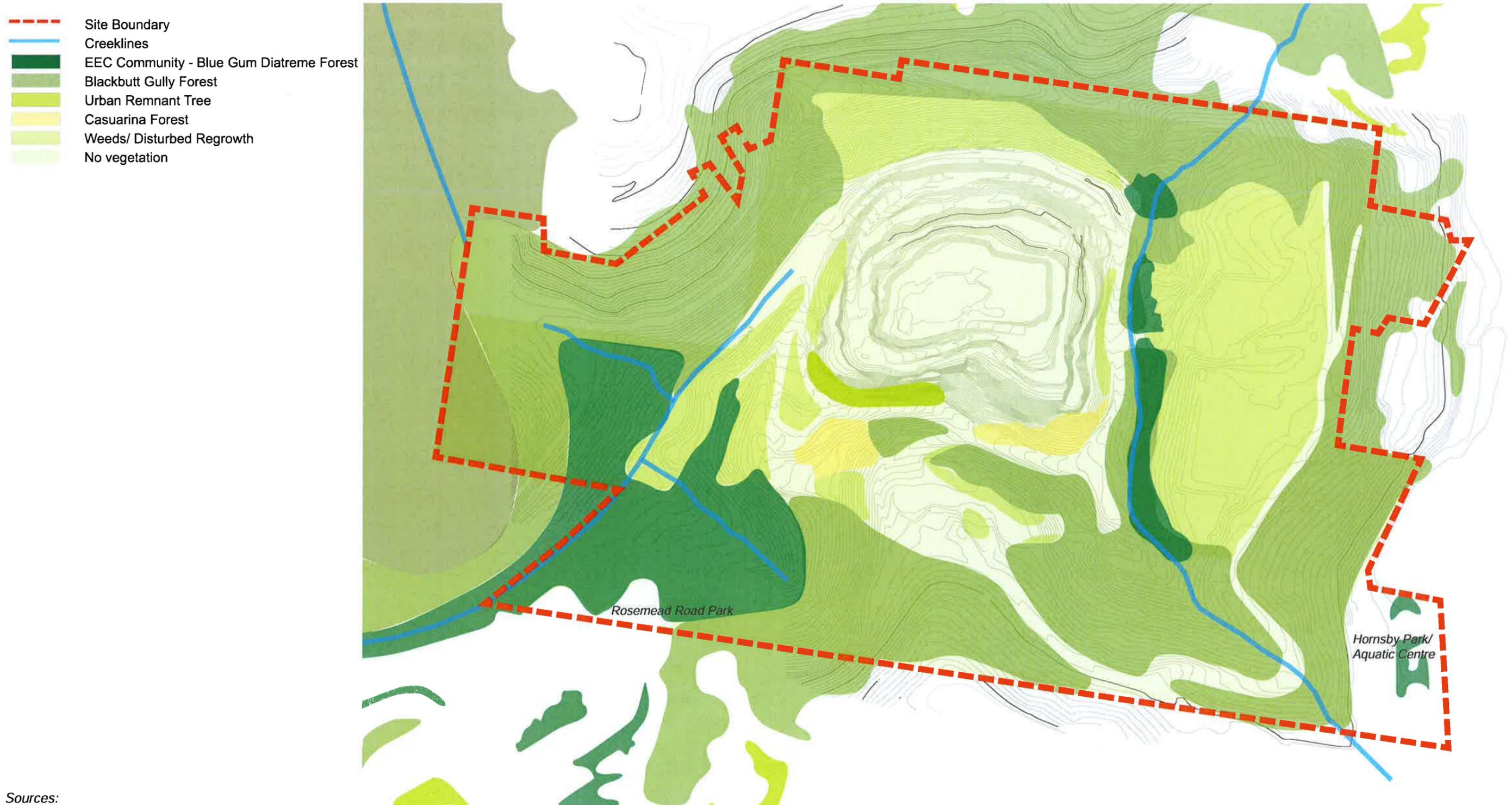
Source:  
Hornsby Quarry and Environs Land Capability Study and Master Plan Vol 1. Technical Investigations, Oct. 2004

# ENVIRONMENT - existing site geology and fill material, slope stability



Source:  
Hornsby Quarry and Environs Land Capability Study and Master Plan Vol 1. Technical Investigations, Oct. 2004

# ENVIRONMENT - soil types, vegetation communities and areas of significant bio-diversity



**Sources:**

HSC GIS Mapping

Vegetation Assessment for Proposed Hornsby Mountain Bike Track, April 2012

REF Proposed Mountain Bike Trail, August 2011

Hornsby Quarry and Environs Land Capability Study and Master Plan Vol 1. Technical Investigations, Oct. 2004

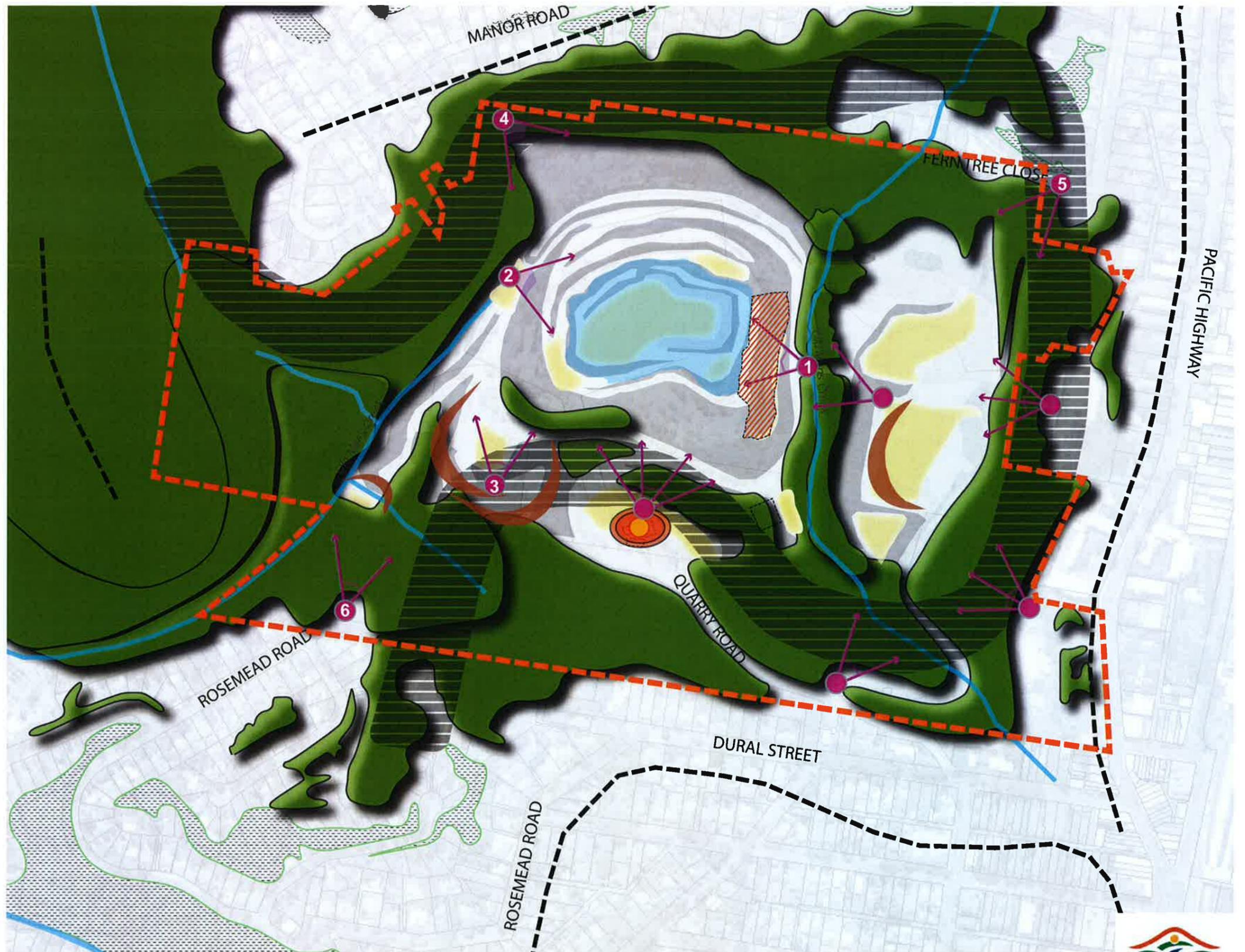
# CULTURAL ENVIRONMENT - local history and heritage, significant buildings, relics

- - - Site Boundary
- EUROPEAN CULTURAL SITES
  - ① Higgins Family Cemetery
  - ② Higgins Family Monument
  - ③ Cool Room
  - ④ Sandstone Receptacle
  - ⑤ Hornsby Heritage Steps
  - ⑥ Former Detonator Magazine
- ① INDUSTRIAL HERITAGE
  - Former Crushing Plant
- ① ENVIRONMENTAL HERITAGE
  - Hornsby Quarry Diatreme

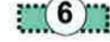


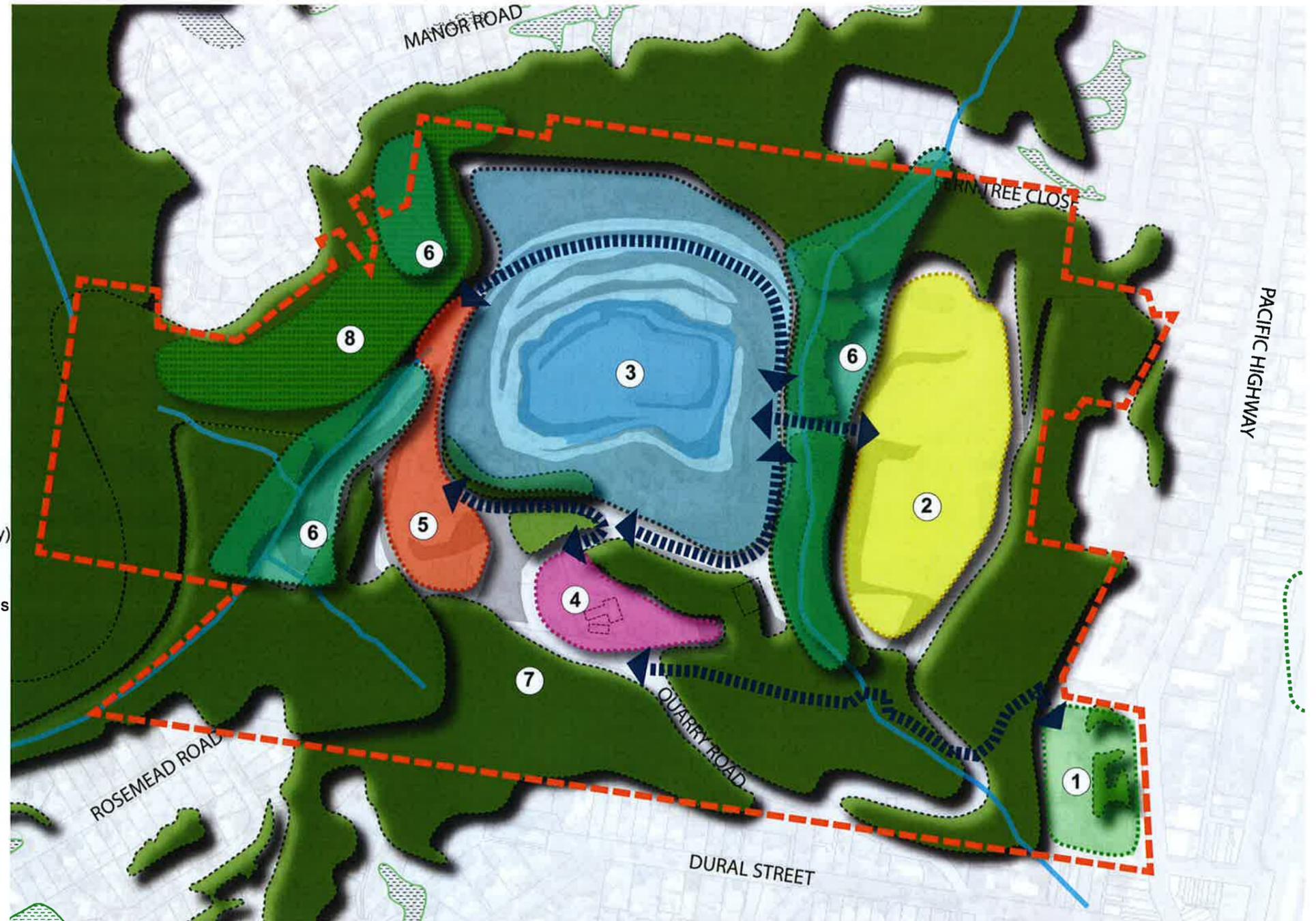
# VISUAL AND SPATIAL ANALYSIS - important views, spatial connections

-  Site Boundary
-  Ridge Line
-  Existing Creekline
-  Existing Lake
-  Significant Built Form (Industrial Heritage)
-  Prominent Landform/ High Point
-  Significant Geological Landform - Diatreme
-  Steep Slopes
-  Visual Boundary/ Valley Edge
-  Enclosing Slope/ Space
-  Significant Contextual Views
-  Flat Land/ Open Area
-  Tall Eucalypt Forest/ Natural Bushland

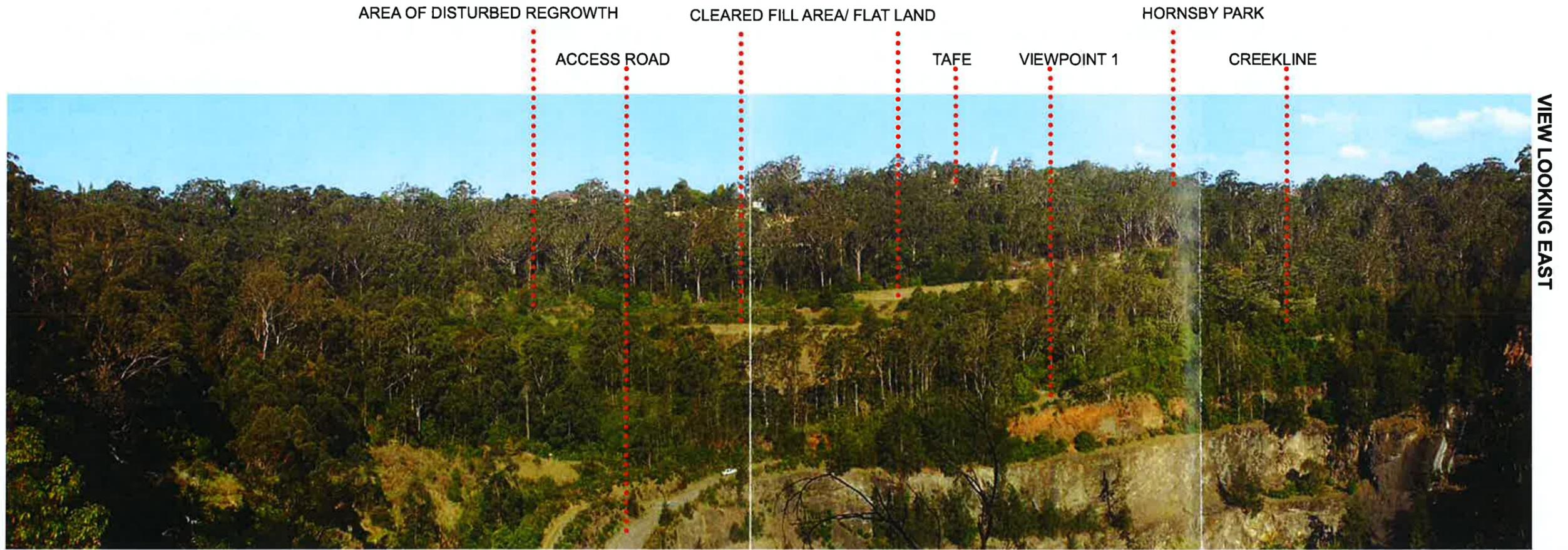


# CHARACTER ZONES

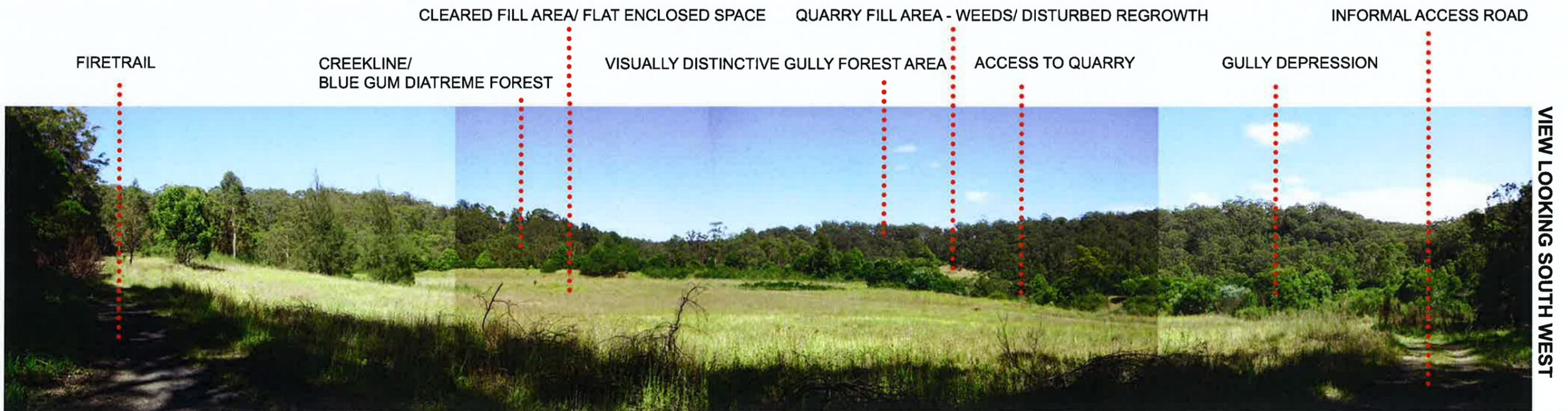
-  Site Boundary
-  Existing Creekline
-  1 Hornsby Park - Heritage Parkland (high visual amenity)
-  2 Old Man's Valley Zone (low visual amenity)  
Cleared fill area including a mix of flat grass areas, mounds of fill and areas of weed and disturbed growth
-  3 Quarry Zone (high visual amenity)  
Dramatic vertical landscape with exposed rockfaces, significant geological formations, disturbed regrowth and a lake
-  4 Cultural Heritage Zone - Old Crusher Plant (high visual amenity)  
Visually Prominent cleared area with Industrial Buildings/ Relics and disturbed regrowth
-  5 South Western Fill Zone (high visual amenity)  
Elevated open areas with significant views
-  6 Gully Depressions/ Steep Vegetated Creeklines (low visual amenity)
-  7 Natural Bushland Zone- Attractive Natural Setting (med visual amenity)
-  8 Visually distinctive Gully Forest area (high visual amenity)
-  Opportunity for new and enhanced connections between activity zones



# VISUAL CHARACTER - SITE IMAGES

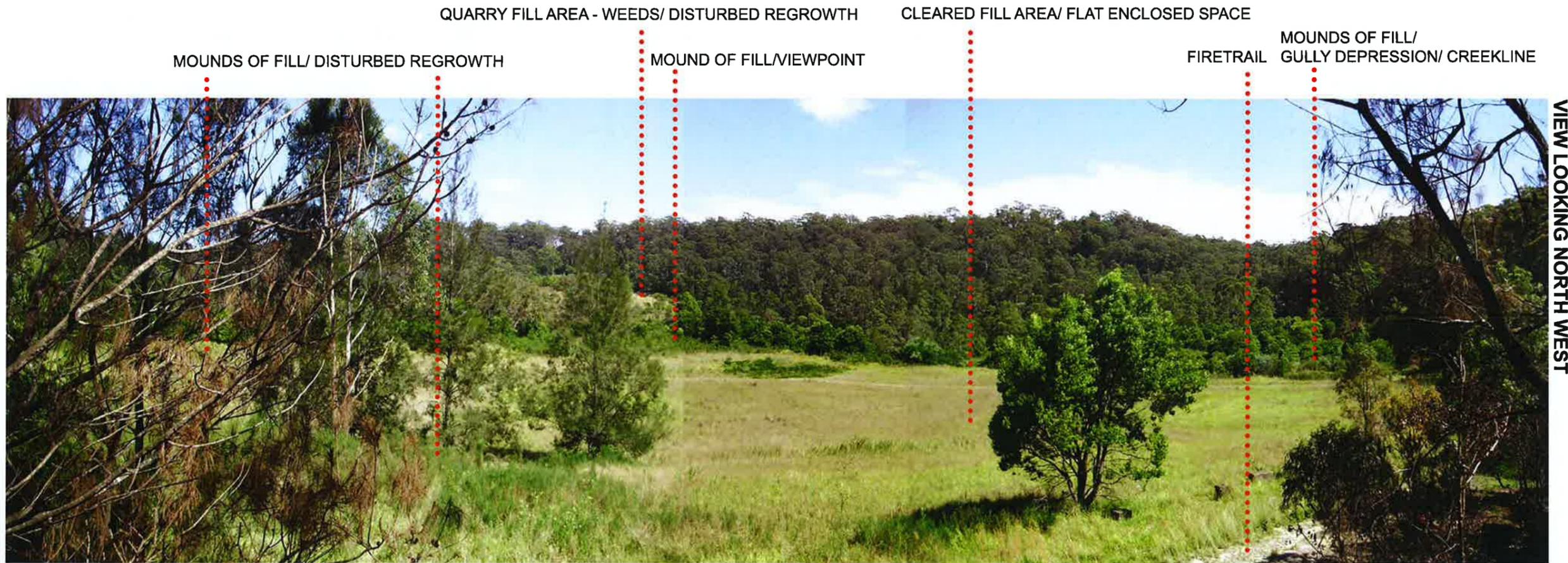


Viewpoint 4 (Refer to Visual and Spatial Analysis)



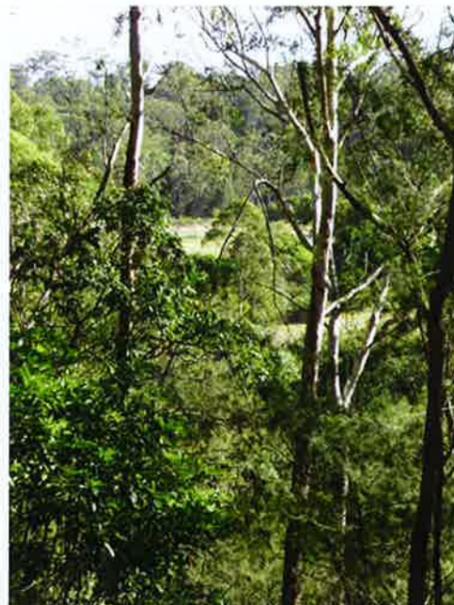
OLD MAN'S VALLEY ZONE - eastern fill area

# VISUAL CHARACTER - SITE IMAGES



MOUND OF FILL/ VIEWPOINT

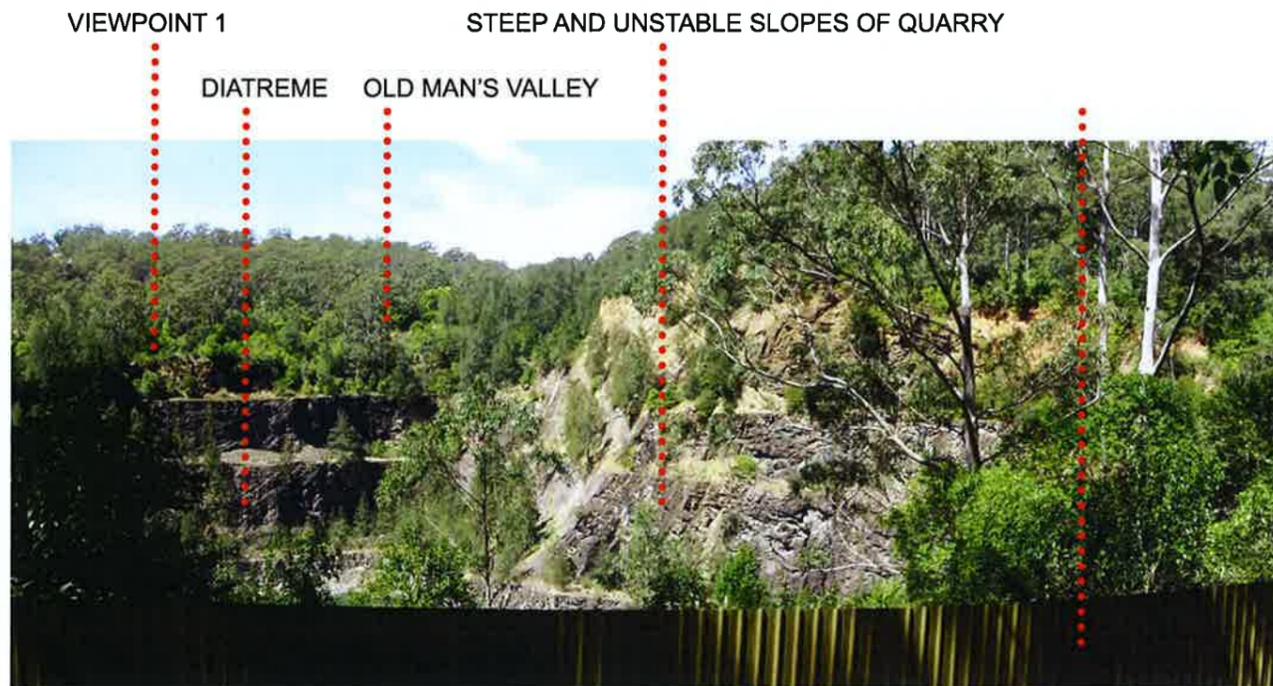
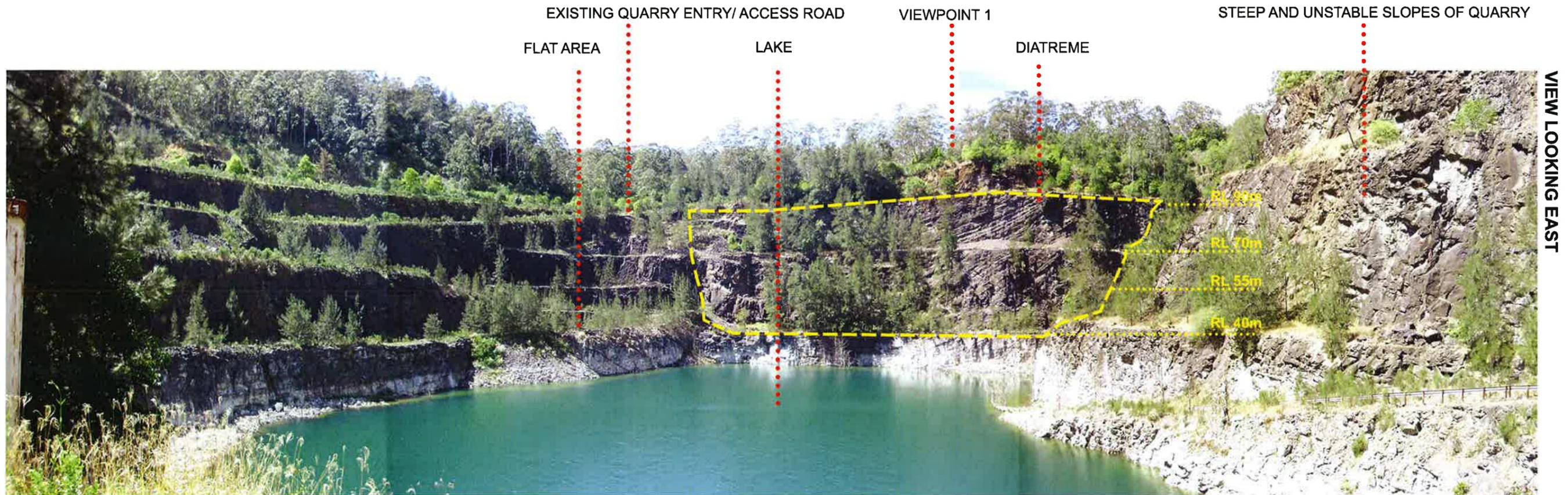
BLACK BUTT GULLY FOREST



OLD MAN'S VALLEY ZONE - eastern fill area

VIEWPOINT5 (Refer to Visual and Spatial Analysis)

# VISUAL CHARACTER - SITE IMAGES



VIEWPOINT 2 (Refer to Visual and Spatial Analysis)



DIVERSION CHANNEL



EXISTING ACCESS ROAD

# VISUAL CHARACTER - SITE IMAGES

OLD MAN'S VALLEY

SIGNIFICANT GEOLOGICAL LANDFORM - DIATREME

STEEP AND UNSTABLE SLOPES OF QUARRY

FLAT AREA

VIEWPOINT 1

HIGGINS FAMILY CEMETERY

OLD CRUSHER PLANT - PROMINENT HIGH POINT



VIEW LOOKING SOUTH



HIGGINS FAMILY CEMETERY

DARAMATIC VERTICAL LANDSCAPE - STEEP AND UNSTABLE SLOPES OF QUARRY BLACKBUTT GULLY FOREST

STEEP SLOPE - FILL AREA - WEEDS/ DISTURBED REGROWTH

DIVERTED DRAINAGE CHANNEL ALONG EDGE OF ROADWAY

FLAT AREA



VIEW LOOKING NORTH



LOCAL FAUNA

# VISUAL CHARACTER - SITE IMAGES

ELEVATED FLAT OPEN AREA - VIEWPOINT 2

STEEP AND UNSTABLE SLOPES OF QUARRY

SOUTHWESTERN FILL ZONE

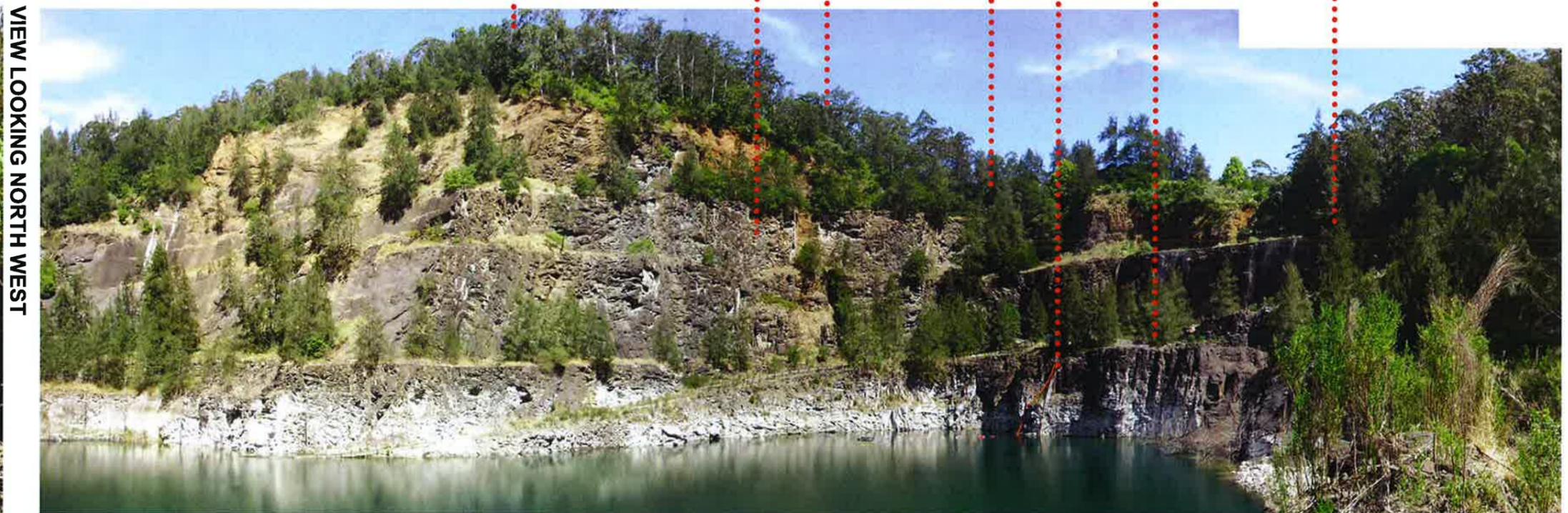
ELEVATED FLAT OPEN AREA - VIEWPOINT 2 WITH INDUSTRIAL HERITAGE ITEMS

VIUSALLY DISTINCTIVE GULLY FOREST AREA

OLD CRUSHER PLANT - PROMINENT HIGH POINT

CASUARINA FOREST

PUMP-OUT PIPE FLAT AREA



VIEW LOOKING NORTH WEST

VIEW LOOKING SOUTH WEST

VIEWPOINT 1 (Refer to Visual and Spatial Analysis)



ELEVATED OPEN AREA W/ REMNANT INDUSTRIAL INFRASTRUCTURE

FORMER DETONATOR MAGAZINE

FUEL TANKS

GREASE TRAP

# VISUAL CHARACTER - SITE IMAGES

VISUALLY DISTINCTIVE GULLY FOREST AREA

STEEP VEGETATED BANK ENCLOSING SPACE

VISUAL BOUNDARY

VIEWPOINT 3

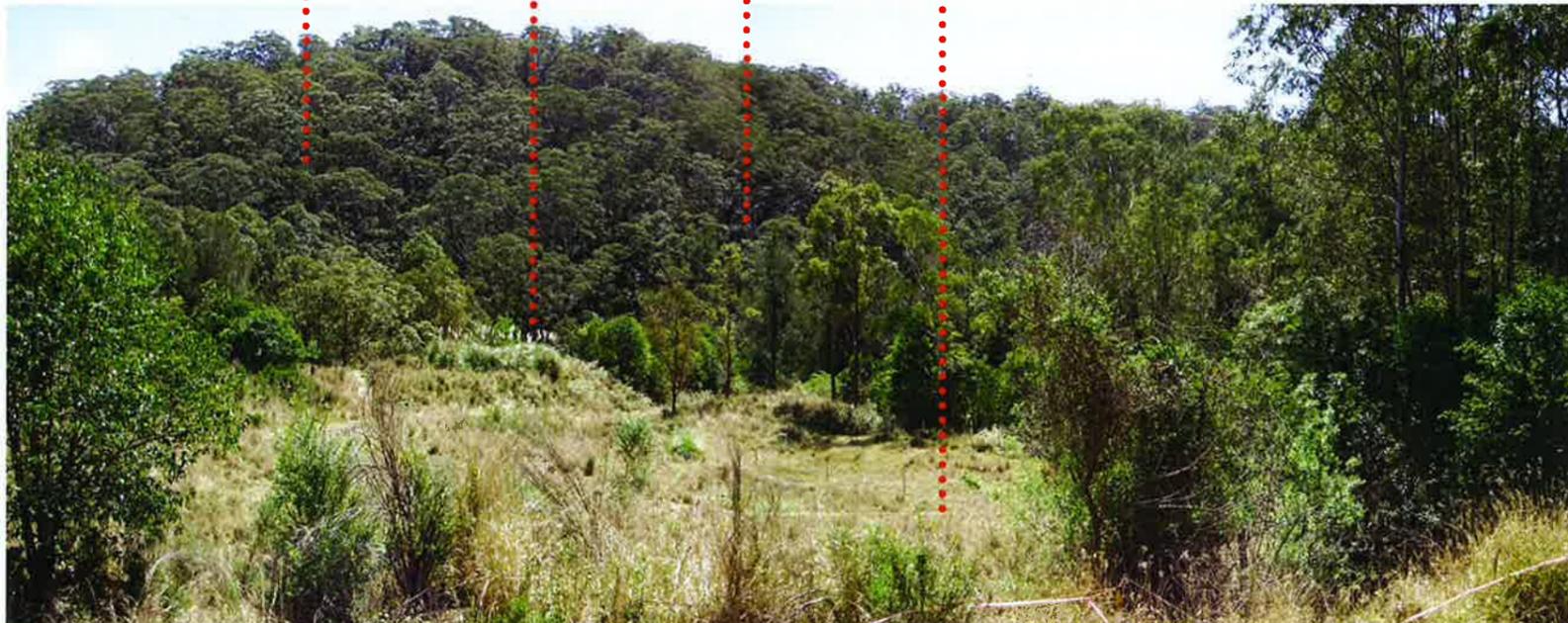
ELEVATED OPEN AREAS WITH SIGNIFICANT VIEWS



VISUALLY DISTINCTIVE GULLY FOREST AREA

ELEVATED OPEN AREAS WITH SIGNIFICANT VIEWS

GULLY DEPRESSIONS/ VEGETATED CREEKLINES



VIEWPOINT 3 (Refer to Visual and Spatial Analysis)

FLOW MEASURING FACILITY FOR QUARRY PUMP

WEED INFESTED CREEKLINES

# VISUAL CHARACTER - SITE IMAGES

ELEVATED CLEARED AREAS

AREAS OF FILL/ WEEDS/ DISTURBED REGROWTH

INDUSTRIAL BUILDING - OLD CRUSHER PLANT  
PROMINENT HIGH POINT

ELEVATED CLEARED AREAS



VIEW LOOKING SOUTH WEST



OLD CRUSHER PLANT



REMNANT INDUSTRIAL INFRASTRUCTURE



# VISUAL CHARACTER - SITE IMAGES

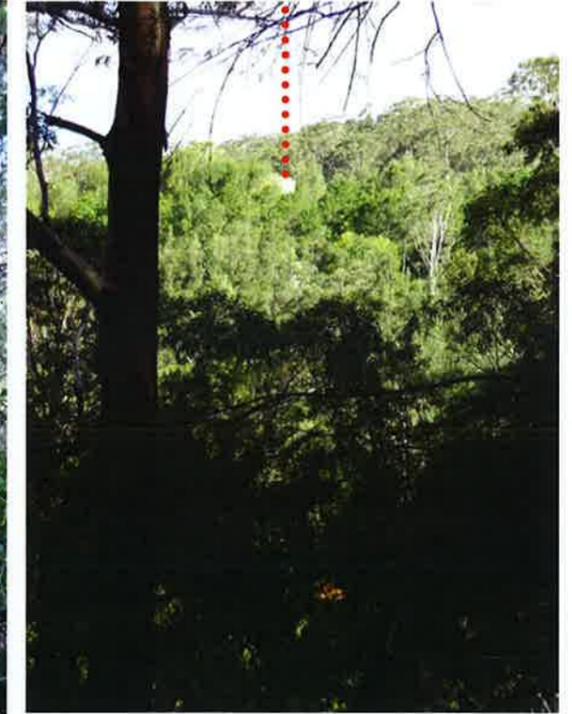
OLD CRUSHER PLANT



NATURAL BUSHLAND ZONE - VIEWPOINT 6 (Refer to Visual and Spatial Analysis)



VISUALLY DISTINCTIVE GULLY FOREST



FOREST CLEARING - ROSEMEAD RD. ENTRY OLD ROADWAY - ROSEMEAD ROAD PARK ENTRY



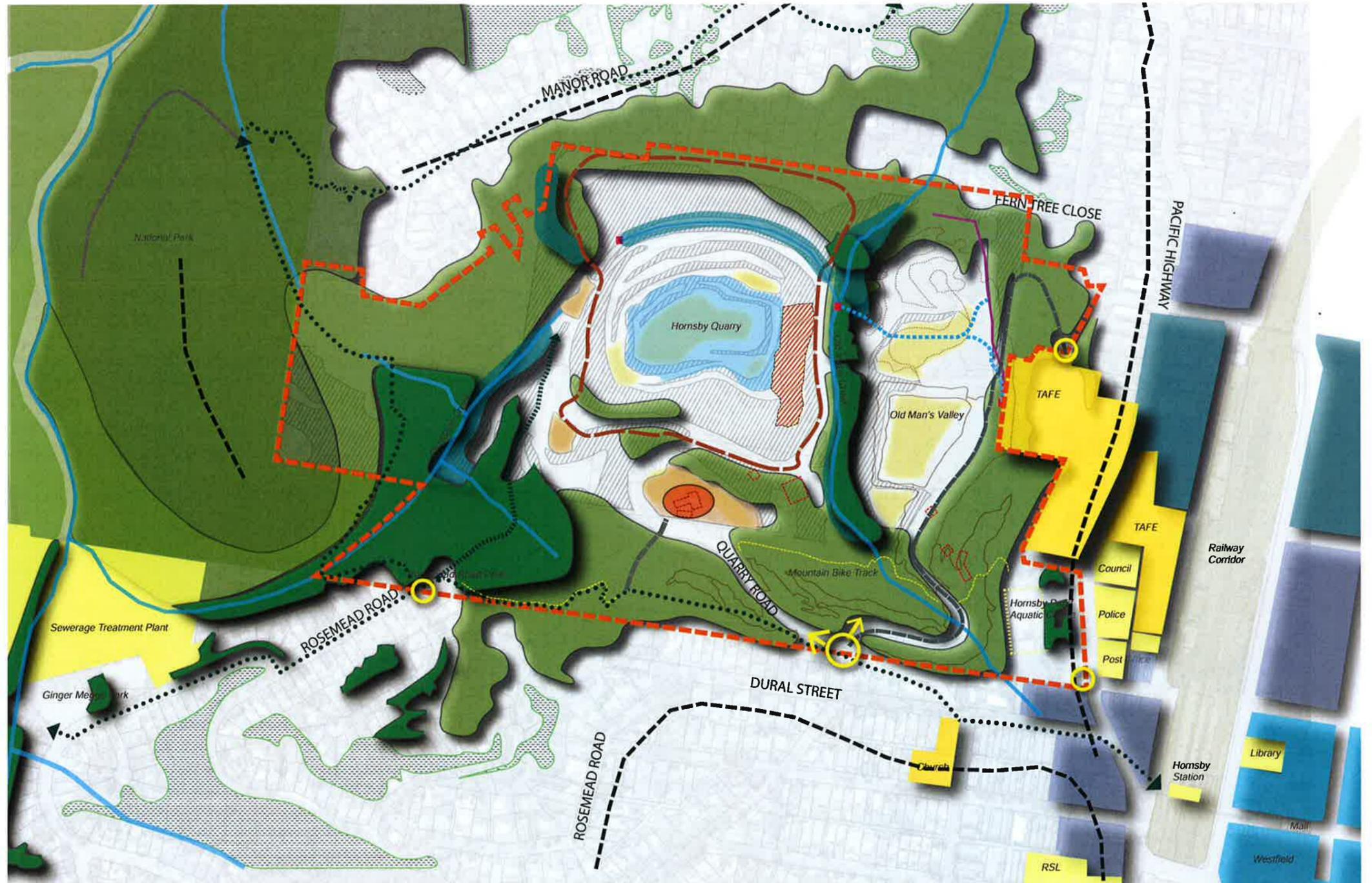
WEED INFESTED GULLY DEPRESSION - OLD MAN'S CREEK



OLD BRIDGE OVER CREEK LINE

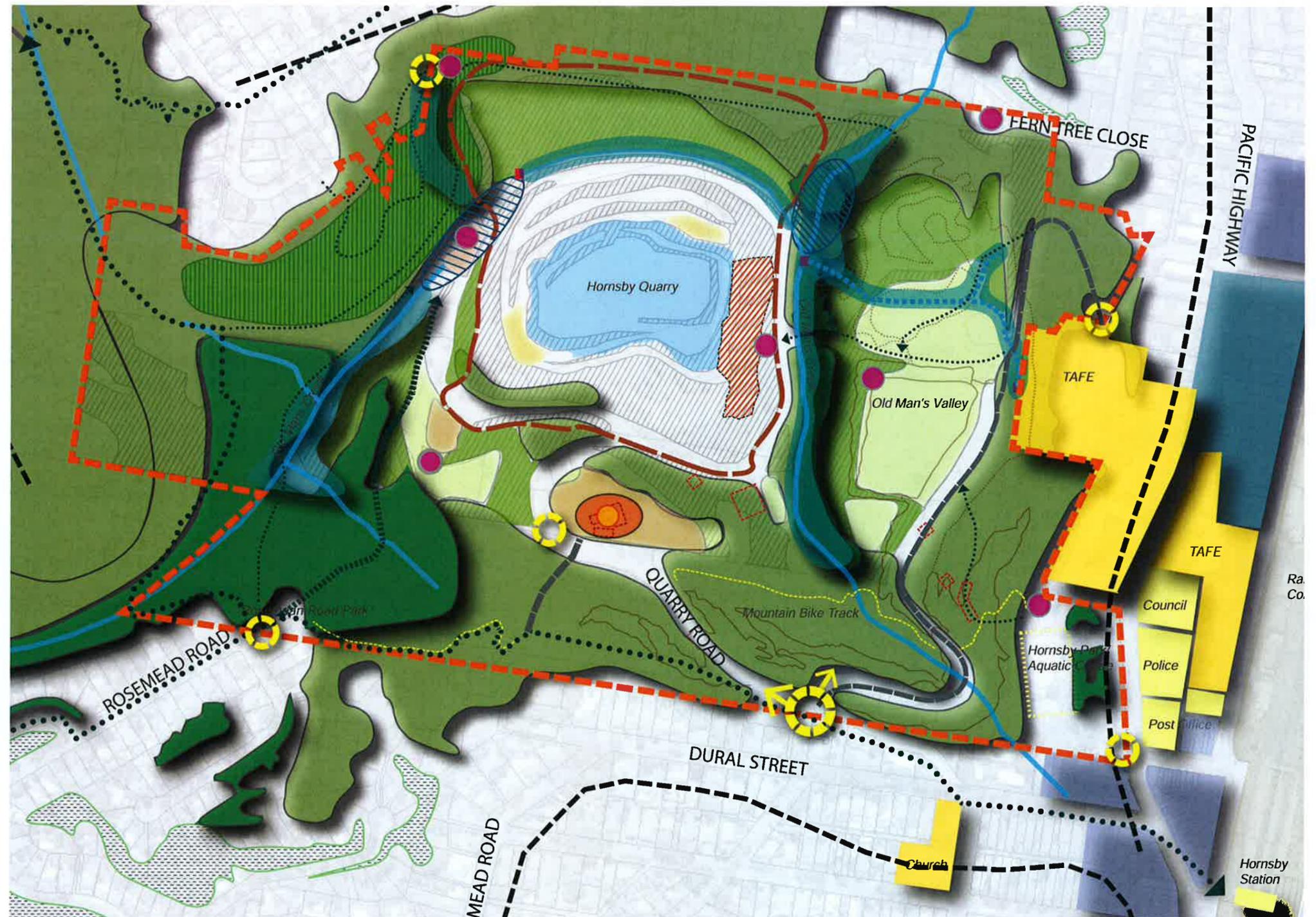
# SITE ANALYSIS/ CONSTRAINTS - existing conditions/ key issues

- - - Site Boundary
  
- TOPOGRAPHY/ GEOLOGY**
- Ridge Line
- Prominent Landform/ High Point
- Significant Geological Landform - Diatreme
- Steep Slopes
- Quarry Zone - Mod /High Risk of Instability (subject to further landform investigations)
  
- DRAINAGE**
- Creekline
- Existing Lake
- Original flowpath now diverted
- Diversion Channel
- Diversion Pipeline
  
- ECOLOGY**
- Blue Gum Diatreme Forest to be protected
- Gully Forest to be protected
  
- HERITAGE**
- Cultural Sites
  
- VISUAL and SPATIAL CHARACTER**
- Flat Open Areas
- Elevated Flat Open Areas
- Steep Vegetated Gully/ Creekline
  
- ACCESS**
- Park Entry Points
- Vehicular Access Road
- Fire Trail
- Great North Walk and signposted Walking Trails
- Horsby Heritage Steps
- Mountain Bike Track
- Mountain Bike Track (Stage 2)
  
- LOCAL CONTEXT**
- Civic/ Council
- Commercial Core
- Mixed-Use
- Business Development



# SITE OPPORTUNITIES

- - - Site Boundary
  
- TOPOGRAPHY/ GEOLOGY**
- Diatreme to be protected/ visually accessible
- Quarry Zone - Mod /High Risk of Instability (subject to further landform investigations)
  
- DRAINAGE**
- Creek Protection/ Regeneration Zone
- Potential to Re-instate Original Creekline
- Potential Pond/ Dam/ Wetland Zone
  
- ECOLOGY**
- Blue Gum Diatreme Forest to be protected
- Gully Forest to be protected
- Enironmental Education Opportunities
- Revegation of steep exposed slopes
- Potential to strengthen natural environment
- Visually distinctive Gully Forest Area to be protected
- Potential for improved access/ Recreation opportunities
  
- HERITAGE**
- Significant Built Form (Crusher Plant)
- Potential Community Facility
- Cultural Sites to be retained/ protected
- Potential for site interpretation strategy
  
- VISUAL and SPATIAL CHARACTER**
- Flat Area - Potential for Lake Access
- Elevated visually prominent Flat Open Areas
- Potential Open Space/ Community Facility (ie. Tourist, Educational, Environmental)
- Enclosed Flat Open Area
- Potential Active Open Space/ Recreation Opportunities
  
- ACCESS**
- ↻ New/ enhanced park entry/ exit
- Potential to improve interrelationship to Town Centre
- ⋯→ New Recreational/ Pedestrian/ Cycle Track and Local Road Connection
- Potential to improve connectivity and relationship to residential zone



## APPENDIX D: ADVENTURE TOURISM REPORT

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Hornsby Shire Council

HORNSBY QUARRY and OLD MANS VALLEY  
ADVENTURE TOURISM SCOPING STUDY  
**Final Draft Report**

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June 2014



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## Section One: Study Background

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## 1.1 INTRODUCTION

The recreation potential and site masterplan undertaken by CLOUSTON Associates has identified a range of potential adventure and sports tourism opportunities, in addition to local recreational opportunities.

Council expressed an interest in developing the site for adventure and sports tourism, subject to determining their financial viability and capacity to provide a long term income stream to Council that will assist in the future management and operations of the Quarry site.

The purpose of this study is to identify and recommend preferred adventure sports tourism products/experiences and/or a mix of products/experience that could be provided at Hornsby Quarry, that are appropriate to the quarry setting and park values and maximise financial and non-financial benefits to Council and the community.

This work of this study will also inform the finalisation of the Draft Recreation Potential Study and Masterplan.

## 1.2 STUDY OBJECTIVES

The objectives of the Feasibility Study, as identified in the brief, are:

- Identify the range of potential adventure sports tourism products and opportunities at Hornsby Quarry along with priority options to be considered in further more detailed planning.
- Assess the market opportunity and demand for such products and opportunities at Hornsby Quarry.
- Scope the level of commercial sector interest in development/investment and or operations of potential adventure sports tourism products and associated benefits to Council and the local area.