



Plan details

Status: **Final**
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 Date printed: 26/07/2018
 Approximate Scale: 1:4500 on A3

Legend

- 10 Property number
- 12 Action plan activity
- Stormwater node
- ▼ Approximate fire hydrant location
- 5m contours
- Stormwater network - Underground *
- - - Stormwater network - Overground / Unknown *
- Bush track / Path *
- Property boundary
- Reserve / bushland
- Council bush regeneration contractors
- Prescribed Burn
- Bush Care Group

* The spatial accuracy of this data is not guaranteed and must be verified prior to use.

The information contained herein is provided in good faith, and all effort has been made to ensure its accuracy and completeness. Willoughby City Council does not take any responsibility for errors or omissions nor any loss or damage that may result from the use of this information.

References

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17. FRG contractors to continue maintenance of ruins area. Implement measures to protect ruins from fire (refer Bushfire Risk Management Plan).
18. Revegetation and bank stabilization along creek line managed by FRG contractors.
19. Contractors to carry out secondary weeding and assisted regeneration in this area. Seating area also to be maintained by contractors.
20. Contractor mower to maintain lawn areas adjacent to West Street.
21. Investigate the possibility of a track upgrade from the West St entrance to ruins.
22. Contractors to continue secondary weeding. The end of West Street through to Quarry Street to be maintained by Tree staff.
23. FRG contractors and bushland staff to maintain areas for interpretive events.
24. Contractors to continue restoration of vegetation around stormwater outlet and adjacent areas.
25. Investigate and minimise floating gross pollutants.
26. Contractors to ensure areas are mown. Tree staff to under prune trees when required on the corner of Strathallen Ave and Cliff Ave.
27. Assisted regeneration focusing along property edge by contractors.
28. Gradual removal of Camphor Laurel Trees protecting A. costata vegetative community.
29. Ongoing assisted regeneration by contractors below Lower Cliff Ave.
30. FRG and contractor staff to consult with wildlife and habitat officers on installation of arboreal, terrestrial and other features to improve wildlife habitat.
31. FRG and contractor staff to consult with wildlife and habitat officers on strategic plans to improve habitat connectivity with adjoining areas.



Flat Rock Gully Bushland Management Actions

1. Planting at West St and on Bicentennial pathway to be maintained by Flat Rock Gully (FRG) contractors.
2. Bushcare group to continue management of site in accordance with the Bushcare Action Plan. Contract mower to maintain lawn area and edges.
3. Improvement of stormwater swales and flow paths to reduce erosion and define flow path.
4. FRG contractors to maintain entrances to the reserve. Upgrades to signage regarding dog on leash requirements below the Market St East entrance and at the top of Wilksch's Walk.
5. Preparation and prescribed burn to be carried out in 2018/19 to encourage Hornsby Enriched Sandstone Exposed Woodland. Woody weeds and vines to be controlled by FRG contractors in the meantime.
6. FRG contractors to control weeds on landscaped areas. Create habitat for small birds and reptiles where possible.
7. Contractors to continue the control of privets and manage other weed species below Pyalla St.
8. FRG contractors to continue maintenance of Calbina Rd entrance ensuring stormwater impacts are reduced.
9. FRG contractors to continue ongoing maintenance of woody weed and vines.
10. FRG contractors to maintain track that crosses private property.
11. FRG contractors to continue the targeting of invasive species in the lower slopes of the creek line. Assisted regeneration to be carried out on these areas.
12. FRG contractors to progressively regenerate bushland to stabilize former tip face.
13. Area below Dawson Street to have vines and privets controlled by contractors encouraging native canopy.
14. Contractors to carry out secondary weeding with attention given to the control of vines.
15. Assisted regeneration in post fire area adjacent to property boundaries.
16. Contractors to continue regeneration work along stormwater line and embankment. The targeting of isolated Blue Gums will also commence in this area.

Flat Rock Gully Reserve Action Plan

Reserve Profile

Flat Rock Gully (FRG) encompasses a total area of 22.3 ha inclusive of a portion of Bicentennial Reserve. Remnant bushland, approximately 14 ha, occurs within the Flat Rock Creek Catchment Area. It is bounded by Flat Rock Drive to the west and extends beyond the historic Cammeray Bridge to the east, adjacent to Tunks Park. Private property backs on to the remaining boundaries of the Reserve. FRG contributes to a habitat linkage (non-continuous) that includes Tunks Park, Northbridge Park, Cliff Ave Reserve, Bicentennial Reserve and Artarmon Reserve. FRG is dominated by Hawkesbury Sandstone with areas classified as Disturbed Terrain. Part of the Gully was used as a tip from the 1930s until 1985 when the rubbish was covered over with landfill and then revegetated.

PLANT COMMUNITY: The reserve is largely dominated by Coastal Sandstone Foreshores Forest (S_DSf06) on its northern boundary. This vegetative community consists of large trees, shrub layer and ground cover of ferns, rushes and grasses. The canopy is predominantly Smooth barked apple (*Angophora costata*) with a layer of hardy mesic small trees and shrubs including Sweet pittosporum (*Pittosporum undulatum*), Cheese tree (*Glochidion ferdinandi*) and Blueberry ash (*Elaeocarpus reticulatus*). Coastal Enriched Sandstone Moist Forest (S_WSF02) dominates the southern boundary of the reserve. This community is a tall open eucalypt forest with a distinctive mesic shrub and small tree layer. The canopy is dominated by various combinations of eucalypts including Blackbutt (*Eucalyptus pilularis*) and Sydney peppermint (*Eucalyptus piperita*). Smooth-barked apple (*Angophora costata*) is invariably present in this area of the reserve. Tall and small trees present closer to Flat Rock Creek are rainforest plants such as coachwood (*Ceratopetalum apetalum*) and blueberry ash (*Elaeocarpus reticulatus*). Located in the north-west corner of the reserve Hornsby Enriched Sandstone Exposed Woodland (S_DSf10). This is low open eucalypt woodland with an open to dense shrub layer. It is one of a suite of heath sandstone woodlands found in Sydney coastal environments. Sydney peppermint (*Eucalyptus piperita*) is prominent on exposed slopes in this vegetative community. The shrub layer carries a diverse mix of sclerophyllous shrubs that are typical in other Sydney sandstone woodlands. A constructed wetland has been established at the end of Flat Rock Creek, at culverts leading through to Long Bay under Tunks Park, to reduce stormwater runoff impacts.

Statement of Significance

Flat Rock Gully is classified as bushland as defined in State Environmental Planning Policy No 19 (*Vol 1, 1.4), and is protected under State and Commonwealth Legislation (*Vol 1, 1.5.2). It is zoned as E2 Environmental Conservation. ABORIGINAL CULTURAL SIGNIFICANCE: Prior to European settlement, the area was inhabited by the Cammeraygal people. Evidence of Aboriginal occupation, in and around FRG, is found in caves, axe grinding grooves, middens, rock carvings and paintings. A layer of shells in a midden was dated to 5,850 years. The last aboriginal encampment was recorded in the 1880s near Flat Rock Bridge.

NATURAL HERITAGE SIGNIFICANCE: FRG is significant due to its diverse range of plant species. The deeper, more sheltered gully, nature of the landscape facilitates a large stand of coachwood trees and some tree ferns. Significant rock outcrops are home to recorded wildlife species including the locally rare Gully Shadeskink, Bibrons Toadlet, Short-beaked Echidna and Brown Antechinus. Burton’s Legless Lizard is found on the south side of Bicentennial Reserve.

HABITAT SIGNIFICANCE: FRG is classified as a Wildlife Protection Area because of its significant habitats. It is a major and central part to the east-west ecological linkage between Middle Harbour and Lane Cove River Catchments. It is significant that diverse remnant habitats present in this reserve are interconnected and

provide continuity through various complex habitats which are home to many animal species. These natural habitats have been complemented by rehabilitation of the former tip site to create a unique and functional landscape which supports a wide range of small birds, reptiles and frogs.

HISTORIC CULTURAL SIGNIFICANCE: Quarrying of sandstone commenced along Flat Rock Creek in the 1880s. Sandstone retaining walls, including the L-shaped walls and drain line below Market St East, were built during the early Depression (c.1930). Terraced gardens and dry walling can be found near the Henry Lawson Cave. Ruins of a pioneer’s cottage exist today. It belonged to “Fatty” Dawson who had a piggery and ran cattle in what is now West St Reserve. Land clearing along the edge of FRG for orchards and market gardens also occurred. In 1892 a suspension bridge across Flat Rock Creek opened. In 1936 the bridge was closed and reopened in 1939 with a reinforced concrete arch replacing the suspension cables. The Suspension bridge, “Fatty” Dawson’s ruins and two stonework sites below Dawson Street are listed as local heritage items in the Willoughby Local Environmental Plan 2012. Tipping of waste material commenced in the area in the 1930s and in 1934 an incinerator was built from designs by Walter Burley Griffin, now listed on the NSW State Heritage Register. More bushland including the Naremburn Waterfall disappeared under rubbish as tipping continued and expanded into FRG during the 1940s. This practice did not cease until 1985 by order from the EPA.

Reserve Impacts

There are 16 culverts and stormwater outlets draining into FRG. Water quality issues mainly relate to deposition of litter from the upper catchment to the lower creek. Upstream from the Gully is highly urbanised and includes a major industrial area. Stormwater runoff has high litter loads and contaminants. Sewage overflow and leachate from landfill have also contributed to poor water quality. A significant problem downstream is the siltation of the lower channel and of Long Bay. Dumping of rubbish and garden waste, theft of bush rock and firewood, and encroachment by local residents (Pyalla St and Dawson St) are additional impacts. Graffiti, vandalism and dogs off leashes are ongoing management issues.

ENCROACHMENTS: All encroachments (76 Cliff Ave, 6-16 Pyalla St, 1-9 Dawson St) to be removed at an appropriate time. New encroachments forwarded to Council Compliance for swift action.

Wildlife Habitat Issues

FRG contains a number of recreated habitats including areas of shrubland and grassland. These areas are valuable habitat for small birds and mammals. An ephemeral creek channel has been created in the upper section of Flat Rock Creek with three detention ponds. This seepage area is significant for frog and lizard populations. The small area of remnant Hornsby Enriched Sandstone Exposed Woodland should be expanded and enhanced as it is essential habitat for fauna. Exotic predators that pose the most serious threat to native wildlife in FRG are foxes, cats and dogs off leashes. The Regional Fox Baiting Program has seen fox numbers gradually decline and this program is expected to continue. Further, ecological burns could be implemented to improve the woodland and regeneration of grassland and woodland habitats.

Achievements

A history of major disturbance and subsequent rehabilitation has shaped FRG to what it is today. The greatest achievement includes the transformation an old tip site into valuable habitat for wildlife and the creation of open space for recreational use.

FRG hosts many community based activities including tree-planting days, educational walks, school activities and bush poetry readings at the Henry Lawson Cave. Extensive revegetation, bush regeneration and weed eradication works have greatly improved the quality and diversity of the existing bushland.

The activities of Bushcare groups, involvement in the Regional Fox Baiting and Streamwatch water monitoring Programs, control of stormwater runoff and the use of prescribed burns have all contributed to enhancing this natural asset.

Initiatives to conserve threatened species and habitat creation efforts have also seen an improvement in the health of native fauna. FRG is a good example of a multi-use reserve where the community both enjoy and assist in the care of the environment.

Bushland Management Goals – O.H. Reid Reserve

The following aims from the Urban Bushland Plan of Management 2014 are priority objectives:

5.3b: To create and or maintain conditions in which creek and drainage lines are protected from increased erosion and / or sedimentation due to urban impacts.

6.2f: To preserve and increase ecological links across the LGA and regionally to assist the movement of fauna.

6.2g: Maintain natural habitat formations and supplement with manufactured structures where natural habitat has been depleted.

6.3b: To implement weed control programs which are based on regeneration and restoration principles and which increase the bushland resilience to further weed infestation.

7.1g: To manage fire such that the fire regime and implementation of the burn is beneficial to flora and fauna diversity and habitat.

Bushland Management – General Principles and Actions

- Bush regeneration is a long term process that requires staged weed removal to ensure establishment of native plant communities. Work should proceed from good bush to degraded areas with techniques that encourage regeneration, including flame weeding, rather than spraying with herbicide.
- If possible, all weed refuse and natural debris to be composted or retained on-site.
- When natural regeneration is deemed inadequate, supplementary plantings to mimic local plant communities and landscapes will be used with local provenance species.
- Standing dead trees and forest litter (including logs and branches) to be kept for wildlife habitat unless deemed a risk to safety.
- Monitor, maintain and enhance vegetation connectivity for wildlife habitat within the reserve and reserve networks.
- Phytophthera cinnamomi* (a root rot pathogen) is listed as a key threatening process in NSW and has been identified as a threat to a number of species. Bushland workers are to use hygiene protocols to minimise risk.
- Report and record all reserve encroachments. Also monitor for tree vandalism and/or removal within the reserve and report to Council Compliance for appropriate action.
- Continue to monitor wildlife habitat requirements and supplement where necessary.
- Monitor feral animal activity and implement appropriate management actions where necessary.
- Encourage the community to report wildlife sightings to Council via the Wildlife Watch program to increase the understanding of native wildlife populations.
- Monitor and protect cultural heritage sites within the reserve with Aboriginal heritage to be protected at all times. Bushland staff to notify Aboriginal Heritage Office prior to each burn to identify sites and implement protection measures and post-fire survey.
- Bushfire management will be achieved through implementation of a strategic hazard reduction program consistent with the Bushfire Risk Management Plan.
- Species diversity will be maintained by an ecological burn program in a mosaic pattern.

- This reserve has a valuable role as an educational resource. Preserve natural features used for educational purposes and continue to inform the community of bushland issues through on-site educational activities and signage. Maintain appropriate signage.
- Formal tracks to be regularly maintained and informal tracks closed to prevent damage to habitat and to impede access of feral animals, unless used for access by bushland workers.
- Establish photo points to monitor the progress of reserve management actions.
- Reserve Action Plan progress to be reviewed annually and updated after five years.

Native Plant List for Flat Rock Gully and Bicentennial Reserve

<i>FERNS</i>	<i>Drosera spatulata</i>	<i>Banksia spinulosa</i>
ADIANTACEAE	ELAEOCARPACEAE	Grevillea buxifolia
Adiantum aethiopicum	Elaeocarpus reticulatus	Grevillea linearifolia
ASPLENIACEAE	EPACRIDACEAE	Grevillea speciosa
Asplenium australasicum	Brachyloma daphnoides	Hakea dactyloides
Asplenium flabellifolium	Dracophyllum secundum	Hakea dactyloides weeping form
BLECHNACEAE	Epacris longiflora	Hakea propinqua
Blechnum cartilagineum	Epacris microphylla	Hakea sericea
CYATHEACEAE	Epacris pulchella	Lambertia formosa
Cyathea australis	Leucopogon amplexicaulis	Lomatia mycroides
DAVALLIACEAE	Leucopogon ericoides	Lomatia silaifolia
Davillia pyxida	Leucopogon juniperinus	Persoonia levis
DENNISTAEIDIACEAE	Styphelia tubiflora	Persoonia linearis
Histiopteris incisa	Woolfia pungens	Persoonia pinifolia
Hypolepis muelleri	EUPHORBACEAE	RHAMNACEAE
Pteridium esculentum	Breynia oblongifolia	Pomaderris discolor
DICKSONIACEAE	Glochidion ferdinandi	RUBIACEAE
Calochlaena dubia	Micrantheum ericoides	Pomax umbellata
GLEICHENIACEAE	Omalanthus populifolius	RUTACEAE
Gleichenia dicarpa	Phyllanthus hirtellus	Crowea saligna
Gleichenia rupestris	FABACEAE FABOIDEAE	Phebalium dentatum
LINDSAEACEAE	Bossiaea heterophylla	Ziera smithii
Lindsaea linearis	Desmodium varians	SAPINDACEAE
Lindsaea microphylla	Dillwynia floribunda	Dodonaea triquetra
OSMANDACEAE	Dillwynia glaberrima	STERCULIACEAE
Todea barbara	Dillwynia retorta	Lasiopetalum ferrugineum
POLYPODIACEAE	Glycine clandestina	STYLIADIACEAE
Platycerium bifurcatum	Gompholobium latifolium	Styidium productum
Pyrostia rupestris	Hardenbergia violacea	THYMELAEACE
PTERIDACEAE	Hovea longifolia	Pimelea linifolia
Pteris umbrosa	Indigophora australis	ULMACEAE
SCHIZAEACEAE	Kernedia rubicunda	Trema aspera
Cheilanthes austrotenuifolia	Mirabella rubifolia	VERBENACEAE
Cheilanthes sieberi	Phyllitis phylloides	Clerodendrum tomentosum
THELYPTERIDACEAE	Platylobium formosum	VITACEAE
Christella dentata	Pullanea daphnoides	Cissus hypoglauca
DICOTS	Pullanea elliptica	MONOCOTS
ALDOACEAE	Pullanea flexilis	COMMELINACEAE
Pseuderanthemum variable	Pullanea stipularis	Commelina cyanea
APIACEAE	Viminaria juncea	CYPERACEAE
Actinotus helianthi	FABACEAE-MIMOSOIDEAE	CAUSTIS diandra
Actinotus minor	Acacia decurrens	Cyperus polystachos
Centella asiatica	Acacia elongata	Gahnia erythrocarpa
Platysace linearifolia	Acacia linifolia	Gahnia spp
Xanthosia pilsoa	Acacia longifolia	Lepidosperma laterale
Xanthosia tridentata	Acacia longissima	Schoenus melanostachys
APOCYNACEAE	Acacia suaveolens	DIOSCOREACEAE
Parsonsia straminea	Acacia terminalis	Dioscora transversa
ARALIACEAE	Acacia ulicifolia	IRIDACEAE
Astrotichia latifolia	Goodeniaceae	Paterosnia sericea
Polyscias sambucifolia	Dampiera stricta	JUNCACEAE
ASCLEPIADACEAE	HALORAGACEAE	Juncus kraussii
Marsdenia suaveolens	Gonocarpus teucrioides	Juncus ustulatus
ASTERACEAE	Haloragis heterophylla	Dianella caerulea
Ozothamnus diosmifolium	LAMIACEAE	Dianella laevis
BAUERACEAE	Prostanthera linearis	Scheilhammera undulata
Bauera rubioides	Lobelia gracilis	LOMANDRACEAE
B. rubioides var microphylla	Pratia purpurascens	Lomandra longifolia
BIGNONIACEAE	MYRSINACEAE	Lomandra multiflora
Pandorea pandorana	Rapanea variabilis	Lomandra obliqua
CAMPANULACEAE	MYRTACEAE	ORCHIDACEAE
Wahlenbergia communis	Angophora costata	Cryptostylis erecta
Wahlenbergia gracilis	Austromyrtus tenuifolia	Dipodium punctatum
CASSYTHACEAE	Corymbia gummifera	Pterostylis nutans
Cassytha paniculata	Eucalyptus pilularis	Pterostylis acuminata
CASUARINACEAE	Eucalyptus piperita	POACEAE
Allocasuarina distyla	Eucalyptus resinifera	Aristida vagans
Allocasuarina littoralis	Eucalyptus sieberi	Dichelachne crinita
Allocasuarina torulosa	Kunzea ambigua	Entolasia marginata
Casuarina glauca	Leptospermum trinervium	Entolasia stricta
CONVOLVULACEAE	Tristania laurina	Imperata cylindrica
Dichondra repens	OLEACEAE	Microlaena stipoides
CUNONIACEAE	Notelaea longifolia	Notodanthonia longifolia
Callicoma serratifolia	Notelaea ovata	Opilismenus imbecillis
Ceratopetalum apetalum	OXALIDACEAE	Opilismenus aemulus
Ceratopetalum gummiferum	Oxalis corniculata	Themeda australis
DILLENIACEAE	PITTIOSPORACEAE	RESTIONACEAE
Hibbertia aspera	Billardiera scandens	Lepyrodia scariosa
Hibbertia dentata	Pittosporum undulatum	SMILACACEAE
Hibbertia empetrifolia	POLYGONACEAE	Smilax glycyphylla
Hibbertia linearis	Persicaria decipiens	XANTHORRHOACEAE
Hibbertia nitida	PROTEACEAE	Xanthorhoea media ssp media
Hibbertia scandens	Banksia ericifolia	Xanthorhoea resinosa spp concava
DROSERACEAE	Banksia integrifolia	Xanthorhoea sp
Drosera auriculata	Banksia serrata	