



New Grafton Correctional Centre

Infrastructure NSW

Bushfire Assessment Report

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NGCC Stage 2 DA Support



New Grafton Correctional Centre

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Document history and status

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Executive Summary

A new correctional centre is being developed at Grafton to help meet the State's need for increased inmate capacity. The new Grafton Correctional Centre (NGCC) will be built and operated as a public-private partnership (PPP) and will be retained in ownership by the NSW Government.

The NSW Government is responsible for site acquisition and the provision of certain public utilities infrastructure to the site. Under the PPP arrangement, the private sector will be responsible for the initial design, construction and financing of the NGCC, as well as the provision of operational (custodial) services, designated health services and hard and soft facilities maintenance services over the contract term.

Consent was granted to the concept proposal for the staged development of New Grafton Correctional Centre (NGCC) in March 2017. This consent covered Stage 1 works for the Project site, which include vegetation clearance, bulk excavation and construction of fire access roads. Planning consent is now being sought for Stage 2 of the development, including detailed design and construction of the facility.

The Project will provide up to 1,700 new prison beds, within a maximum and minimum security correctional centre with relevant support services and facilities. The Project is treated as a Special Fire Protection Purposes (SFPP) development for the purpose of defining the bushfire protection measures. This bushfire assessment report assesses bushfire hazards associated with the Project and describes applicable bushfire protection measures.

The Project is to be developed on a site which is not currently classified as bushfire prone land. Since the site and surrounding lands support connected areas of tall open forest, this classification was found to understate the site's bushfire risk. With its existing vegetation cover, much of the Project site is considered to be bushfire prone (as defined by the NSW Rural Fire Service (RFS)). Even with the permitted clearing to construct and operate the correction centre, the Project site will include bushfire prone land.

A suite of bushfire protection measures have been developed for construction and operation of the project. They are predicated on the facility not being evacuated in case of an approaching bushfire and reflect the requirements of the RFS publication *Planning for Bushfire Protection* (RFS, 2006). The key protection measures include:

- Development of 100 m wide asset protection zone (APZ) around the secure and related facilities.
- Construction of an access road into the facility and access tracks around the outer perimeter of the asset protection zone.
- Provision of fire water supplies during construction and operational phases.
- Safe provision of other utilities.
- Emergency planning.
- Maintenance of fuel hazard in the APZs and throughout the Project site, as well as of the access tracks.
- Management of risks associated with hot works and the storage of flammable and other hazardous materials.

These are described in detail in this report and a Bushfire Management Plan prepared for the construction and operation of the correction centre.

On the assumptions that native vegetation currently located within the Project's "cleared zone" (which relates to the cleared buffer surrounding the Project facilities that is required for security reasons) is entirely removed, there would be minimal additional vegetation removal required to implement the proposed bushfire protection measures. Environmental impacts associated with these measures would then be limited to the relatively minor impacts potentially associated with construction of the outer fire trail and fire break.

This Bushfire Assessment Report and the NGCC Bushfire Management Plan have fulfilled the requirement of SEAR No 17 the development satisfy applicable requirements for a Special Fire Protection Purpose development as detailed in *Planning for Bushfire Protection 2006*. In addition this Bushfire Assessment Report and the NGCC Bushfire Management Plan have fulfilled the requirement of the B17 Schedule 2, Part B of the Stage 1 Conditions).

1. Introduction and overview

1.1 Background

A new correctional centre is being developed at Grafton to help meet the State's need for increased inmate capacity. The new Grafton Correctional Centre (NGCC) will be built and operated as a public-private partnership (PPP) and will be retained in ownership by the NSW Government.

It has been designated a State Significant Development and is expected to open in 2020 after the planning process and construction period.

The NSW Government is responsible for site acquisition and the provision of certain public utilities infrastructure to the site. Under the PPP arrangement, the private sector will be responsible for the initial design, construction and financing of the NGCC, as well as the provision of operational (custodial) services, designated health services and hard and soft facilities maintenance services over the contract term.

NGCC will be the major multifunctional, regional correctional facility servicing the northern part of NSW and will be the primary correctional facility for all corrections operations from the Queensland border in the north to Kempsey in the south, and Tamworth in the southwest.

The vision for the Project is to operate in accordance with innovative best practice, both in providing safety and security and providing dynamic, pro-social management of inmates.

1.2 Stage 1 Consent

On 14 March 2017 consent was granted to the concept proposal for the staged development of New Grafton Correctional Centre (NGCC) comprising:

- 1,700 maximum and minimum security beds, consisting of:
 - 1,000 maximum security beds for male inmates;
 - 300 maximum security beds for female inmates; and
 - 400 minimum security beds for male inmates.
- Core correctional facility buildings including: maximum and minimum accommodation units; special accommodation units; health facilities; education and programs areas; administration; workshops; staff amenities; and visitor facilities;
- A recreational oval within the perimeter of the facility;
- A six metre high fence or wall around the perimeter of the facility, with light and security camera poles up to 10 metres in height;
- Store buildings, small ancillary facilities, a central energy plant, black-water treatment facilities and a drug dog detection unit and yard located outside the perimeter wall / fence;
- Fire access roads on the inside and the outside of the perimeter wall/ fence of the facility;
- Water, power, wastewater and communication utilities within the site;
- A maximum building height of 12 metres (approximately three storeys);
- Total GFA of approximately 100,000 square metres (sqm);
- Vegetative buffer of 50 metres along the northern boundary, 15 metres along the eastern boundary and 30 metres along the southern boundary;
- Asset protection zone of 100 metres from every boundary or vegetation buffer;
- One vehicular entry/exit point from Avenue Road;
- 500 car parking spaces;

- 1.5 metre high boundary fence; and
- Landscaping of ground cover and /or shrubbery.

All development under the concept proposal consent (Stage 1 consent) is to be the subject of a subsequent development application with the exception of the Stage 1 works.

The approved Stage 1 works include:

- Vegetation clearance and biodiversity management activities;
- Bulk excavation and site stabilisation works;
- Demolition of the existing house and sheds;
- Construction of access roads including fire access roads to the extent required to conduct Stage 1 works
- Construction of auxiliary facilities such as construction compound, construction staff parking facilities and stockpiles sites;
- Temporary provision of water, power and communication services within the site to the extent required to conduct Stage 1 works; and
- Landscaping.

These Stage 1 works will be undertaken to facilitate the subsequent development as envisaged in the concept proposals.

At the same time, Infrastructure New South Wales (INSW) is arranging for the delivery of services to the site including a mains water supply, electricity, telecommunications and access.

The subsequent development application (Stage 2 DA) will be generally consistent with the concept proposal as outlined on the previous page.

The proposed NGCC will be delivered through a public private partnership with a private custodial service provider operating and managing all aspects of the new centre. The primary aim of the PPP is to achieve innovation and efficiencies in the proposed design, construction and delivery of the NGCC.

NGCC will be constructed and maintained by John Holland and Serco will operate the correctional centre.

1.3 Approvals framework

NGCC is a State Significant Development with planning approval being obtained in two stages:

- Stage 1 – for the concept proposal and Stage 1 works; and
- Stage 2 – for the design and construction of the facility.

The Stage 1 consent was obtained by the Infrastructure NSW (INSW) on behalf of Corrective Services NSW (CSNSW), a division of the Department of Justice with approval received on the 14 March 2017. INSW, on behalf of Corrective Services NSW (CSNSW), a division of the Department of Justice is the applicant for this Stage 2 development application.

The development to which the Stage 2 development application relates is also State significant development. Clause 8(1)(b) in Part 2 of State Environmental Planning Policy (State and Regional development) 2011 ("the SRD SEPP"), development is declared to be State significant development if the development is specified in Schedule 1 or 2 of the SRD SEPP. Schedule 1 includes paragraph 16:

16 Correctional centres

Development for the purpose of correctional centres that has a capital investment value of more than \$30 million.

The proposed NGCC has a capital investment value of over \$30 million and is State Significant Development.

The Minister is the consent authority for State Significant Development.

1.4 The site and its context

1.4.1 Regional context

The site is located 23 km by road to the south east of Grafton, 5 km north east of Grafton Airport and 7 km east of the Pacific Highway at 313 Avenue Road Lavadia on the Mid North Coast of New South Wales (refer to **Figure 1-1**).

The Pacific Highway provides connections north towards Queensland and south towards the Hunter and Sydney. The Gwydir Highway provides a connection between the North Coast and the New England and Summerland Way extends north connecting Grafton, Casino and Kyogle to the Mt Lindesay Highway.

Grafton is a focal point for regional road, river and other transport networks and focus of higher order services to the Clarence Valley sub-region. It is the sub-region's major employment centre and a focus of government administration.

1.4.2 The site

The site on which the NGCC is to be constructed comprises Lot 26 DP751376 and Lot 1 DP 1190399 each roughly rectangular with a total area of 195 ha (refer to **Figure 1-2**). It is known as 313 Avenue Road Lavadia although the site straddles the boundary between the localities of Lavadia and Glenugie.

It has a frontage to Avenue Road of approximately 2.2 km, a northern boundary to an unformed Crown road of 1.1 km, a western boundary to adjoining private property and unformed Crown roads of 2.3 km and a southern boundary of 627 m to the Pacific Highway under construction including the relocated Old Six Mile Lane.

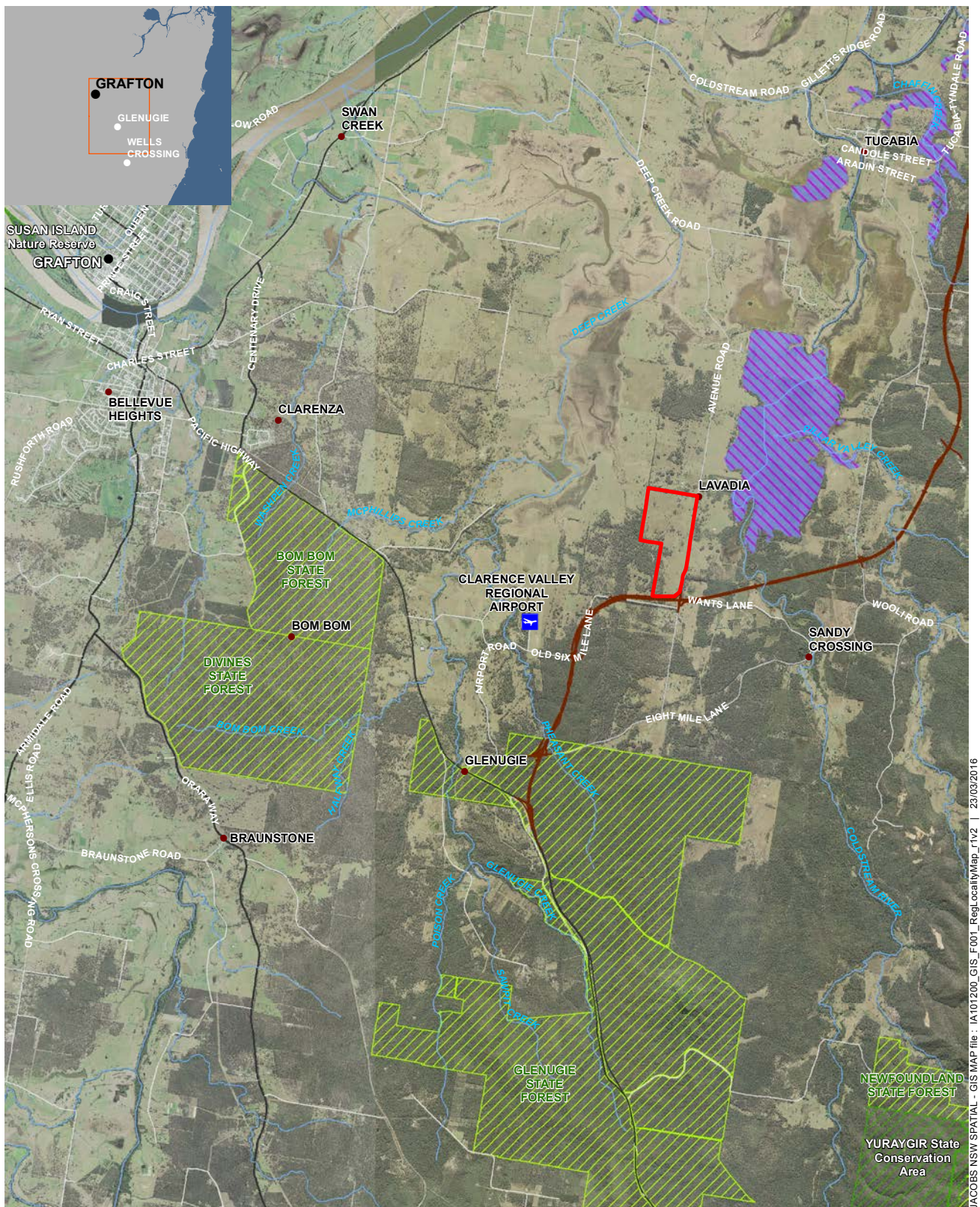
1.5 The proposal

The proposed development comprises the construction of a new correctional centre designed to accommodate 1,700 male and female inmates comprising 14 different cohorts including but not limited to:

Classification	Number	Gender
Maximum Security Classification Inmates	1000	Male
Maximum Security Classification Inmates	300	Female
Minimum Security Classification Inmates	400	Male
Total	1,700	

Other associated facilities include but are not limited to:

- Recreational oval, special accommodation units, administration, industries and educational facilities, workshops, staff amenities, visits facilities, prisoner reception and health facilities (including beds and some diagnostic facilities), access, parking and utilities;
- An overall Gross Floor Area (GFA) of under 100,000 m²;
- Secure perimeter fences to the two correctional precincts comprising concrete and anti-climb mesh fences with a Sterile Zone;
- Additional beds for remand/reception management and management of unforeseen contingencies such as a requirement to separate inmates;
- Associated support and ancillary buildings for the delivery of services (other than functions);



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Legend

- The Project
- Grafton Bypass (proposed)
- SEPP 14 Wetlands
- National Park Reserves
- State Forests

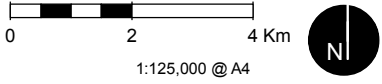
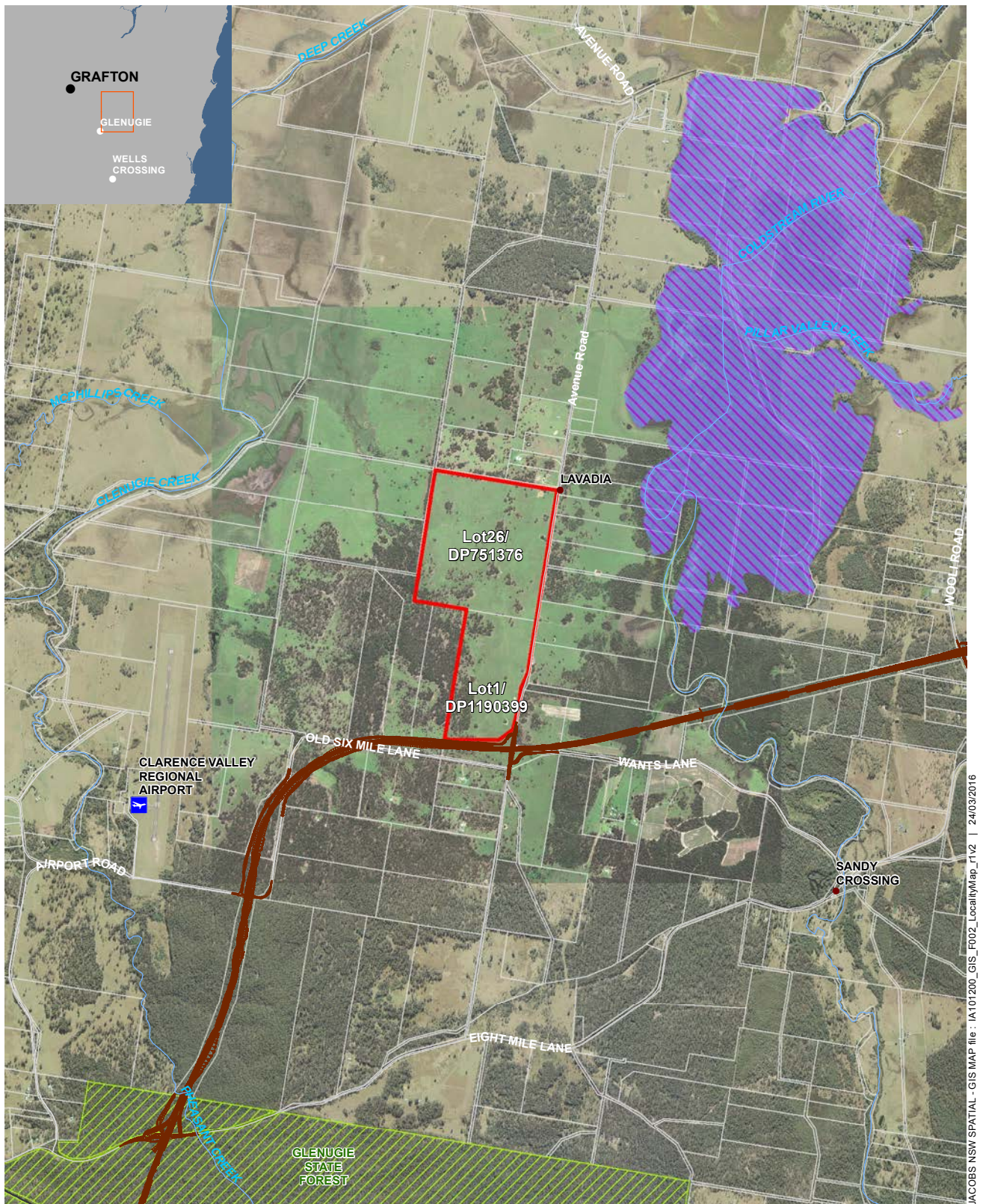


Figure 1-1 | Regional Locality

Data sources
 Jacobs 2015
 LPI 2015
 NSW DPE 2015
 RMS 2013 (W2B Alliance)



JACOBS NSW SPATIAL - GIS MAP file: I:\101200_GIS_F002_LocalityMap_r1v2 | 24/03/2016

Legend

- The Project
- SEPP 14 Wetlands
- Grafton Bypass (proposed)
- State Forests

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Data sources

Jacobs 2015
LPI 2015
NSW DPE 2015
RMS 2013 (W2B Alliance)

Figure 1-2 | The Project

- Provision of integrated power, fire, general infrastructure and security & communications backbone; and
- Provision of furniture, fittings & equipment (FF&E) to deliver the services and other functions.

Two distinct correctional precincts for the management of maximum and minimum security inmate cohorts are proposed with movement of staff, inmates and visitors managed through individual gatehouses.

These are located either side of central facilities such as parking visits arrivals areas and the like.

The facility has been designed to be legible for all users, engendering a feeling of personal safety. In providing the physical spaces requisite for the execution of day-to-day operations and achievement of high-level goals, the design results in efficiencies and minimised impact on the environment.

The design provides a campus-style layout for the three correctional centres – Male Maximum, Female and Male Minimum and positions each centre on either side of the existing ridgeline running on a north–south axis through the Site. This ridgeline offers views to Glenugie Peak in the distance to the south, captured by the proposed cultural centre. Views to this significant feature are symbolic and meaningful to locals, and particularly for the Indigenous community.

Each centre is designed with a ‘spine’ or ‘street’ of support facilities, and a number of neighbourhoods of residential accommodation. These spines are set out along a gentle curve, generated from the existing topography and natural landforms.

The Male Maximum and Female Centres are enclosed by one maximum-security perimeter and designed with physical, visual and acoustic separation between male and female Inmates. This is achieved through the natural ridgeline layering the support facilities spines for each centre on either side of a green space. A secure line between each of the Centres prevents Inmates from accessing the other.

Each centre is accessed from the support facilities spine through a series of managed secure officer posts in lieu of a central movement control post, facilitating ease of movement into the campus facilities (e.g. recreation, industries, programs and education). The facilities are set out along a curved communication spine determined by functional requirements, acting as the ‘wayfinding’ across the facility. This pathway network provides a functional solution aligned with operational needs and accommodates natural ‘desire’ lines of pedestrians. Movement areas are observed by staff points, and movement within the centres’ shared spaces is controlled using buildings and landscape elements to define circulation routes.

The landscape design follows the campus style design approach being integrated into the existing local environmental context. Areas of existing vegetation are retained, wherever possible, and extensive screen planting of endemic trees, shrubs and grasses to the boundaries, the drainage lines, and the hill to the north. The entrance road planting of informal groves of local trees, retains the local rural character.

Secure perimeter fences would be provided to the two correctional precincts comprising 6.0m high concrete and anti-climb mesh fences with a secure sterile zone. Detection monitoring and CCTV coverage of perimeter security zones will be provided with security lighting.

A single point of entry and control would be provided from Avenue Road. Internal access roads and parking for approximately 700 car spaces comprising:

- 350 staff car parking spaces and 10 motorcycles spaces; and
- 350 visitor car parking spaces and 10 motorcycles with a standover space

All car parks will be lit for safety and will have CCTV coverage across the entire footprint.

A bus stop close to the visits area would be provided with provision for bus turnaround

NORTHERNpathways propose to design, build and operate a Membrane Bioreactor (MBR) Waste Water Treatment Plant with a 2,800-person capacity to accommodate inmates, staff and visitors and all peak load periods. The proposed MBR system is the combination of an activated sludge biological treatment plant with

Ultra filtration membrane process utilising a suspended growth bioreactor producing Class A+ potable water. This water would be reticulated as recycle water through the facility, with excess directed to travelling surface irrigators. The plant would be fully automated and be remotely monitored for additional offsite technical support.

The facility would be constructed in one stage with occupancy managed by gradual ramp up to capacity over a period of 6 months. The facility will commence construction pursuant to the Stage 1 consent issued in March 2017 and, subject to works under a Stage 2 DA, is due for completion in early 2020 ready for occupation from July 2020.

The construction and delivery of the project will be undertaken in coordination with other major projects in the region, namely the Pacific Highway upgrade currently under construction by the Roads and Maritime Services and the additional bridge crossing of the Clarence River in Grafton.

Detailed consideration has been given to construction planning and management.

It is estimated that some 600 jobs would be provided at the facility with approximately 350 of these being custodial officers.

During construction, some 1,100 jobs would be provided.

The capital investment value of the development is \$540 million.

1.6 Purpose of this report

This report is the *Bushfire assessment report* and will support the Stage 2 development application. It addresses the Secretary's Environmental Assessment Requirement (SEAR) No. 17 for the Stage 2 Project (refer to **Table 1-1**) and the Stage 1 Conditions of Approval (refer to **Table 1-2**) as issued by the Department of Planning and Environment (DPE) on the 28 March 2017.

Table 1-1 Summary of Stage 2 SEARs relevant to this Bushfire Assessment Report

SEAR	Condition requirements	Document referenced
Stage 2 SEARs #17	Address bushfire hazard and prepare a report that addresses the requirements for SFPP development as detailed in <i>Planning for Bush Fire Protection 2006</i> .	NGCC Stage 2 DA and EIS (NORTHERNpathways, 2017) and this report.

Table 1-2 Summary of Stage 1 Conditions to be satisfied in future DAs relevant to this Bushfire Assessment Report

Section	Stage 1 Conditions to be satisfied in future DAs	Cross reference
Schedule 2, Part B B17	The development application for Stage 2 must demonstrate that bushfire protection measures, comply with the relevant provisions of <i>Planning for Bushfire Protection 2006</i> and the requirements of the RFS in relation, but not limited, to: a) Asset Protection Zones (APZs); b) fire fighting vehicle access roads; and c) fire fighting water supply.	Refer to Sections 4.2, 4.3 and 4.4.1 for construction measures and refer to Section 5.2, 5.3 and 5.4.1 for operation measures on items a, b and c. Further detail is included in the Bushfire Management Plan that is a sub-plan of the Construction Environment Management Plan.

1.7 Report Structure

This report is the *Bushfire Assessment Working Paper* and will support the EIS required for the Proposal under Division 4.1, Part 4 of the EP&A. The structure of the report is summarised in **Table 1-3**

Table 1-3 Report structure

Section reference	Section heading	Description
Executive summary	Executive summary	Concise summary of this technical paper and the key findings
1	Introduction • Background • Locality • Proposal description • Proposal objectives • Report structure	Overview of the Project and description of the structure of this technical report.
2	Assessment requirements: • Legislative requirements • Planning for bushfire protection • Bushfire prone land • Special fire protection purpose developments	Identifies the legislative and policy bases for this assessment and their key requirements.
3	Bushfire hazard assessment: • Overview • Site details • Bushfire prone land • Bushfire attack level exposure	The assessment of bushfire hazard for the site in terms of its bushfire prone land status and the anticipated level of bushfire risk and bushfire attack exposure.
4	Bushfire protection measures during operation of the Project: • Overview • Key bushfire risk scenarios • Asset protection zones • Internal access roads • Utility provision • Emergency planning • Property maintenance • Potential environmental impacts of proposed bushfire protection measures • Managing bushfire ignitions on the Project site	Describes bushfire protection measures required for construction of the Project as a Special Fire Protection Purposes (SFPP) development. Additional property protection measures are described, as are potential environmental impacts of the protection measures. Bushfire protection measures for the operation of the Project are presented before those for construction. This reflects that operational requirements are specified by regulations and provide the framework for construction phase bushfire protection measures.
5	Bushfire protection measures during Project construction: • Overview • Key bushfire risk scenarios • Bushfire protection measures • Potential environmental impacts of bushfire protection measures	Describes bushfire protection measures required during construction phase of the Project and their potential environmental impacts.
6	Conclusions and recommendations: • Bushfire hazard assessment • Bushfire risk scenarios	Concise statement about the key findings of this Bushfire Assessment Working Paper.

Section reference	Section heading	Description
	• Bushfire protection measures • Potential environmental impacts of bushfire protection measures • Recommendations	

2. Assessment requirements

2.1 Legislative requirements

Planning consent for developments proposed to take place on bushfire prone land (BPL) in New South Wales is required under the *Environmental Planning and Assessment Act 1979* and *Rural Fires Act 1997* to conform with specifications and guidance in *Planning for Bush Fire Protection* (PBP; RFS, 2006).

2.2 Planning for bushfire protection

PBP seeks to provide for human safety (including of fire responders) during bushfire events and minimise the effects of bushfires on property. It is underpinned by several principles:

- *Risk*: protection measures are proportional to the threat or risk bushfires pose to a development. Regardless of any setbacks or protection measures, the safety of a development in a bushfire-prone area cannot be entirely guaranteed.
- *Setbacks*: setbacks are used to provide a defensible space between a bushfire hazard and buildings and reduce the risk of direct flame contact and ember attack. Greater setback distances lower any subsequent requirement for bush fire protection construction standards.
- *Managing interfaces*: threats posed by bushfires are diminished by reducing the direct interface between developments and bushfire hazards.
- *Bush fire protection measures*: which assist building survival during bushfires and contribute to the safety of fire responders and members of the public located within a development on BPL. Bushfire protection measures must be contained within the overall development area. Only under exceptional circumstances may they be displaced onto adjoining lands.

Specific additional controls apply on bushfire protection measures to residential, rural residential and SFPP developments (see **Section 2.4**). These respond to their elevated level of risk. PBP defines several classes of bushfire protection measure, namely:

- *Asset protection zones (APZ) and defensible space*: these are buffer zones between bushfire hazards and buildings. They are managed to reduce fuel hazard and consequent radiant heat, flame, ember and smoke exposure. APZ comprise inner and outer protection areas, with the former incorporating the defensible space.
- *Construction standards and design*: while these are not finalised at the development application stage, preliminary consideration of construction is required to ensure Building Council of Australia (BCA) standards are complied with and assumptions underpinning the APZ are appropriate.
- *Access standards*: new subdivisions and large SFPP must ensure that there is safe access, egress and defensible space for emergency services, as well as access for on-going management of APZ.
- *Water supply and utilities*: adequate fire water supplies are required. Gas and electricity services should not add to fire risk or impede fire responses.
- *Emergency management arrangements*: procedures for emergency responses and evacuation should be considered, particularly for SFPP.
- *Landscaping*: landscaping within the APZ must be consistent with provision of defensible space.

Bushfire protection measures are typically used in combinations which are relevant to the circumstances of the development site and the anticipated bushfire behaviour.

2.3 Bushfire prone land

The identification of BPL in New South Wales is the responsibility of local government area-based Bush Fire Management Committees (BFMC). BPL mapping is typically published by the respective local government and the maps and metadata are developed according to guidance provided by RFS (2014).

BPL assessments are based on allocation of the vegetation present into one of three broad categories, as follows:

- *Category 1:* which includes areas of forest; woodland, heath, forested wetland and timber plantation, as well as remnant and short fire run vegetation within 30 m of each other where the combined area is greater than 2.5 ha.
- *Category 2:* which includes grasslands, freshwater wetlands, semi-arid woodlands, arid shrublands and rainforests, as well as remnant vegetation and short fire run vegetation with greater than 100 m lateral separation from category 1 vegetation and 30 m from other category 2 vegetation.
- *Excluded vegetation:* small patches or strips of remnant vegetation, managed agricultural and non-agricultural grasslands, agricultural cropland, gardens and mangroves are not mapped as bushfire prone.

BPL is defined as land with category 1 or 2 vegetation and land within 100 m and 30 m buffers, respectively, of either class of vegetation.

2.4 Special Fire Protection Purposes development

SFPP developments are a special case, with residents having greater vulnerability due (e.g.) to their lower capacity to evaluate bushfire risk, poorer mobility and/or the greater logistical challenges in evacuation or providing alternative accommodation. Examples include: schools; child care facilities; hospitals, motels; housing for older or disabled people; and retirement facilities. Categories are defined in the *Rural Fires Act (1997)* and the associated *Rural Fire Regulations (2013)*.

In formulating BPM for SFPP developments, PBP (RFS, 2006) indicate that it is necessary to provide for:

- *Special characteristics and needs of occupants:* occupants of SFPP developments may not be able to assist in property protection following the passage of the fire front and may be more vulnerable to the effects of smoke or heat while being evacuated.
- *Safe emergency evacuation procedures:* which require greater separation from bushfire threats to avoid prolonged exposure of emergency services personnel through evacuation.

Correctional facilities are not specifically listed in PBP as a type of SFPP development, although they and their occupants potentially share many of the attributes of such developments. The SEAR for bushfire (No. 17) specifies that the correction centre must be considered as an SFPP development (refer to **Section 1.6**).

3. Bushfire hazard assessment

3.1 Overview

This assessment is focused on bushfire hazards and their management arising from the construction of the NGCC within the prescribed Project site boundary (i.e. Lot 26 DP 751376 and Lot 1 DP 1190399; as shown in **Figure 1-2**).

3.2 Site details

The NGCC is to be constructed on two adjoining properties (Lot 26 DP 751376 and Lot 1 DP 1190399) located south-east of Grafton. The site's total area is 195 ha. It currently supports patches of remnant native vegetation of various sizes, as well as individual and small clumps of native trees. Pasture grasses dominate the cleared sections of the property and form the main understorey component in remnant vegetation patches (refer to **Figure 3-1 a**).



a) View from north of the Project site, showing pastures and scattered remnant native vegetation.



b) View of patch of remnant native vegetation in south-west of the Project site. Understorey mainly comprises pasture grasses.

Figure 3-1 Views of project site:

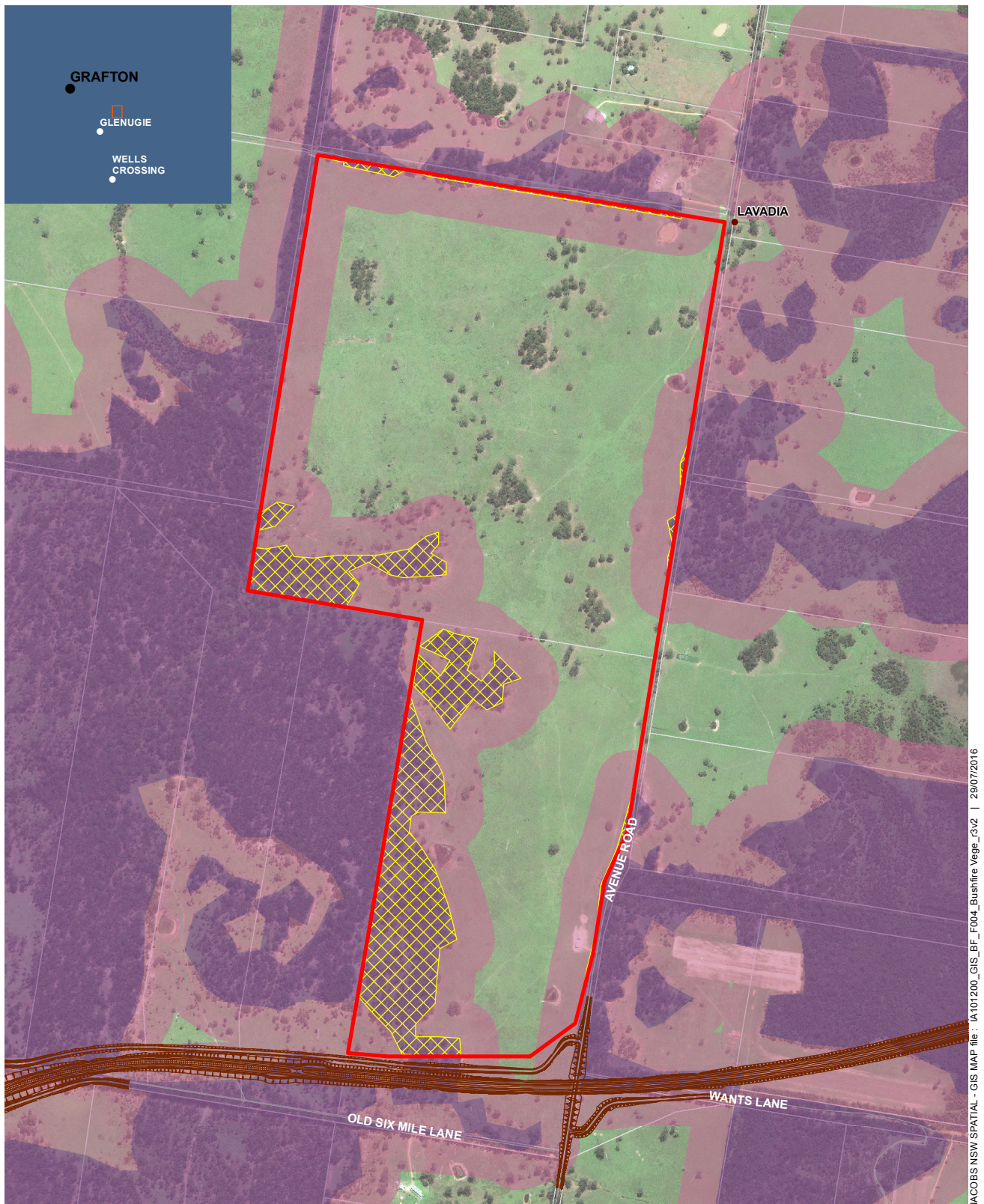
Retained native vegetation on the Project site and in the immediate areas around it (refer to **Figure 3-1b**) are mainly comprised of tall open forest of various eucalypt species, sometimes in association with *Allocasuarina littoralis* (Jacobs, 2016a). The main eucalypt species present are Pink Bloodwood (*Corymbia intermedia*), Grey Gum (*Eucalyptus punctata*), Spotted Gum (*C. maculata*) and Grey Ironbark (*E. paniculata*). Much of the native vegetation on the western side of the Project site is contiguous with larger patches on the adjoining properties. For more information about the vegetation on the Project Site refer to the Biodiversity Assessment Report (Jacobs, 2016a).

The properties on which the Project is proposed to be developed are located on a low, north-south trending ridge. Elevations range between about 10 and 35 m AHD. Slopes range up to about 10%, with the steepest areas located in the north of the Project site. The site has multiple aspects, but is generally west or east facing either side of the ridge.

3.3 Bushfire prone land

Bushfire prone land mapping published by Clarence Valley Council¹ does not identify the Project site as being bushfire prone. However, based on an assessment of the distribution of native vegetation (Jacobs, 2016b; based on RFS, 2014 guidance), bushfire prone land was found to extend into the Project site. This area includes parts of the planned footprint for the NGCC (refer to **Figure 3-2**).

¹ <http://spectrum.clarence.nsw.gov.au:8010/connect/analyst/?mapcfg=CV%20Bushfire%20Layers>



JACOBS NSW SPATIAL - GIS MAP file : IA101200_GIS_BF_F004_Bushfire Vege_r3v2 | 29/07/2016

Legend

- The Project
- Grafton Bypass (proposed)
- Bushfire risk areas
 - High bushfire risk area
 - 100m buffer on the high bushfire risk area
 - Project Site bushfire risk areas

0 250 500 Metres
1:15,000 @ A4



Data sources

Jacobs 2015
LPI 2015
NSW DPE 2015
RMS 2013 (W2B Alliance)

Figure 3-2 | Bushfire risk hazard map

3.4 Bushfire attack level exposure

Residential buildings located on BPL are required to conform to AS 3959-2009, *Construction of buildings in bushfire prone areas* (Standards Australia, 2009). AS 3959-2009 requires that residential buildings which may be exposed to flame, heat or ember attack incorporate appropriate protective design measures. These measures are proportional to the level of radiant heat exposure, which is defined by the separation between the structure and bushfire prone vegetation, the nature of the vegetation, the slope of the land on which the vegetation is located and the likely severity of fire weather conditions. No specific design measures are required if the bushfire prone vegetation is located more than 100 m from the structure. In such cases, the bushfire attack level (BAL) is rated as low.

Remnant vegetation around the footprint of the NGCC and associated facilities will be cleared during construction to create an APZ. This will alter the bushfire risk exposure of the Project site, as follows:

- **Bushfire prone land:** the area of BPL will be reduced, although only marginally. Most BPL within the Project site is associated with remnant vegetation which is either outside of the site boundaries or is on site and will remain uncleared.
- **Bushfire attack level:** as the APZ will extend for 100 m beyond the secure perimeter of the NGCC, the BAL exposure of all habitable buildings within the facility will be reduced to BAL-low. Consequently, no specific design measures to account for radiant heat exposure or ember attack will be required.

3.5 Fire weather conditions

The Project site has a warm temperate maritime climate with a summer/autumn rainfall peak (refer to Figure 3-3). Average annual rainfall at Grafton is 995 mm. Rainfall is highly variable, having ranged between 505 mm (1932) and 1859 mm (1950). Average monthly rainfall varies between 41 mm in August and 135 mm in January. Average daily temperatures range between 18.9 and 30.2°C in January and 6.6 and 20.2°C in July. The hottest day on record was 12 February 2017, when temperatures reached 46.3°C. The coldest day on record was 8 July 2014, when temperatures dropped to -1.9°C.

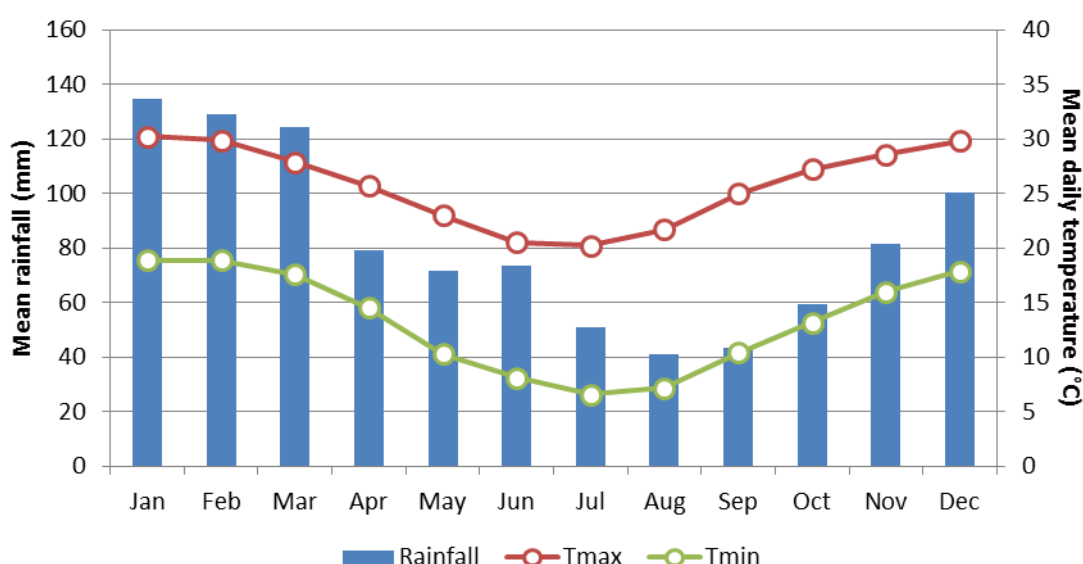


Figure 3-3 Average monthly rainfall, maximum temperature (Tmax) and minimum temperature (Tmin) for the Project site. Data from Bureau of Meteorology station 058077 (Grafton Research Station) for 1917-2017.

The statutory fire danger period typically commences in September and extends through to about March. However, it has commenced as early as mid-July and finished as late as mid-April the following year in years with abnormally low rainfall (Clarence Valley Bush Fire Management Committee [BFMC] 2008).

Days with elevated fire weather conditions are most commonly experienced during spring and are characterised by strong, dry and warm westerly winds.

3.6 Key bushfire risk scenarios

Given the climate of the Grafton area and location of the Project site in relation to large patches of native vegetation in which bushfires may develop, there are considered to be two main bushfire risk scenarios:

- *Scenario 1:* fire approaching the NGCC through native vegetation and pasture lands, under the influence of strong, dry, warm westerly winds. Such conditions would elevate fire danger and potentially contribute to dangerous and unpredictable fire behaviour. In such a scenario, a relatively intense bushfire could approach the NGCC quite rapidly and burn in bushland to the edge of the Project site. Such a fire could cut access to the facility from the south and west.
- *Scenario 2:* fire approaching the NGCC through pasturelands and/or native vegetation under the influence of strong, but mild and relatively humid winds from the south to north-east. Milder conditions would reduce the intensity and rate of spread of such a fire relative to one envisaged under the first scenario. Such a fire may also cut access to the facility from the south and east. Once constructed, the upgraded Pacific Highway will reduce the exposure of the Project site to fires burning the south and south-east.

4. Bushfire protection measures during construction of the New Grafton Correction Centre

4.1 Overview

The NGCC is required (as per the SEARs) to be considered as a SFPP development. Bushfire protection measures for operation of the facility are to follow those described for SFPP developments in *Planning for bushfire protection* (RFS, 2006) and will be developed during construction. These provide excellent foundation for protection of infrastructure and personnel during the construction phase.

The main forms of bushfire protection measure (from PBP) which have application to construction and operation of the NGCC are:

- **APZ:** which provide a buffer zone between a bushfire hazard and buildings. APZ are managed to minimise fuel loads and reduce potential radiant heat levels, flame, ember and smoke attack. They provide adequate defensible space for firefighters and other emergency services personnel. A 100 m wide APZ is to be provided around the secure perimeter of the NGCC. This provides a suitable framework for the protection from bushfire of temporary, construction-phase buildings or other structures.
- **Site and internal access roads:** which provide safe operational access to and within the Project site for emergency services personnel to suppress a bushfire.
- **Utility provision:** adequate water is required for fire suppression and/or protection of structures or equipment located on site. Electricity and any gas services should be located to avoid exacerbating the risk of fire to the buildings.
- **Emergency and evacuation planning:** evacuation of construction personnel may be required in case of a bushfire emergency.

Bushfire hazards associated with hot works, storage of flammable or otherwise hazardous materials and the accumulation of grassy bushfire fuels must also be managed through the construction phase.

Details of construction and operation stage bushfire protection measures for the NGCC and Project site are also provided in the facility's *Bushfire Management Plan* (John Holland Group, 2017).

4.2 Asset protection zones

APZ provide a low fuel hazard buffer between buildings and a bushfire hazard and create a defensible space to manage the flame, radiant heat and ember exposure of the building, emergency service personnel and occupants who remain in place or are evacuated. The required width of an APZ is determined from consideration of several factors, including:

- **Type of development:** SFPP developments require greater APZ widths than other types of development due to the greater vulnerability of occupants.
- **Type of vegetation:** tall open forests of the type present within and near the Project site pose the greatest bushfire risk and require the widest APZ of any of the vegetation types considered by PBP.
- **Slope:** under the higher risk bushfire scenario, bushfire prone vegetation is generally located downslope of the proposed NGCC facility. This means that fires will burn upslope towards them, which will increase the intensity and rate of spread.
- **Prevailing fire weather conditions:** the expected maximum fire danger index for Clarence Valley LGA (Far North NSW) is 80.

Based on the characteristics of the Project site, the APZ for the NGCC must be at least 70 m wide, with at least 50 m of readily defensible inner protection area. If no provision is made for ember protection in the buildings' final design and construction, the APZ and its inner protection area must be at least 100 m wide.

Development of a cleared zone around the secure outer perimeter of the high and low security facilities allows for the creation of an at least 100 m wide APZ (refer to **Figure 4-1**). This will be developed during the construction phase and remain in place during operation of the correction centre.

The cleared zone will also provide for an APZ of at least 20 m around the site of the proposed waste water treatment plant (WWTP, refer to **Figure 4-1**). This is to provide a buffer around the storage lagoon and protection for any sensitive equipment. The latter will all be located considerably more than 100 m from any non-grassy bushfire fuel hazard.

Temporary buildings to support construction will generally be located within and protected by the space cleared for the APZ. All temporary buildings will be located so that they are protected by at least a 50 m APZ.

Grass growing in the cleared space within the APZ will be maintained intensively, particularly at any stage when the grasses are cured and more flammable. The maximum recommended height is 20 cm at any time and 10 cm when the grasses are cured. Any woody vegetation regrowth within this area should be removed. Landscaping within the APZ should not allow continuous canopy connection to other vegetation.

4.3 Internal access roads

Access for emergency services personnel responding to a bushfire event is required into and around the Project site.

4.3.1 Access into the Project site

There is a single proposed access point to the Project site. It enters the Project Site from Avenue Road. Avenue Road connects to the Pacific Highway via Eight Mile Lane to the south and Old Six Mile Lane connects to the Pacific Highway to the west via Clarence Valley Regional Airport. If a fire were to approach the Project site from bushland to the south or west, emergency services may need to gain access from the north, via Avenue and Deep Creek Roads.

The upgraded Pacific Highway will form the southern boundary of this site once completed in approximately 2019. As part of that project, Avenue Road will pass under the Pacific Highway and the intersection of Avenue Road and Old Six Mile Road will be upgraded to improve local access, without direct connection to the highway.

The capacity of both northerly and southerly/westerly access routes to safely provide access to the Project site for up to Category 1 fire appliances should be assessed. If access from either direction is deficient, upgrading of either or both access routes should be considered and undertaken if necessary. Avenue Road will be upgraded during construction of the project, with responsibility for this residing with Infrastructure NSW.

4.3.2 Access around the Project site

Access within the APZ and through the remainder of the property is required for bushfire protection. A fire access track will be established inside the perimeter of the APZ (refer to **Figure 4-1**) during its development and remain in operation through the life of the correction centre. The track is to be a minimum of 4 m wide, with passing bays every 200 m. The track will need to support heavy vehicles, and have a minimum vertical clearance of 4 m to any overhanging obstructions. It will meet the standards specified in the Bush Fire Coordinating Committee Policy No. 2/2007 Fire trails for Category 1 fire appliances.

Other internal access tracks will be developed to support heavy vehicle access during construction of the correction centre. These will be available for use in fire responses, if required.

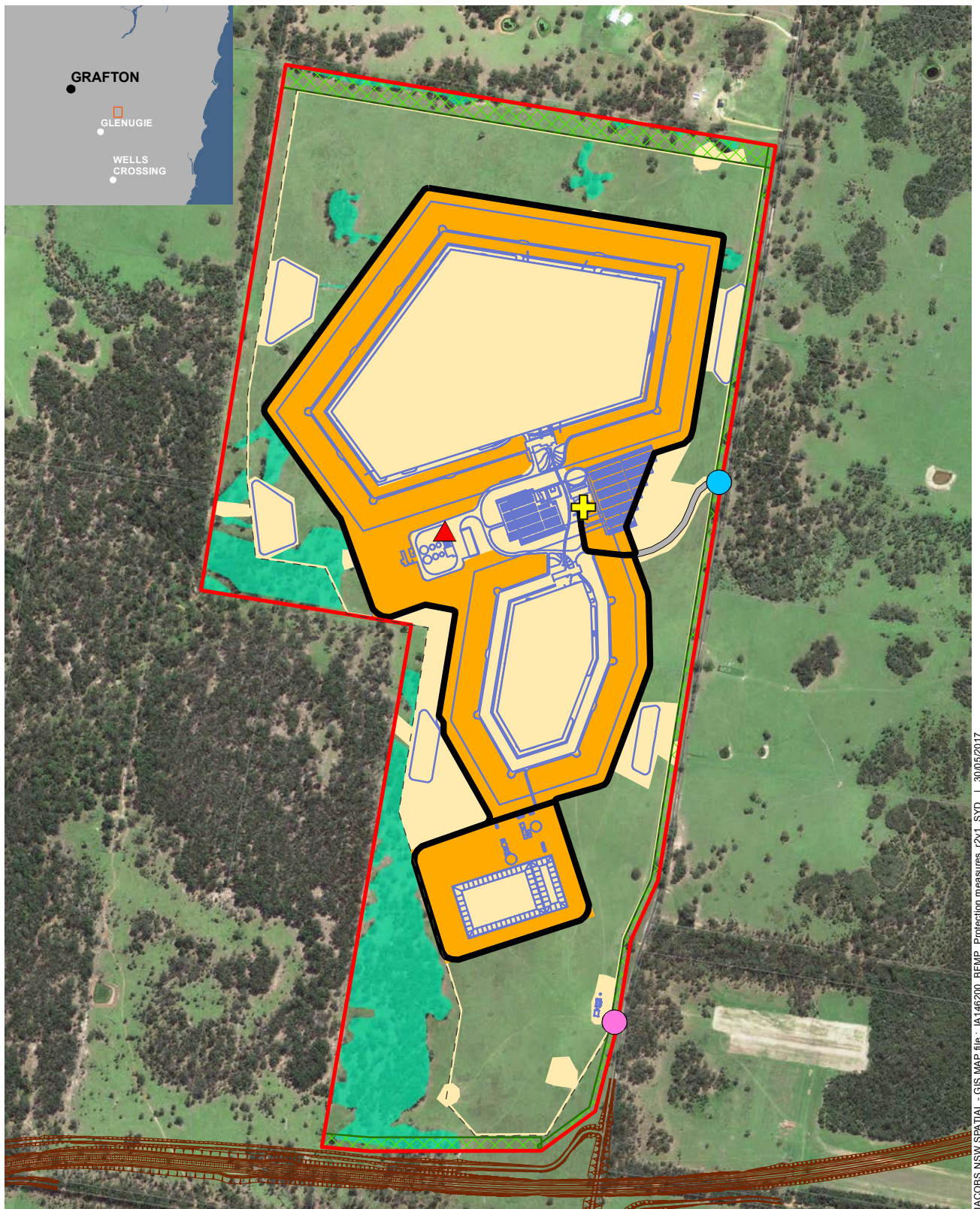


Figure 4-1 | Bushfire protection measures

Data sources
 Jacobs 2017
 LPI 2016

4.4 Utility provision

4.4.1 Water for fire fighting

It is essential that water supplies are adequate for the protection of temporary construction buildings and suppression of fires within the Project site. A 20,000 L fire water tank will be located on site at commencement of construction works (Figure 4-1). Construction of the tank will be as per RFS standards for fire resistance and the tank will be fitted with standard fittings to allow use by RFS appliances. A concrete hard stand will be constructed adjacent to the water tank and a 3 kW petrol or diesel-powered water pump will be available at this location at all times. The water point will be clearly signposted.

Fire water supplies are to be provided for operation of the correction centre via stand pipes which will be constructed at approximately 200 m intervals along the track which follows the outer boundary of the APZ. These will be available for use in fire suppression once they are operational.

Storm water detention basins are to be constructed around the perimeter of the site. Once they are in operation, they may also act (subject to water availability) as an additional source of fire-fighting water.

4.4.2 Gas and electricity

Electricity and any gas service provision will be located and maintained so that they do not exacerbate bushfire risks to the facility or its occupants. Consistent with the PBP recommendations for SFPP developments, on-site electrical services will be provided underground. Any LP gas services will be installed and maintained in accordance with AS1596-2014 *The storage and handling of LP gas* (Standards Australia, 2014).

4.5 Emergency planning

The construction footprint is to be totally cleared, which reduces the potential exposure of construction personnel to bushfire hazards during construction. In the event of a bushfire emergency, all construction personnel will be instructed to make their way to the Emergency Assembly point located at the site entry point on Avenue Road in case of bushfire.

Select JHG staff members are to be trained as fire wardens for the period of construction. Duties of the fire wardens include:

- Knowledge of operation and application of fire extinguishers and other fire fighting gear present on site;
- Monitor fire weather conditions and the incidence of fire in the surrounding landscape (via Bureau of Meteorology, ABC local radio [738 AM], Fires Near Me NSW mobile app);
- Watching out for smoke; and
- Co-ordination of site evacuation if necessary.

If a bushfire threatens the Project site, the site manager (or delegate) will contact emergency services on 000 or 112. Staff will be evacuated from site if and as recommended by the RFS. An emergency evacuation plan has been prepared for the construction phase and is included with the Bushfire Management Plan (John Holland Group, 2017).

4.6 Management of bushfire hazards

4.6.1 Construction activities

Construction activities pose risks for on-site ignitions which may result in a fire escaping to surrounding properties. These mainly arise from hot work (activities with naked flames or the potential to generate sparks), vegetation clearing and management and use of vehicles on site.

- *Hot works*: hot works will comply with the JHG Hot Works Management Plan, which is included with the Bushfire Management Plan (John Holland Group, 2017).

- *Storage of flammable liquids and other hazardous materials:* bulk flammable liquids and materials will be kept in an area that is clearly delineated, identified and marked on the site plan for reference (refer to **Figure 4-1**). This area will be within the defined APZ. Bulk containers and bulk storage units will comply with the requirements of AS 1940 - *The storage of flammable and combustible and combustible liquids*. John Holland procedures for storing bulk hazardous chemicals will apply, as described in the Bushfire Management Plan (John Holland Group, 2017).

4.6.2 Property maintenance

Once constructed, the APZ will be maintained in the following condition:

- Clear, open area with no structures, landscaping or woody vegetation; and
- Grass to be mown/slashed regularly, maximum length of 10 cm and 5 cm when cured.

Maintenance of low bushfire fuel hazard levels within the Project site boundaries (beyond the APZ) will further assist in providing a safe environment for Project staff during site construction. Pasture grasses in existing cleared areas that are not proposed for native vegetation restoration will be managed by grazing and/or slashing to prevent the accumulation of bushfire fuel hazard and reduce the potential for fire to spread from adjacent bushland areas. Grasses will be maintained at no more than 10 cm height when cured.

4.7 Potential environmental impacts of proposed bushfire protection measures

Potential environmental impacts of the proposed bushfire protection measures are largely confined to the clearing of remnant native vegetation within the cleared zone. Since this clearing is proposed to occur regardless of bushfire protection measures, clearing for the latter is not considered to be an additional environmental impact.

Construction of the internal fire trails would involve minor local soil disturbance along their routes and localised disruption to overland flow paths. The latter will be addressed as required, potentially with the installation of culverts and standard drainage stabilisation techniques.

Proposed maintenance of the APZ and grassland areas would largely replicate the historical management of the property and have no additional environmental impact.

Bushfire fuel hazards within patches of native vegetation which are to be retained on site will not be actively managed during construction.

5. Bushfire protection measures during operation of the New Grafton Correction Centre

5.1 Overview

Planning for Bushfire Protection (NSW RFS, 2006) is primarily concerned with bushfire protection measures for the operational phase of SFPP and other developments. However, many of the required measures will be implemented during construction and have already been described (refer to **Section 4**).

This section provides an overview of bushfire risks applicable to operation of the correction centre and draws on the facility's Bushfire Management Plan (John Holland Group, 2017). Some aspects (particularly emergency management) will be developed by the facility's operator prior to commencement of operations.

The main forms of bushfire protection measure (from PBP) which have application to construction and operation of the NGCC are similar to those described in **Section 4.1** and include construction of APZs, site and internal access roads and provision of fire water supplies. Bushfire hazards associated with "hot" maintenance works, storage of flammable or otherwise hazardous materials and the accumulation of grassy bushfire fuels must also be managed while the facility is operated.

5.2 Asset protection zones

APZ provide a low fuel hazard buffer between buildings and a bushfire hazard and create a defensible space to manage the flame, radiant heat and ember exposure of the building, emergency service personnel and occupants who remain in place or are evacuated.

Development of a cleared zone around the secure outer perimeter of the high and low security facilities allows for the creation of an at least 100 m wide APZ (refer to **Figure 4-1**). This will be developed during the construction phase and remain in place during operation of the correction centre. The cleared zone will also provide for an APZ of at least 20 m around the site of the WWTP. This is to provide a buffer around the storage lagoon and protection for any sensitive equipment. The latter will all be located considerably more than 100 m from any non-grassy bushfire fuel hazard.

Grass growing in the cleared space within the APZ will be maintained intensively, particularly at any stage when the grasses are cured and more flammable. The maximum recommended height is 20 cm at any time and 10 cm when the grasses are cured. Any woody vegetation regrowth within this area should be removed. Landscaping within the APZ should not allow continuous canopy connection to other vegetation.

5.3 Internal access roads

Access for emergency services personnel responding to a bushfire event is required into and around the Project site.

5.3.1 Access into the Project site

There is a single proposed access point to the Project site, from Avenue Road (refer to **Figure 4-1**). Avenue Road connects to the Pacific Highway via Eight Mile Lane to the south and Old Six Mile Lane connects to the Pacific Highway to the west via Clarence Valley Regional Airport. By the time the NGCC is operational, the upgraded Pacific Highway is likely to form the southern boundary of this site. Avenue Road will pass under the Pacific Highway and the intersection of Avenue Road and Old Six Mile Road will be upgraded to improve local access, without direct connection to the highway.

Avenue Road will be upgraded (by Infrastructure NSW) during construction of the project. This will allow access by Category 1 fire appliances.

5.3.2 Access around the Project site

Access within the APZ will be provided via an access track constructed along its perimeter (refer to **Figure 4-1**). The track will be a minimum of 4 m wide, with passing bays every 200 m. It will meet the standards specified in the Bush Fire Coordinating Committee Policy No. 2/2007 Fire trails for Category 1 fire appliances.

5.4 Utility provision

5.4.1 Water for fire fighting

Fire water supplies are to be provided for operation of the correction centre via stand pipes which will be constructed at approximately 200 m intervals along the track which follows the outer boundary of the APZ. Concrete hard stands will be constructed at each water point to ensure accessibility.

Storm water detention basins are to be constructed around the perimeter of the site. They may also act (subject to water availability) as an additional source of fire-fighting water during operation of the correction centre.

5.4.2 Gas and electricity

Electricity and any gas service provision will be located and maintained so that they do not exacerbate bushfire risks to the facility or its occupants. On-site electrical services will be provided underground. Any LP gas services will be installed and maintained in accordance with AS1596-2014 *The storage and handling of LP gas* (Standards Australia, 2014).

5.5 Emergency planning

As a large, secure correctional facility, emergency evacuation in case of bushfire is unlikely to be considered. Emergency responses will instead focus on supporting occupants of the facility in place during a bushfire event, effective bushfire responses by emergency service agencies and the provision of fire water supplies. These would be supported by planned and programmed maintenance of the APZ and internal access tracks.

To comply with requirements for SFPP developments under PBP, a bushfire emergency plan will be prepared (by the operator) in accordance with AS3745-2010 *Planning for emergencies in facilities* (Standards Australia, 2010).

5.6 Management of bushfire hazards

Management of the NGCC has potential to cause on-site ignitions which may result in a fire escaping to surrounding properties. This risk mainly arises from hot work (activities with naked flames or the potential to generate sparks) and use of vehicles on site. Risk controls for hot works will be described in the operator's hot works procedures.

During operation of the NGCC, bulk flammable liquids and materials will be kept in an area that is clearly delineated, sign-posted and identified on the site plan. This area will be located with the APZ. Bulk containers and bulk storage units will comply with the requirements of AS 1940 - *The storage of flammable and combustible and combustible liquids* and the operators own safe work procedures.

The APZ will generally be maintained with no structures, landscaping or woody vegetation. Grass is to be maintained at a maximum length of 10 cm when cured. Maintenance of low bushfire fuel hazard levels within the Project site boundaries beyond the APZ will further assist in providing a safe environment at the NGCC. Pasture grasses in existing cleared areas that are not proposed for native vegetation restoration will be managed by grazing and/or slashing to prevent the accumulation of bushfire fuel hazard and reduce the potential for fire to spread from adjacent bushland areas. Grasses will be maintained at no more than 10 cm height when cured.

Fuel hazard within retained native vegetation will be managed in a manner consistent with these areas' ecological requirements.

5.7 Potential environmental impacts of proposed bushfire protection measures

Potential environmental impacts of the proposed bushfire protection measures will largely be experienced during the construction phase (as per **Section 4.7**).

6. Conclusions and recommendations

6.1 Bushfire hazard assessment

The Project is to be constructed on two allotments (Lot 26 DP 751376 and Lot 1 DP 1190399) near Lavadia, south-east of Grafton. The Project Site has a total area of 195 ha and supports a mix of pasture grassland and tall open forest with a grassy understorey. The majority of the native vegetation is connected with larger patches on adjacent landholdings to the west and south. It is proposed that all woody vegetation with a defined “cleared zone” be removed as part of the Project.

BPL mapping published by the Clarence Valley Council does not show the Project Site to be bushfire prone. However, based on the type of vegetation and the connection between patches of remnant vegetation in this area, it is considered that this classification is incorrect and that the site and most surrounding land is bushfire prone.

With the removal of remnant native vegetation from the cleared zone, there will be at least 100 m separation between bushfire prone vegetation and habitable structures to be constructed as part of the facility. Thus their bushfire attack level is anticipated to be BAL-low and no specific protective measures for ember attack or radiant heat exposure are required.

6.2 Bushfire risk scenarios

The bushfire season in the Clarence Valley generally commences in early September and finishes in late February/early March. As a result of the area’s relatively humid climate, days with greatly elevated fire danger are uncommon. They mostly occur during spring and on days with strong, warm, dry westerly winds.

Two main bushfire risk scenarios facing the Project site have been identified as part of this assessment:

- *Scenario 1:* fire approaching the Project site through native vegetation and pasture lands, under the influence of strong, dry, warm westerly winds. Such conditions would elevate fire danger and potentially contribute to dangerous and unpredictable fire behaviour. In such a scenario, a relatively intense bushfire could approach the Project site quite rapidly and burn in bushland along the site’s western boundary. Such a fire could cut access to the Project from the south and west.
- *Scenario 2:* fire approaching the Project site through pasturelands and/or native vegetation under the influence of strong, but mild and relatively humid winds from the south to north-east. Milder conditions would reduce the intensity and rate of spread of such a fire relative to one envisaged under the first scenario. Such a fire may also cut access to the Project site from the south and east. Once constructed, the upgraded Pacific Highway would reduce the exposure of the Project from the south and south-east.

6.3 Bushfire protection measures

Bushfire protection measures have been developed to take account of the risks posed by these two scenarios, particularly the first and more hazardous of the two. They are predicated on the correction centre not being evacuated (under all foreseeable circumstances) in case of an approaching bushfire. These protection measures address the requirements of *Planning for bushfire protection* (RFS, 2006) and the treatment of the Project as a SFPP development. They are described in detail in the NGCC Bushfire Management Plan.

Key BPM includes:

- *APZ:* which provide a buffer zone between bush fire hazards in the surrounding properties and buildings to be constructed as part of the Project. A 100 m wide APZ will be constructed around the secure perimeter of the high and low security facilities and maintained with low bushfire fuel hazard. It will provide an adequate defensible space for firefighters and other emergency services personnel and eliminate any requirement for habitable buildings within the facility to incorporate design features to address radiant heat exposure or ember attack.

- *External access and internal access roads:* which provide safe operational access into the Project site and around the outside of the APZ.
- *Utility provision:* a fire water supply system will be provided during construction and operation of the correction centre. Water supplies will be provided via a 20,000 L water tank and pump. This will be replaced during operations by a series of stand pipes located at about 200 m intervals along the APZ access track. Electricity and any gas services will be located safely.
- *Emergency planning:* suitable emergency management arrangements have been devised for the construction phase. These are documented in the site Bushfire Management Plan. Emergency management procedures will be developed for the operational phase of the facility before this commences.
- *Property maintenance:* low bushfire fuel hazards will be maintained throughout the property, particularly within the APZs. Areas covered by pasture grasses managed by slashing and/or grazing. Tracks will be maintained to ensure accessibility by fire appliances. Any accumulations of dead plant material from landscape buffers or retained native vegetation along the property boundary will be managed to address ecological requirements
- *Hot works:* safe hot work procedures will be developed and implemented during construction and operator to manage the risk of bushfire ignitions from sparks and naked flames.
- *Hazardous materials storage:* flammable and other hazardous will be stored safely to control risks associated with their ignition during a bushfire event.

6.4 Potential environmental impacts of bushfire protection measures

One of the key assumptions of this assessment was that native vegetation within the Development Zone and the 100 m wide APZ will be entirely removed for ease of construction, security and bushfire safety. Placement of the high and low security on the Project site allows much of the native vegetation to be retained, hence reducing the ecological impact of clearing.

Beyond the effect of clearing, the environmental impacts of bushfire protections measures are considered to be marginal.

6.5 Conclusion

This Bushfire Assessment Report and the NGCC Bushfire Management Plan have fulfilled the requirement of SEAR No 17 the development satisfy applicable requirements for a Special Fire Protection Purpose development as detailed in *Planning for Bushfire Protection 2006*. In addition this Bushfire Assessment Report and the NGCC Bushfire Management Plan have fulfilled the requirement of B17 Schedule 2, Part B of the Stage 1 Conditions.

7. Glossary

APZ	Asset protection zone(s).
BAL	Bushfire attack level (after AS 3959-2009 <i>Construction of buildings in bushfire prone areas</i>).
BCA	Building Council of Australia.
BFCC	Bush Fire Coordinating Committee of NSW.
BPL	Bushfire prone land.
CVBFMC	Clarence Valley Bush Fire Management Committee.
DPE	Department of Planning and Environment.
EIS	Environmental Impact Assessment.
EP&PA Act	<i>Environmental Planning and Assessment Act 1979</i> .
FDR	Fire danger rating.
INSW	Infrastructure NSW.
LGA	Local government area.
NGCC	New Grafton Correctional Centre.
PBP	Planning for bushfire protection (NSW RFS, 2006).
PPP	Public-private partnership.
RFS	NSW Rural Fire Service.
SEARs	Secretary's Environment Assessment Requirements.
SFPP	Special Fire Protection Purposes development.
SRD SEPP	<i>State Environmental Planning Policy (State and Regional Development) 2011</i> .
SSD	State Significant Development.

8. References

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John Holland Group 2017. New Grafton Correction Centre. Bush Fire Management Plan (BFMP). Document JHG-NGCC-PLN-APP-017.

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