STATE SIGNIFICANT INFRASTRUCTURE ASSESSMENT:
Chaffey Dam Safety Upgrade and Augmentation
SSI-5039

Director-General's
Environmental Assessment Report
Section 115ZA of the
Environmental Planning and Assessment Act 1979

February 2014

ABBREVIATIONS

AEP	Annual Exceedance Probability: the probability that rainfall accumulated over a given duration will be exceeded in any one year
Agency	Planning & Infrastructure
ARI	Average Recurrence Interval: The average, or expected, value of the periods between exceedances of a given rainfall total accumulated over a given duration
CEEC	Critically Endangered Ecological Community
CIV	Capital Investment Value
DoE	Department of the Environment
DGRs	Director-General's Requirements
Director-General	Director-General of Planning & Infrastructure
DPI	Department of Primary Industries; includes the NSW Office of Water (NOW), Fisheries NSW, Crown Lands and Agriculture NSW
EEC	Endangered Ecological Community
EPA	Environment Protection Authority
EP&A Act	*Environmental Planning and Assessment Act 1979*
EP&A Regulation	Environmental Planning and Assessment Regulation 2000
EPI	Environmental Planning Instrument
GL	Giga litres
ISEPP	State Environmental Planning Policy (Infrastructure) 2007
MD SEPP	State Environmental Planning Policy (Major Development) 2005
Minister	Minister for Planning and Infrastructure
ML	Mega litres
Namoi CMA	Namoi Catchment Management Authority
North West LLS	North West Local Land Services
OEH	Office of Environment and Heritage
PEA	Preliminary Environmental Assessment
PIR	Preferred Infrastructure Report
PMF	Probable Maximum Flood: largest flood that could conceivably occur at a given location. The PMF at Chaffey Dam is approximately 1 in 1,000,000 AEP
Proponent	State Water Corporation
RMS	Roads and Maritime Services
SSI	State Significant Infrastructure, under Part 5.1 of the *Environmental Planning and Assessment Act 1979*

Cover Photograph: View of reservoir from dam wall, with spillway in foreground (officer's photograph, April 2013)

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EXECUTIVE SUMMARY

State Water Corporation has lodged a State Significant Infrastructure application for the Chaffey Dam Safety Upgrade and Augmentation Project, at Chaffey Dam, approximately 45 kilometres south-east of Tamworth. The key objectives of the project are to ensure that the flood safety of the dam meets contemporary standards and to maintain a secure water supply for Tamworth and surrounding irrigated agricultural land uses.

The proposal seeks to raise the existing dam wall and 'morning glory' spillway by 6.5 metres (to 542.1 and 525.1 metres AHD respectively), and to increase the size of the reservoir to a Full Supply Level (FSL) of 525.1m AHD and to a capacity of 100,000 megalitres (ML). The project has a Capital Investment Value of $43.3 million, and is expected to create up to 50 jobs during construction.

The Environmental Assessment of the project was placed on public exhibition from 13 December 2012 to 31 January 2013. Six submissions were received during the exhibition period, all from public authorities. Two submissions were received after the exhibition period, one from a public authority and one from a member of the public. None of the submissions from public authorities objected to the proposal but raised comments for consideration and/or recommended conditions. The late public submission raised concerns about potential impacts on the Booroolong Frog and about the effectiveness of existing conservation programs.

The Preferred Infrastructure Report addressed these submissions, changed the construction method of the dam wall to a concrete parapet, reduced the amount of clearing thereby improving the preservation of native vegetation, and provided further project justification and flora and fauna assessment.

The key issues considered in Planning and Infrastructure's assessment include:

- flora and fauna;
- water allocations and dam operation; and
- land
- use and recreational impacts.

The project will have impacts on Endangered Ecological Community (EEC) and Critically Endangered Ecological Community (CEEC), and two threatened species. These constitute potential impacts on Matters of National Environmental Significance (MNES) requiring approval from the Commonwealth Environment Minister under the *Environment Protection and Biodiversity Conservation Act 1999*. Planning and Infrastructure has liaised with the Commonwealth Department of the Environment in preparing this report and is satisfied that impacts can be appropriately mitigated and/or offset.

Water and flooding impacts include potential changes to water supply during construction and additional downstream flooding due to the operation of the auxiliary spillway. Downstream water supply is subject to separate review/determination under the *Water Management Act 2000*, and flooding impacts are not considered significant in the context of the large rain event that would trigger the auxiliary spillway.

The augmentation will inundate some recreational uses associated with the reservoir and parts of adjoining farms. Recreational facilities will be replaced and inundated parts of adjoining farms will be acquired. Planning and Infrastructure is satisfied that impacts associated with the proposal will not significantly affect recreational uses or agriculture in a regional context.

Planning and Infrastructure has undertaken a comprehensive assessment of the proposal's merits and acknowledges that the project is required to meet contemporary dam safety standards and to secure water supply in the future. The environmental commitments, impact avoidance and minimisation measures contained in the Environmental Assessment, Preferred Infrastructure

Report, and Planning and Infrastructure's recommended conditions of approval ensure that the impacts associated with construction and operation of the project are mitigated or managed to acceptable levels.

Planning and Infrastructure therefore recommends that the application be approved, subject to recommended conditions.

1. BACKGROUND

1.1. Project Overview

State Water Corporation (the Proponent) operates Chaffey Dam on the Peel River, approximately 45 kilometres south-south-east of Tamworth. It serves as a flood control measure for the Peel River and is the primary town water source for Tamworth. The dam also provides water for irrigated agricultural land uses in the Peel Valley.

The SSI seeks approval to upgrade the safety of the dam to enable the dam wall to withstand a Probable Maximum Flood (PMF) and to provide greater certainty of water supply for Tamworth and surrounding agricultural areas. Specifically, the proposal seeks to raise the dam wall by 6.8 metres to 542.1 metres AHD and to increase the reservoir capacity from 62,000 megalitres (ML) to 100,000 (ML).

Chaffey Dam was built to meet flood safety standards at the time of its design and construction in the mid to late 1970s, but changes to flood modelling methodologies mean that the dam does not meet contemporary dam safety standards. Studies for dam safety works were carried out in the early 1990s and in the mid 2000s. Safety works were carried out in 2011 to construct an auxiliary spillway that is designed to safely pass a 1 in 470,000 Annual Exceedence Probabilty (AEP) flood. Despite this interim measure, Chaffey Dam does not meet relevant safety standards, which require it to safely pass a Probable Maximum Flood (PMF) event.

Tamworth's town water consumption is variable and fluctuates with drought and water restrictions. Recent annual use has ranged between less than 7,000 ML during drought conditions in 2007 and more than 10,000 ML in non-drought conditions. Town water is taken from the regulated Peel River Intake Pumping Station upstream of the confluence with the Cockburn River. Water at this location is released from Chaffey Dam and Dungowan Dam (a smaller dam on Dungowan Creek).

Chaffey Dam also provides water for general security water licences, which predominantly serve irrigated agriculture within the Peel Valley. General security water licences have a lower allocation priority than high security licences. Access to general security water and proportions of entitlements allocated depend on the volume of water available after high security allocations are exhausted.

While Tamworth's current water demands are within its water licence entitlement and can generally be accommodated by Chaffey Dam's existing capacity, the projected growth in population and the number of households is likely to increase town water consumption. This will affect the capacity of Tamworth's water supply to meet supply standards and reduce the availability of water for irrigation.

There is a long history of proposals to augment and/or upgrade the safety of Chaffey Dam. Preparatory studies and designs for an enlargement project were conducted by the NSW Department of Public Works in 1990. A further series of studies was conducted in the mid to late 2000s. In 2007 the NSW and Commonwealth governments announced funding for the augmentation and safety upgrade of the dam, but that funding was withdrawn in 2009. In response, the Proponent constructed an auxiliary spillway in 2011 as an interim measure, which increased the flood capacity from a 1 in 100,000 AEP rain event to a 1 in 470,000 AEP event. NSW and Commonwealth funding for the current project was announced in 2011.

1.2. Location

Chaffey Dam is located in the New England and North West Slopes region of NSW, approximately 45 km south-east of Tamworth, six kilometres south of Woolomin, and 13 kilometres north of Nundle, within the Tamworth Regional local government area. The project location is shown in **Figure 1**.

1.3. Site and surrounding land uses

Chaffey Dam was completed in 1979 and responded to an increased need for water storage in the Tamworth region. Its reservoir has a current Full Supply Level (FSL) of 518.6 metres AHD, a storage capacity of 62,000 ML, a reservoir surface area of 542 hectares (ha), and a catchment area of 420 square kilometres.

Land uses surrounding the dam include rural residential, agriculture and recreational uses associated with the dam, such as site offices, a campsite, picnic area, and fishing and water sports facilities. Historic land uses include agriculture and alluvial gold mining. Historical relics of these uses are evident around the dam. Small-scale gold fossicking continues to occur on the banks of the Peel River upstream of the reservoir.

Figure 1: Project location (Source: Google Maps)

2. PROPOSED PROJECT

2.1. Project Description

State Water Corporation proposes a safety upgrade and augmentation of Chaffey Dam. The key objectives of the proposal are to ensure that Chaffey Dam meets dam safety requirements to safely pass a Probable Maximum Flood (PMF) and to improve water supply reliability for Tamworth and surrounding agricultural users.

The proposal is to increase the dam wall height by 6.8 metres, from 535.3m AHD to 542.1m AHD, and to raise the main 'morning glory' spillway from 518.6m AHD to 525.1m AHD. The augmentation of the reservoir increases its FSL height from 518.6m AHD to 525.1m AHD, with a resultant capacity increase from 62,000 ML to 100,000 ML (an approximately 61 per cent increase). The existing spillway is also raised to 525.1m AHD to accommodate this augmented capacity.

The proposal also seeks approval to construct associated road works and reinstate recreational facilities lost to inundation. This includes the realignment of existing roads and bridges to the west and south-east of the reservoir to replace sections of road and bridges that will be inundated by the augmented FSL. The project layout is shown in **Figure 2**. The key components of the project are listed in **Table 1**.

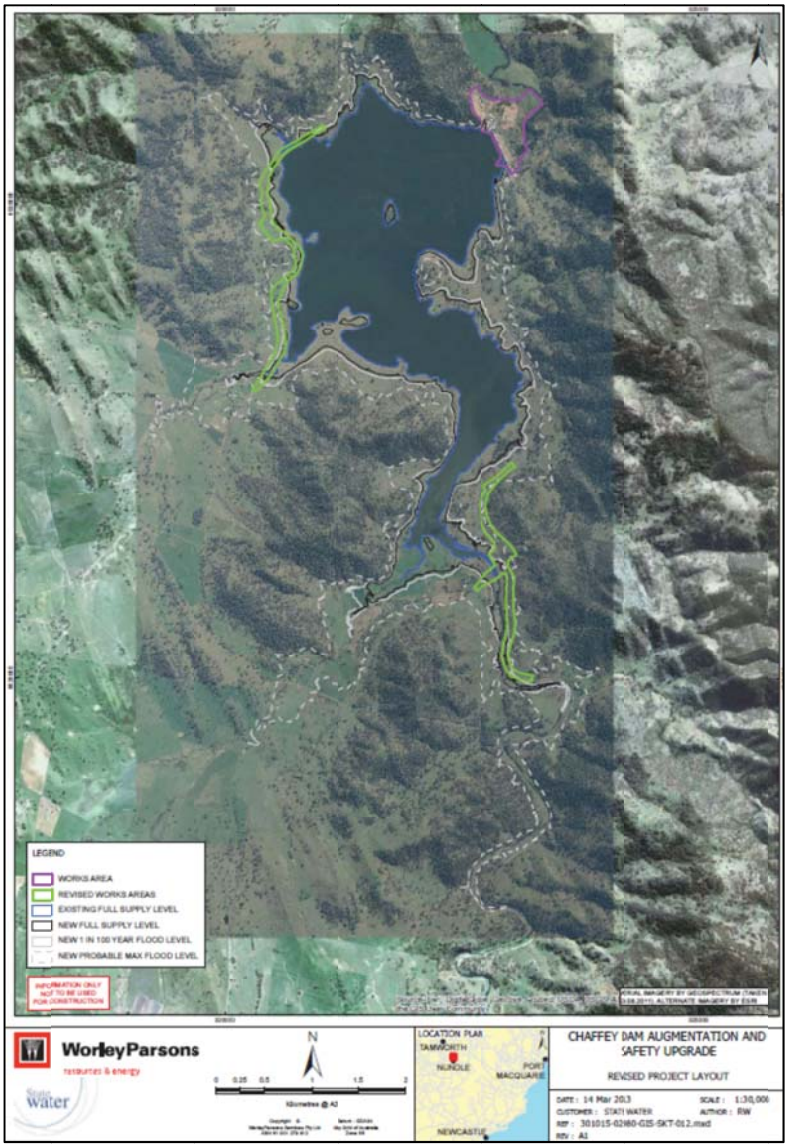

Figure 2: Project layout (Source: Preferred Infrastructure Report)

Table 1: Key project components

Aspect	*Description*
Project Summary	• Raise the height of the wall and existing spillway of Chaffey Dam; • Increase FSL of the reservoir from 62,000ML to 100,000ML; • Increase FSL of the reservoir from 518.6m AHD to 525.1m AHD; and • Realign sections of Tamworth-Nundle Road, Rivers Road, and Western Foreshore Road, including replacement of bridges and culverts.
Raising Dam Wall and Morning Glory Spillway	• Increase existing wall height by 6.8m from 535.3m AHD to 542.1m AHD and increase morning glory spillway height by 6.5m; • Vertical increase of dam wall height; and • Remove existing offtake of morning glory spillway, extend support piers, and replace with new offtake, at a height of 525.1m AHD.
Inundation to Augmented Reservoir FSL	• Increase reservoir capacity at FSL from 62,000ML to 100,000ML. Water level at FSL increase from 518.6m AHD to 525.1m AHD; and • Increase surface area of the reservoir from 542ha to 727ha.
Realignment of Roads and Bridges	• Realignment of Tamworth-Nundle Road and Rivers Road (eastern side of dam), including an intersection and construction of a new Bowling Alley Point Bridge; and • Realignment of Western Foreshore Road (western side of dam), including modification to Hydes Creek Bridge and modification to the existing culvert crossing at Silver Gully.
Relocation of recreational facilities	• Replacement of facilities for South Bowlo Fishing Club (on the northern shore of Chaffey Dam) above the 1 in 100 AEP flood level, including new access road, clubhouse, amenities, shelters, boat ramp, and caravan park, and new lease area for the club; and • Relocation/replacement of facilities to be inundated at the Bowling Alley Point Recreation Area.
Reserve Offset Areas	• Two areas established for biodiversity offsets including 983.77ha to the north-west of the reservoir and 74.49ha within the Peel River and adjoining riparian zones, upstream of the reservoir to the south of Nundle.

2.2. The Preferred Project

The Preferred Infrastructure Report and letter from Worley Parsons to Planning and Infrastructure of 20 August 2013 resulted in changes to the project. Consistent with the objectives of the proposal, the revised design meets the dam safety requirements to safely pass a PMF. **Table 2** provides a summary of key project changes.

Table 2 : Key project changes

Aspect	*Environmental Assessment*	*Preferred Infrastructure Report*
Dam wall construction	Enlarge height of embankment wall to 542.1m AHD.	Construct parapet wall on top of existing embankment to 542.1m AHD.
Auxiliary spillway	New dual fuse installed to trigger the spillway at a 1 in 10,000 AEP and 1 in 20,000 AEP event.	No change to existing auxiliary spillway. Raised reservoir level will result in triggering existing fuse at a 1 in 1,000 AEP event.
Road construction	127.8ha of native vegetation cleared for road realignment and bridge reconstruction works.	48.9ha of native vegetation cleared for road and bridge works.
Offsets	Offset area not identified	983.77ha offset site to north-west of the reservoir. 74.49ha offset site on Peel River and adjoining riparian zones.

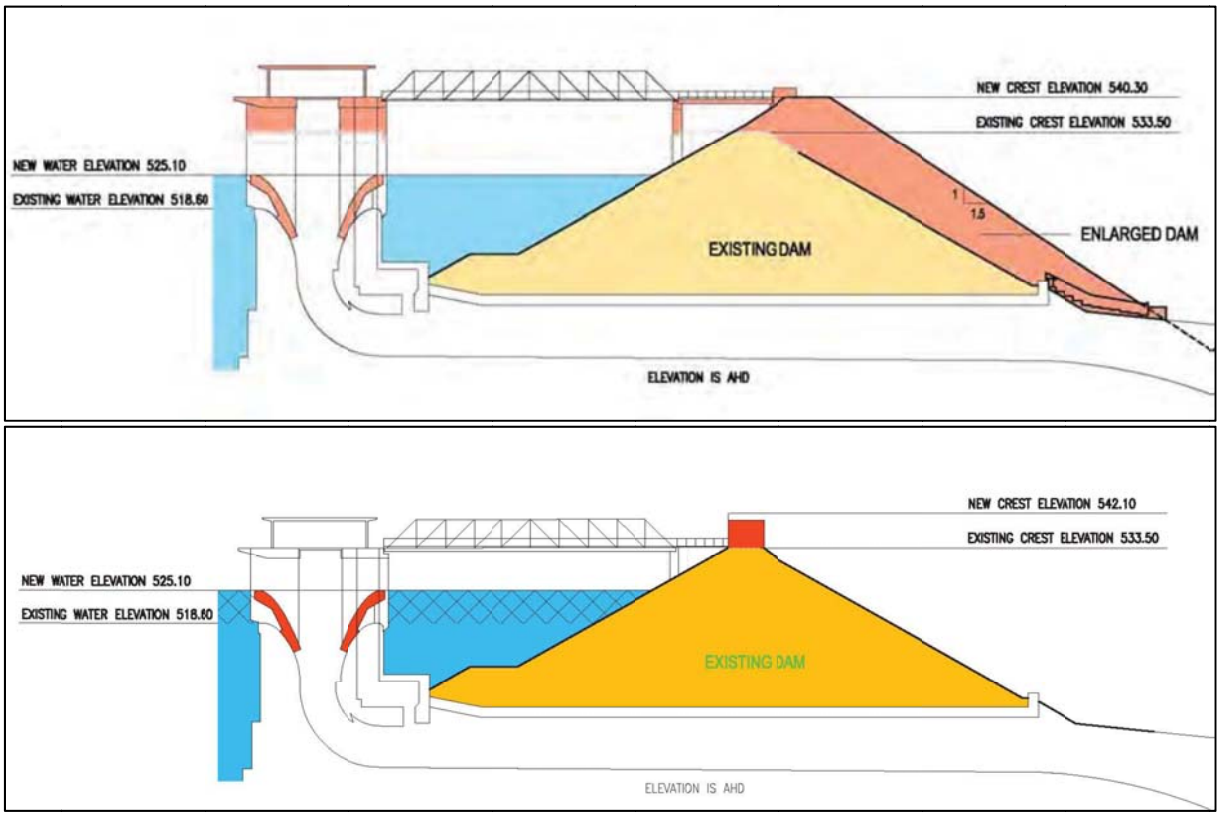

Figure 3: EA (top) and determination (bottom) dam wall additions

2.3. Project Need and Justification

Safety Upgrade

Dam safety in NSW is regulated by the *Dams Safety Act 1978* and by the Dams Safety Committee (DSC). Chaffey Dam is a scheduled dam under Schedule 1 of the *Dams Safety Act* and is considered to be an extreme consequence dam. Dams are rated in the "extreme" consequence category when their failure would result in a probable loss of life of greater than 50, and would have major or catastrophic damage or loss based on the social, economic, and environmental impacts of dam failure. GHD estimated that a failure of Chaffey Dam due to an

extreme flood event may lead to a loss of up to 150 lives and cause over $2.1 billion of damage to property and lost agricultural production. In addition, dam failure would have a significant impact on the water supply to Tamworth and local agricultural land uses.

The DSC requires that dams rated in the "extreme" consequence category pass a PMF and maintain a 600mm freeboard between the top of the water level and the crest of the dam during a PMF when the dam is already at its approved maximum FSL. The PMF of the Chaffey Dam reservoir catchment is approximately a 1 in 1,000,000 AEP event.

Prior to the 2011 auxiliary spillway works, Chaffey Dam had capacity to contain a 1 in 100,000 AEP flood event. The construction of the auxiliary spillway improved the safety risk of the dam and its flood capacity was increased to a 1 in 470,000 AEP event. However, this increased flood capacity is still not compliant with the extreme consequence category to safely pass a PMF. The Dams Safety Committee Annual Report 2010/11 identified Chaffey Dam as a dam with inadequate flood capacity, even with the auxiliary spillway.

The existing spillway capacity of the dam is therefore inadequate and Chaffey Dam cannot currently pass a PMF as it does not meet the safety requirements for an extreme consequence category dam. The EA advises that the dam wall addition has been designed to safely pass a PMF and its height is designed to ensure that the wall will not overtop and fail, therefore meeting the Dams Safety Committee standards.

Security of Water Supply

Tamworth's water demand is expected to increase as its population increases. The existing water entitlement is likely to be sufficient to meet Tamworth's predicted future needs, although not at an acceptable security of supply. Increased usage of Tamworth's high security town water entitlement is expected to have a significant effect on the availability of general security water for irrigated agriculture, as general security water is allocated after high security water has been made available.

Therefore, there is a relationship between high security and general security entitlements, given that the greater proportion of water allocated to high security licences used, reduced the availability for general security water. In the case of Chaffey Dam, the effect of this relationship is that as town water demand grows, lower volumes of water will be available for agricultural users.

Tamworth town water

Tamworth's town water consumption averages approximately 8,000-9,000ML per year, and varies from less than 7,000ML to more than 10,000ML, depending on water restrictions and other factors. Tamworth Regional Council has a high security water entitlement of 16,400ML per year from the regulated river below Chaffey Dam and is also entitled to 5,600ML per year from the Council-owned Dungowan Dam. Of the Chaffey Dam entitlement, approximately 5,000ML per year is actually used.

No change to Tamworth's entitlement is proposed, but increased demand due to population growth is likely to result in incremental annual increases in consumption of this high security entitlement.

The HWA (2011) study conducted for Tamworth Regional Council shows annual water demand in 2040 as ranging from 12,000ML to 17,000ML. The 17,000ML figure exceeds the entitlement from water released from Chaffey Dam, but is within the combined Chaffey and Dungowan entitlement. While Tamworth's town water is sourced from Chaffey and Dungowan Dams, Dungowan's relatively small capacity limits its ability to meet increased water demand for Tamworth. It is therefore likely that increases in Tamworth's town water consumption will be primarily sourced from Chaffey Dam.

Tamworth's expected increased water consumption will impact upon the ability to meet secure yield thresholds. Secure yield thresholds are benchmarks for water supply and provide that town water supplies are sufficiently secure to meet the "5/10/10 rule":

- *Duration of water restrictions* should not be more than 5% of the time;
- *Frequency of water restrictions* should not be more than 10% of years; and
- *Severity of restrictions* should not be more than 10%, meaning that water supplies should be sufficient to withstand a repeat of the worst drought on record.

Tamworth's current water consumption is at the threshold of not meeting the 5/10/10 rule and increases in demand are likely to increase consumption past that threshold. As Tamworth's water demand increases to its full entitlement, it would face water restrictions approximately every six years (17% of years), under the current capacity of the Chaffey Dam reservoir.

While Tamworth's existing high security water entitlements are likely to cater for modelled 2040 demand under ordinary water storage conditions, they are unlikely to meet secure yield thresholds during drought. The proposed augmentation would provide increased water storage and therefore meet the objective of improving the security of town water supplies.

Irrigation water
As Tamworth Regional Council's 16,400 ML entitlement will allow it to meet projected demand, the impacts of increased demand for high security town water will be borne by the irrigated agriculture that relies on the allocated general security water. Irrigators indicated that a long term 70% probability of an 80% allocation would provide sufficient certainty in irrigated agriculture. An increase in town water consumption to 12,000 ML with the current reservoir capacity will lead to a 0% probability of an 80% allocation. Augmentation to a 100,000 ML capacity provides for a 70% probability up to a town water consumption of 20,500 ML. The project would therefore meet its objective to improve the security of supply for Peel Valley irrigation users.

3. STATUTORY CONTEXT

3.1. State Significant Infrastructure

The proposal is State Significant Infrastructure under Part 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Clause 115U of the EP&A Act provides that "a state environmental planning policy may declare any development, or any class or description of development, to be State significant infrastructure". Clause 14(1) of the State Environmental Planning Policy (State and Regional Development) 2011 provides that, pursuant to Clause 115U of the EP&A Act, development is declared to be State significant infrastructure if:

(a) the development on the land concerned is, by the operation of a State environmental planning policy, permissible without development consent under Part 4 of the Act, and
(b) the development is specified in Schedule 3.

The proposal meets category (a) of subclause 14(1) of SEPP (State and Regional Development) 2011 because it is development for the purpose of a water supply system (including public recreation facilities associated with the water supply system) carried out by a public authority that is permissible without development consent under clause 125 of State Environmental Planning Policy (Infrastructure) 2007.

Subclause 125(5) states that *a reference to development for the purpose of a water supply system of any kind includes a reference to development for any of the following purposes if the development is in connection with the water supply system:*

(a) dams, reservoirs, weirs, levees, spillways and fishways….
(i) construction works.

The project includes construction works to the dam wall that are necessary for the safety upgrade and allow for the capacity augmentation. It is Planning and Infrastructure's opinion that categories (a) and (i) are relevant to the proposal. Planning and Infrastructure considers that the safety upgrade and augmentation components of the project are development without consent as per Clause 125 of SEPP (Infrastructure) 2007.

The proposal meets category (b) of subclause 14(1) of SEPP (State and Regional Development) 2011 because clause 4(1) of Schedule 3 of that SEPP specifies "development for the purpose of water storage or water treatment facilities (not including desalination plants) carried out by or on behalf of a public authority that has a capital investment value of more than $30 million". The capital investment value of the proposal is $43.3 million. The proposal therefore meets the relevant criteria to be State Significant Infrastructure under Clause 14 of *SEPP (State and Regional Development) 2011*.

3.2. Permissibility

Clause 125(2) of the SEPP (Infrastructure) 2007 provides that development for the purpose of water storage facilities in the RU1 zone, including the dam safety and augmentation components of the project, as well as development for the purpose of public recreational facilities associated with a water storage facility, is development permitted without consent. All of the land comprising the application site (i.e. construction areas and inundated land) is zoned RU1 – Primary Production under the Tamworth Regional Local Environmental Plan 2010.

Water supply systems (which include water storage facilities) are permissible with consent within this zone and roads are permitted without consent. Wharf or boating facilities (which include launching and storage facilities for boats, which forms part of the reconstruction works for the ancillary public recreation facilities) are ordinarily prohibited in the RU1 zone. However, Clause 5.12 of the Tamworth LEP 2010 provides that the LEP does not restrict or prohibit any development that may be carried out with or without consent under the SEPP (Infrastructure) 2007. As public recreation facilities are permissible without consent under this SEPP, the proposed wharf or boating facilities are not prohibited. Planning and Infrastructure is therefore satisfied that the proposal is, in its entirety, development permitted without consent.

3.3. Environmental Planning Instruments

There are no relevant EPIs other than those that establish the project as State Significant Infrastructure and as development without consent (SEPP (Infrastructure) 2007).

3.4. Approval Authority

Section 115W of the *Environmental Planning and Assessment Act 1979* provides that the Minister's approval is required for State Significant Infrastructure. Therefore the Minister for Planning and Infrastructure is the approval authority.

On 27 February 2013, the Minister for Planning and Infrastructure delegated responsibility for the determination of State Significant Infrastructure applications under Section 115ZA of the *Environmental Planning and Assessment Act 1979* to the Executive Director, Development Assessment Systems and Approvals where:

- the relevant local council has not made an objection;
- a political disclosure statement has not been made; and
- there are fewer than 25 submissions in the nature of objections in respect of the project application.

Tamworth Regional Council did not object to the application, a political disclosure statement has not been made, and the application received fewer than 25 submissions in the nature of objections. The Executive Director, Development Assessment Systems and Approvals can therefore determine the project under delegated authority.

3.5. Objects of the EP&A Act

Decisions made under the EP&A Act must have regard to the objects of the Act, as set out in Section 5 of the Act. The relevant objects are:

(a) to encourage:
- *(i) the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment,*
- *(ii) the promotion and co-ordination of the orderly and economic use and development of land,*
- *(iii) the protection, provision and co-ordination of communication and utility services,*
- *(iv) the provision of land for public purposes,*
- *(v) the provision and co-ordination of community services and facilities, and*
- *(vi) the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats, and*
- *(vii) ecologically sustainable development, and*
- *(viii) the provision and maintenance of affordable housing, and*

(b) to promote the sharing of the responsibility for environmental planning between the different levels of government in the State, and

(c) to provide increased opportunity for public involvement and participation in environmental planning and assessment.

Objects (i), (iii), (iv) (v), (vi) and (vii) of section 5(a) of the Act are of particular relevance to the proposal. The proposal is consistent with these objectives as detailed in the following:

- the project aims to improve the safety of the dam in extreme flood events in accordance with relevant safety standards, and aims to increase the capacity of the dam, which will provide security of access to a key natural resource for domestic and agricultural purposes;
- the project aims to protect the safety and security of water utilities within the area served by the dam;
- the project provides land for public purposes and community recreational services and facilities;
- the project is likely to have an impact on endangered species and ecological communities, however, this impact is mitigated though environmental management plans and through appropriate offsets for residual impacts; and
- the Act adopts the definition in the Protection of the Environment Administration Act 1991, including the precautionary principle, the principle of inter-generational equity, the principle of conservation of biological diversity and ecological integrity, and the principle of improved valuation, pricing and incentive mechanisms. The EA has assessed the impacts of the proposal against the principles of ecologically sustainable development, and Planning and Infrastructure is satisfied that the project is consistent with these principles.

3.6. Ecologically Sustainable Development

The EP&A Act adopts the definition of Ecologically Sustainable Development (ESD) found in the *Protection of the Environment Administration Act 1991*. Section 6(2) of that Act states that ESD requires the effective integration of economic and environmental considerations in decision-making processes and that ESD can be achieved through the implementation of:

(a) the precautionary principle,
(b) inter-generational equity,
(c) conservation of biological diversity and ecological integrity,
(d) improved valuation, pricing and incentive mechanisms.

Planning and Infrastructure has considered the need to encourage the principles of ecologically sustainable development, in addition to the need for the proper management and conservation of water resources, the orderly development of land considering land use,

the need for the project as a whole, and the protection of the environment including threatened species in **Section 5** of this report.

Planning and Infrastructure considers that the project promotes the principles of ESD as it is proposed to be undertaken in a manner that minimises environmental impacts, including biodiversity, and promotes inter-generational equity through provision of water supply over the longer term for the city of Tamworth and surrounding agricultural districts.

3.7. Statement of Compliance

In accordance with section 115Y of the EP&A Act, Planning and Infrastructure is satisfied that the Director-General's environmental assessment requirements have been complied with.

3.8. Environment Protection and Biodiversity Conservation Act

On 28 September 2012, the project was determined to be a "controlled action" under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), as it was considered likely that the proposal could have a significant impact on matters of national environmental significance, including the White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland critically endangered ecological community, and the endangered species Booroolong Frog (*Litoria booroolongensis*), Border Thick-tailed Gecko (*Uvidicolus sphyrurus*), and Murray Cod (*Maccullochella peelii)*.

At the same time, the Proponent was advised that the project would be subject to the accredited assessment process under the NSW EP&A Act. This means that separate assessment processes are not required under both the EPBC Act and the EP&A Act, and the NSW assessment process has been accredited for the purpose of the assessment requirements of the EPBC Act. However, the Commonwealth Minister for the Environment maintains an independent approval role and the Commonwealth provides input to the assessment then.

Planning and Infrastructure has consulted the Department of the Environment throughout the assessment process, and Planning and Infrastructure's assessment of the matters raised are detailed in **Section 5** of this report.

4. CONSULTATION AND SUBMISSIONS

4.1. Exhibition

Under section 115Z(3) of the EP&A Act, the Director-General is required to make the EA of an application publicly available for at least 30 days. Planning and Infrastructure publicly exhibited the EA from 12 December 2012 until 31 January 2013 (50 days due to Christmas/New Year) on Planning and Infrastructure's website, and at the following exhibition locations:

- Planning and Infrastructure Information Centre, Sydney;
- Nature Conservation Council, Newtown;
- Tamworth Regional Council, Tamworth;
- Nundle Library, Nundle; and
- Woolomin Gold Rush Store, Woolomin.

Planning and Infrastructure also advertised the public exhibition in the Sydney Morning Herald and Daily Telegraph and the North-West Magazine and Northern Daily Leader (Tamworth) on Monday 3 December 2012 and notified landholders, local community groups and relevant State and local government authorities in writing.

Planning and Infrastructure received eight submissions to the EA. Six submissions were received from public authorities during exhibition. One late submission was received from a

member of the public and one was received from a public authority. A summary of the issues raised in submissions is provided below.

4.2. Public Authority Submissions

Seven submissions were received from public authorities. None objected to the proposal, although submissions regarding biodiversity issues noted that further and/or more detailed information was required for relevant agencies to provide substantial feedback.

Office of Environment and Heritage (OEH) did not object but commented on the following areas:

Flora and Fauna
- Direct impacts on the Booroolong Frog and its habitat, and the impact of the project on this species across its range;
- The offsets strategy/plan was incomplete and depended on the results of summer surveys. Requested that all affected vegetation be offset and a final offset strategy prior to determination, using calculators and methodologies to determine offsets and mechanisms;
- Questioned the practical and ecological desirability of relocating individuals of threatened fauna species, such as the Booroolong Frog and Border Thick-tailed Gecko; and
- Requested justification for why some threatened flora species that are predicted to occur within the area were not targeted for survey.

Water Impacts
- Recommend that environmental release flows reflect the natural variability of the Peel River system.

Aboriginal Cultural Heritage
- Ensure that all existing and newly identified sites are recorded in the Aboriginal Heritage Information Management System (AHIMS);
- Place additional buffer zones to protect sites in and near work areas; and
- Requested clarification that consultation was in accordance with relevant guidelines.

Office of Environment and Heritage (historic heritage) did not object but recommended that the historic heritage investigation should consider all historic and potential archaeological sites, rather than just those listed as heritage items under the Tamworth LEP 2010.

Environmental Protection Authority did not object and raised the following issues:

Air Quality Impacts
- Road and bridge construction has the potential for impacts to air quality that exceed EPA guidelines for residential receivers, and recommended that additional particle mitigation strategies be employed; and
- An Air Quality Management Plan be developed for the project.

Noise and Vibration
- Recommend that alternative piling methods be used where feasible to reduce noise and vibration impacts, and that air blast overpressure and ground vibration associated with blasting are monitored.

Namoi Catchment Management Authority did not object but raised the following concerns:

Booroolong Frog Impacts

- Noted participation in further Booroolong Frog surveys to clarify and quantify impacts, and raised concern that affected area is prime habitat for the frog, and that impacts across its range are not known;
- Suggested that offsets consider addressing key threatening processes and the Namoi CMA Offset Strategy 2011, in addition to State and Commonwealth policies; and
- Requested a consultation role in the preparation of various post-approval environmental management plans.

Roads and Maritime Services (RMS) did not object but advised that road works require approval from Tamworth Regional Council as the relevant roads authority and recommended that a Construction Traffic Management Plan (CTMP) be submitted to the RMS and Tamworth Council for approval prior to construction.

Department of Primary Industries did not object but its constituent agencies raised the following concerns:

Crown Lands noted the proposal for a Recreation Continuance Plan for the Bowling Alley Point Recreation Area, which is a Crown Reserve. It recommends that this plan note the significance of the campsite to the local tourism industry and provide facilities that are equivalent to or better quality and size than the existing facilities.

NSW Office of Water (NOW) advised that the likely decrease in water restrictions for Tamworth and increase in availability of general security water licences may trigger a growth in use strategy and/or result in reduced water flows from the Peel system into the Lower Namoi system. NOW has subsequently clarified that, if required, a growth in use strategy would be prepared separately to this application, through the *Water Sharing Plan for the Peel Valley Regulated, Unregulated, Alluvium and Fractured Rock Water Sources 2010*. Also, water draw down (during construction) is not provided for in the *Water Sharing Plan*. The drawdown may result in a decrease in availability for downstream users, with reductions of up to 28 per cent for general security licence holders.

Fisheries NSW recommends that areas for building material and storage areas for fuels, lubricants and chemicals be set back from waterways; cold water pollution be monitored during operation; bridge design should be forwarded for assessment; supports riparian planting and recommends that these be fenced; and requested that construction plans be referred for comment.

Department of Trade and Investment, Regional Infrastructure and Services Resources and Energy Division made a late submission, advising Planning and Infrastructure of a nearby exploration licence.

4.3. Public Submissions

One late submission was received from a member of the public. It raised concern over the impact of existing fossicking activities on Booroolong Frog habitat; noted/alleged that fossicking occurs illegally and is not adequately policed; expressed an opinion that local authorities exhibit a preference for fossicking-related tourism over conservation, and raised concern about impacts on the Booroolong Frog (including spread of the Chytrid fungus) and the effectiveness of existing Management Agreements. Where these concerns are within the scope of the assessment of the SSI, they are discussed in **Section 5** of this report.

4.4. Proponent's Preferred Infrastructure Report and Subsequent Changes

The Proponent provided a response to the issues raised in submissions in the *Chaffey Dam Augmentation and Safety Upgrade Preferred Infrastructure Report* (Worley Parsons, March 2013), which included the following project changes:

- reduction in works areas for road and bridge realignment from 127.8ha to 48.9ha;
- reduction in the proposed excavation for road and bridge works from 100 tonnes per hour (tph) to 50 tph, with a consequential reduction in air emissions; and
- use of less acoustically intrusive piling methods for construction.

The PIR contained supplementary discussion on the impacts on terrestrial and aquatic biodiversity (including results of summer surveys), Aboriginal and historic heritage, noise and vibration, and air quality, and was accompanied by addendum flora and fauna impact and air quality assessments. The biodiversity assessment nominated offset sites for impacts on the White Box-Yellow Box-Blakely's Red Gum Woodland EEC and Booroolong Frog. Copies of the PIR were provided to agencies that made submissions to the SSI and the following comments were received:

OEH raised concerns regarding the methods for assessing Booroolong Frog habitat for impact and offset purposes, noted that the proposed offset must be calculated according to NSW methods in addition to Commonwealth methods, and noted that the proposed EEC offsets do not meet 'like for like' requirements with regards to particular vegetation communities;

Namoi CMA noted that the proposed EEC offset site is inconsistent with the CMA's internal offsets policy as it results in a net loss of native vegetation, and advised that the proposed Booroolong Frog offset site upstream of the augmented reservoir is inappropriate, as this stretch of river is already the subject of management agreements between landowners and the CMA, so the proposed offset would not add sufficient conservation benefits.

DPI including NOW noted that the potential temporary draw down of the reservoir's FSL during construction, and any other changes to the Proponent's existing operating approval/licence under the *Water Management Act 2000* are subject to separate application for approval of NOW/Minister for Primary Industries. Fisheries NSW and Crown Lands reiterated their comments to the EIS exhibition.

RMS, **EPA**, and **OEH (historic heritage)** advised that the PIR and appendices satisfy their previous concerns.

The *Response to Agencies' Comments on the PIR* changed the construction methodology by employing a vertical concrete wall rather than extending the existing rock-filled clay wall. This resulted in a reduction in the extent of required excavation of the existing dam wall, and removal of the existing rock face on the dam wall. The Response also contained supplementary discussion on biodiversity impacts, including revision of mitigation and offset measures for residual impacts.

The *Chaffey Dam Augmentation and Safety Upgrade Vegetation Offset Plan* and *Booroolong Frog Offset Plan* clarified the vegetation offset measures and proposed a new Booroolong Frog offsite site due to difficulty in acquiring the originally proposed site.

Overall, the PIR and *Response to Agencies Comments on the PIR* have reduced the impacts to vegetation and potential threatened species habitat.

5. ASSESSMENT

Planning and Infrastructure considers the key environmental issues for the project to be:

- flora and fauna impacts;
- soil and water management; and
- land use and recreational uses.

Other issues have been appropriately addressed by the Proponent and are considered in **Section 5.4** or as part of the Proponent's EIS/PIR and Planning and Infrastructure's recommended conditions.

5.1. Flora and Fauna

Impacts to native terrestrial flora and fauna will result from the dam wall construction, road construction, and inundation of the enlarged dam. The proposal is expected to permanently impact on the following:

- seven vegetation communities including: the Threatened Species Conservation Act EEC White Box Yellow Box Blakely's Red Gum Woodland which includes the Commonwealth EPBC Act CEEC White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland; and
- two threatened fauna species: the Booroolong Frog and the Border Thick-tailed Gecko, which are listed in the schedules of both the EPBC and Threatened Species Conservation Act.

Flora

The study area (i.e. the area within one kilometre of the reservoir), being 2,214ha of native vegetation, includes 1,307ha of NSW White Box-Yellow Box-Blakely's Red Gum Woodland EEC listed in the Threatened Species Conservation Act 1997. Of this, 506ha is Commonwealth White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland CEEC. **Table 3** details the impact on ecological communities. In total, 161.71ha of native vegetation will be affected by construction and increased inundation. NSW White Box-Yellow Box-Blakely's Red Gum Woodland EEC comprises 150ha of the total and includes 7.5ha of the Commonwealth White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland CEEC.

Table 3 : Biodiversity impacts of proposal (note - the Commonwealth CEEC is a sub-set of the NSW EEC and is not included in the native vegetation total)

Community	***Area impacted***	***Total Area***	***Area impacted***
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland CEEC	7.5ha	506ha	1.5%
White Box-Yellow Box-Blakely's Red Gum Woodland EEC	150ha	1,307ha	11.4%
Other native vegetation	11.71ha	907ha	1.29%
Native Vegetation Total	161.71ha	2214ha	7.3%

Construction at the dam will not affect any EEC or CEEC however road realignment and bridge construction will permanently impact 33ha of White Box-Yellow Box-Blakely's Red Gum Woodland EEC, including 1.5ha of White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland CEEC. This is reduced from the original impact of 63ha of EEC including 4ha of CEEC given the reduction in the road corridor width outlined in the PIR. Impacts to the White Box-Yellow Box-Blakely's Red Gum Woodland EEC (117ha) and White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland CEEC (6ha) will occur due to the increased inundation area at full supply level.

Planning and Infrastructure's Consideration

The Proponent has achieved a reduction in the area to be cleared through road realignments and reducing the road corridor width. Planning and Infrastructure acknowledges that this is a significant reduction, almost halving the area originally proposed for clearing. However, the impacts of increasing the inundation area remain unchanged.

The EEC comprises three Regional Vegetation Communities (RVCs) located in or near the study area. These are: Box-gum grassy woodlands, Brigalow Belt South and Nandewar (RVC 17); White Box grassy woodland, Brigalow Belt South and Nandewar (RVC 18); and Derived Grasslands (RVC 28).

shows the extent and location of these communities. There are approximately 200,053ha of the White Box-Yellow Box-Blakely's Red Gum Woodland EEC within the Namoi catchment.

The condition of EEC in the study area varies. The Box-gum grassy woodland component is mostly in poor to moderate condition, with the exception of good and moderate quality areas that comprise and surround the CEEC.

The proposal impacts upon 11.4% of the extent of the EEC in the study area with the majority being lower quality Derived native grasslands, which are relatively common in the region and a small proportion being the higher quality Box-gum grassy woodland classified as a CEEC (1.5% of its extent within the study area). This is not considered to be substantial in a regional context. There are approximately 200,053ha of the White Box-Yellow Box-Blakely's Red Gum Woodland EEC within the Namoi catchment. The 150ha impacted by the application during both construction and inundation represents approximately 0.08% of the EEC within the Namoi catchment.

Vegetation loss due to increased inundation and completion of upgrade work to the dam wall is unavoidable and unable to be mitigated. In this circumstance offsetting is an appropriate mechanism to compensate for these impacts. The proposed offset for impacted native vegetation is the North West offset site, located on the northern and north-western shores of the augmented reservoir. The site is owned by various NSW Government entities and available to State Water for offset purposes. The site consists of 11 parcels of land. Five parcels are owned by the Land and Property Management Authority, four by the Water Administration and Ministerial Corporation, and one each by the State of NSW and Department of Sport, Recreation and Racing. The Proponent has confirmed that all of the land except for the parcel owned by the State of NSW is vested to the Proponent. The Proponent is currently seeking authority to enable it to enter into Conservation Agreements over this land or to transfer it to the Proponent's ownership. Discussions are also underway regarding the parcel owned by the State of NSW. However, given that this land is 1.5ha, its exclusion is unlikely to have a significant impact on the offset.

The specific offset site comprises an area of 983.77ha to offset the 117ha of EEC impacted by the allocation. It consists of Yellow Box and White Box grassy woodland communities (both of which comprise the White Box-Yellow Box-Blakely's Red Gum Woodland EEC) on lower elevations, and Rough-barked Apple-Silvertop Stringybark grassy open forest at higher elevations. Rough-barked Apple-Silvertop Stringybark grassy open forest does not form part of an EEC but is often found adjacent to and higher than the vegetation communities that comprise the White Box-Yellow Box-Blakely's Red Gum Woodland EEC.

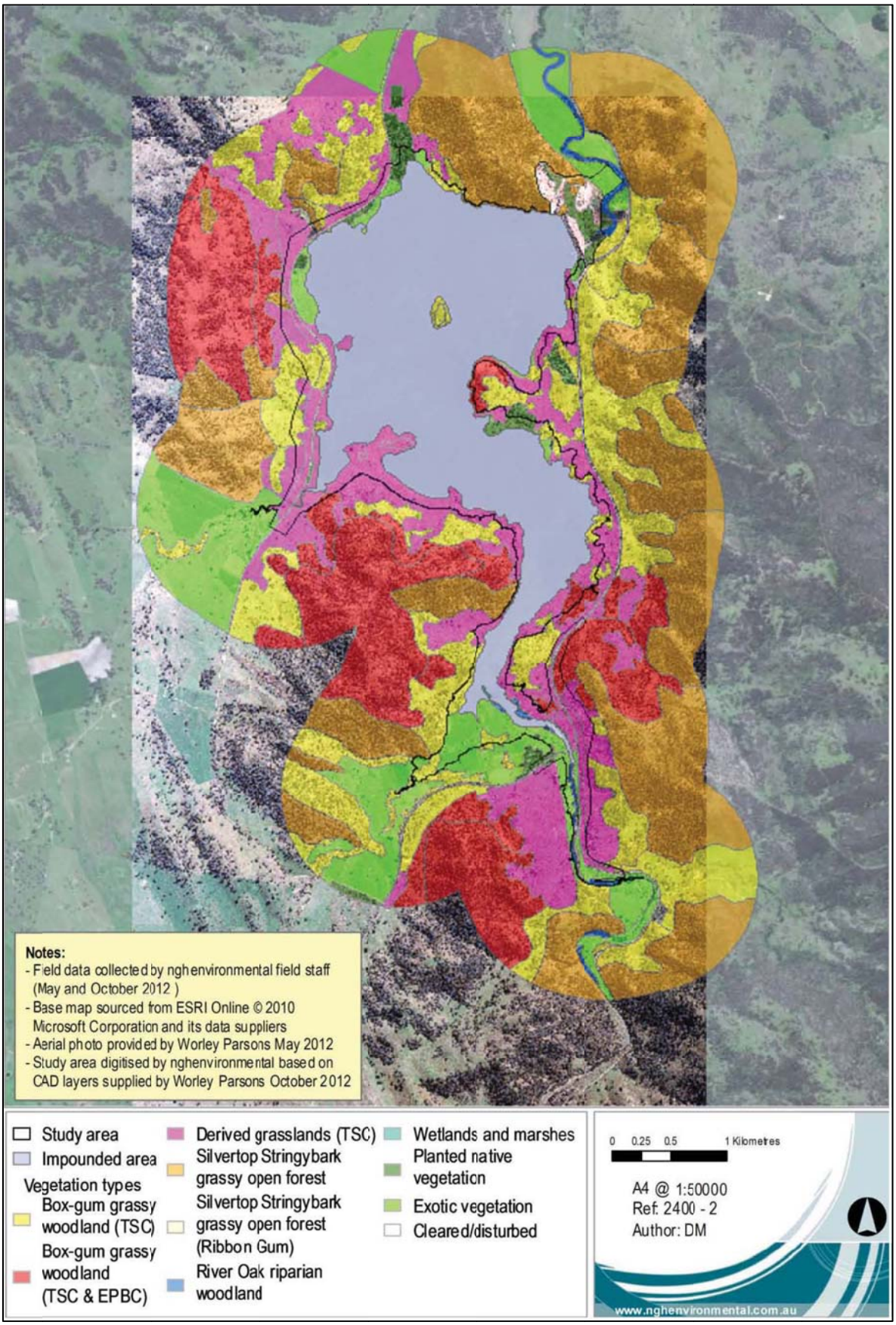

Figure 4: Ecological communities surrounding application site (Source: Environmental Assessment)

The Proponent has used the BioBanking calculator and methodology to identify the credits required to offset the impact of 161.71ha of native vegetation, including 156ha of EEC. **Table 4** outlines the required and provided credits.

Table 4 : BioBanking calculations for North West offset site

Vegetation Type	Habitat Loss (ha)	Area within Offset (ha)	Impact Credits Required	Offset Credits Generated	Credit Difference
Yellow Box-Blakely's Red Gum grassy woodland of the Nandewar Bioregion	152.35	125.76	8128	1500	-6628
White Box grassy woodland of the Nandewar and Brigalow Belt South Bioregions	0	196.05	0	2019	2019
Rough Barked Apple-Silvertop Stringybark grassy open forest of the south western New England Tablelands	3.65	649.88	254	7310	7056
River Oak riparian woodland of the Brigalow Belt South and Nandewar Bioregions	5.71	12.08	323	231	-92
Total	**161.71**	**983.77**	**8705**	**11060**	**2355**

The North West offset site provides sufficient area/biodiversity credits to offset the impact on native vegetation, but does not provide a like for like offset for the impacted EEC. Notwithstanding, the *NSW OEH Interim Policy on Assessing and Offsetting Biodiversity Impacts of Part 3A, SSD and SSI Projects* allows for the substitution of other ecological communities as a "mitigated net loss" approach under certain circumstances and subject to certain criteria. These criteria include:

- whether the credits required are available to be purchased and retired;
- whether alternative offset sites are available on the market; and
- the overall costs of the offsets and whether these are reasonable in the circumstances.

The proposed offset site meets the specified circumstances, as no suitable Biobanking credits are available for purchase, alternative offsets sites are not available on the market, and even if they were, the likely acquisition costs are considered unreasonable (i.e. private landowners have indicated that they would only consider the sale of their entire properties). OEH has advised that it is satisfied with the justification of the variation criteria.

The variation criteria requires that the community 'substituted in' falls within the same vegetation formation within the bioregion; the total Biobanking credit requirement is met; and a 2:1 ratio of offset community is achieved. In this regard, the Rough-barked Apple-Silvertop Stringybark grassy open forest of south western New England Tablelands that substitutes for the White Box and Yellow Box-Blakely's Red Gum woodlands falls within the same

vegetation community. There is also a 254ha credit above that required area, and the ratio of the EEC area in the offset site to the impact site is 2.11:1.

The proposed offset meets the requirements under the EPBC Act Offsets Assessment Guide for the White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland CEEC. The offset site contains approximately 207ha of the CEEC. The Proponent has advised that the extent of the CEEC within the North West offset site provides 304% of the offset required by the calculator to meet the requirements of the Commonwealth offsetting policy.

It is proposed that the offset will be secured on the land title in perpetuity by a Conservation Agreement under the *National Parks and Wildlife Act 1974*. Management actions will be undertaken by the Proponent, and include measures such as strategic stock exclusion (allowing limited grazing to allow native regrowth but control weeds), weed control, feral animal control, restriction of public access (to limit activities such as unauthorised dumping, camping and four wheel driving), assisted regeneration, and controlled burns. The Proponent has noted that more detailed descriptions of governance and management actions will be provided in post-determination documentation. The recommended Condition B7 requires that a Biodiversity Offset Strategy be provided with specific governance and management details. Details relating to the North West offset site will be required by that condition.

The Namoi Catchment Management Authority has developed its own offsetting policy for activities within the catchment area to assist in meeting the biodiversity targets established under the Namoi Catchment Action Plan 2010-2020. The submission from the Namoi Catchment Management Authority noted that the proposal results in a net loss of native vegetation. The Namoi CMA suggested that the Proponent create an area of new native vegetation equivalent in size to the impacted area. Planning and Infrastructure notes that the CMA's policy is a locally developed tool and despite the merits of the policy, it has no statutory or whole of government acceptance. Therefore, this policy does not override the application of the NSW or Commonwealth policies and compliance is not required in this circumstance.

Conclusion

The proposal results in the loss of native vegetation, including 150ha of endangered ecological community and a total of 164.25ha when including other native vegetation. Planning and Infrastructure accepts that:

- the Proponent has significantly reduced the likely area of vegetation to be cleared for road realignment works;
- vegetation loss associated with the larger impoundment area is unavoidable; and
- that offsetting in this circumstance is appropriate.

The scale of vegetation loss relative to that present in the broader Namoi catchment suggests that the loss is not likely to put the EEC at imminent risk of extinction. Further, the proposed offsetting site is consistent with NSW (OEH) requirements, taking into account the application of variation criteria, and with Commonwealth requirements (with respect to the CEEC). The proposed offset management actions are considered appropriate, and Condition B7 requires that a Biodiversity Offset Strategy providing further details is approved by the Director General prior to impacts occurring.

Fauna

The application will impact on two terrestrial species: the Border Thick-tailed Gecko and the Booroolong Frog. Surveys were conducted for these species. **Table 5** provides expected fauna habitat impacts.

Table 5 : Fauna habitat impacts

Species	*Habitat Impact*	*Habitat within study area*	*Impacted area proportion of habitat in study area*
Booroolong Frog	1.6km stream length within new FSL	25km stream length	6.4%
Border Thick-tailed Gecko	0.26ha permanent; 0.2ha temporary	5.6ha (habitat on dam wall – records of additional habitat in broader vicinity)	9.2%

Booroolong Frog
The augmented FSL will inundate approximately 1.6km or 4.09ha of Booroolong Frog habitat within and on the banks of the Peel River, immediately upstream of the existing FSL.

The population of the Booroolong Frog within the Peel River varies from year to year. Surveys conducted in 2009 recorded approximately 600 individuals in the stretch of the Peel River that will be inundated by the augmented FSL; however this is thought to have been due to localised flooding that washed frogs and tadpoles downstream towards the reservoir. A survey conducted in January and February 2013 for the current application covered 25km on the Peel River and Wombramurra Creek (a tributary of the Peel) upstream of the reservoir. Approximately 2,289 individuals were recorded distributed along the entire 25km, including 50 within the inundation area of the augmented dam. Frogs consistently inhabited the study area. While there are greater numbers in certain locations, there were no long stretches without frog populations. This supports the proposition that the entire river stretch inundated by the augmented FSL provides Booroolong Frog habitat, albeit of varying quality/preference.

The Peel River Booroolong Frog population is at the northern-most extent of the species' known range. This range has declined significantly in the last 20-30 years and is particularly the case for the northern population, where the frog was common until the mid-1980s, being found throughout the New England Tablelands and Northern Tablelands. The existing habitat within the upper Namoi/Peel system is the only known surviving element of the northern population (OEH, 2012). There are significant genetic differences between the northern population and other populations of the Booroolong Frog, which accentuate the impact of the application on the Booroolong Frog.

Recognised threats to the Booroolong Frog include stream drying, changes to hydrology that impact upon preferred habitat, use of pesticides, habitat degradation, disease (most notably the Chytridiomycosis or 'Chytrid' disease that affects many amphibian species), and predation by exotic fish. A local threat to the species is understood to be the disturbance of river banks and gravel stream beds from fossicking for precious metals, including the alleged use of heavy machinery to excavate banks and stream beds.

Planning and Infrastructure's Consideration
The application will result in increased inundation due to the augmentation of the dam and increase storage capacity. At FSL, this will extend approximately 1.6km upstream of the current FSL and will inundate known Booroolong Frog habitat equivalent to 6.4% of the

known Booroolong Frog habitat in the Peel River system. Given the limited and isolated habitat of the northern population of the Booroolong Frog population, and the decline in that habitat in the last 20-30 years, Planning and Infrastructure concurs with the Proponent and relevant agencies that this could have a significant impact on the species.

The impacts on the frog will occur primarily as a result of inundation to the new 100,000ML FSL and therefore cannot be avoided. The likely time period for the reservoir to reach the augmented FSL is between 8 and 21 weeks (based on simulated 100 year dam volumes). A gradual filling to the augmented FSL may allow frogs to migrate upstream and colonise areas outside the new FSL. This may reduce the impact on individuals, but will not change the impact on habitat.

Construction of the new Bowling Alley Point Bridge (crossing the Peel River) could directly impact the Booroolong Frog, although these works are within the riparian area affected by inundation. Mitigation techniques have been proposed during construction, including hygiene controls to reduce the risk of the spread of the Chytridiomycosis fungus, sediment and erosion controls, and preparation of site induction material regarding the Booroolong Frog for works at Bowling Alley Point Bridge (Condition C2(a)).

Despite these mitigation measures, the primary impact will be upstream inundation, which cannot be avoided or completely mitigated. Having demonstrated that the project is needed and justified, the offsetting of the impacts is an appropriate approach to compensate those impacts, albeit offsetting a riverine habitat is inherently more difficult than other "like for like", terrestrial-based offsets.

The revised Booroolong Frog offset, as outlined in the *Chaffey Dam Augmentation and Safety Upgrade Project Booroolong Frog Offset Plan* proposes an offset area of 74.49ha within and immediately adjacent to the Peel River (7.45km in river length), upstream (south) of Nundle. The offset area includes the bed and banks of the Peel River and land within 30 metres of the top of each bank. Approximately 13.22ha of the offset area have been identified as Booroolong Frog habitat. There are no active conservation programs occurring on this land. **Figure 5** shows the impact and proposed offset sites.

The proposed impact requires 55 credits under the NSW BioBanking Offset Calculator. The Proponent advises that the offset area generates 69 credits and provides 101.75% of the Commonwealth Department of Environment *Environmental Offsets Guide* calculator requirement. The available offset area meets the requirements of the NSW and Commonwealth offset calculators. Both the NSW Office of Environment and Heritage and the Commonwealth Department of the Environment have indicated that the proposed offset area would be acceptable.

The proposed offset site comprises land owned by 16 different (predominantly private) landowners, as well as the Peel River channel itself, which is Crown Land. The proposal is to manage the offset site through Property Vegetation Plans between landowners and the North West Local Land Services under the *Native Vegetation Act 2003*. The Proponent and North West LLS have an agreement for the LLS to administer/monitor/manage the offset program on behalf of the Proponent.

Proposed management actions within the offset plan include provision and maintenance of fencing, limitations on grazing, such as minimum ground coverage and stock exclusion periods during summer, and pest and weed control. These actions aim to encourage the growth of native vegetation and promote river bank stability and clearly address some of the key threats to the species.

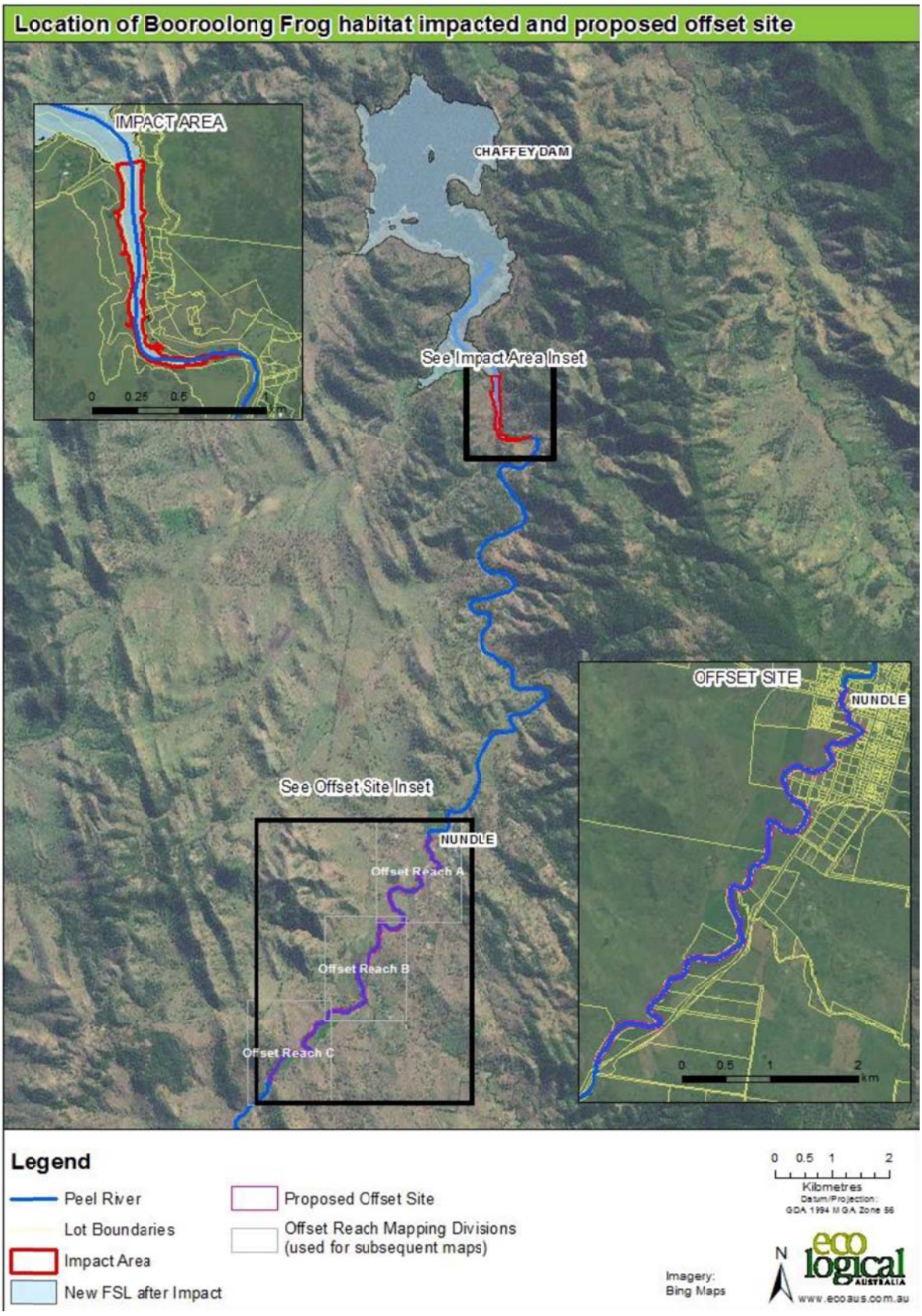

Figure 5: Impacted Booroolong Frog habitat and proposed offset site (Source: Chaffey Dam Augmentation and Safety Upgrade Project Booroolong Frog Offset Plan)

The Proponent has provided 'letters of intent' from 14 of the 16 landowners to enter into further discussions towards entering into PVPs. There is no land title attached to the Crown land within the Peel River channel. No formal agreement is proposed for this land, but the Department of Primary Industries (Crown Lands) has advised that it will consent to the

Proponent conducting conservation management measures if landowners on both adjoining banks participate in the offset strategy. The area for which letters of intent have been received is 37.72ha, or 50.7% of the offset area, and the corresponding river channel, which is subject to the agreement between the Proponent and DPI (Crown Lands) is 29.13ha, or 39.1% of the offset area.

Planning and Infrastructure acknowledges that the process of securing the offset site is complex given the multiple owners of the site and the scarcity of alternative suitable Booroolong Frog habitat. The Proponent has demonstrated an intent to find an appropriate offset and while the offset site has not been completely secured, the provision of letters of intent provides an acceptable degree of certainty to enable decision makers to determine the project. To this end, Planning and Infrastructure will require a Biodiversity Offset Package to be refined and further practical implementation detail included prior to commencement of construction and/or relevant impacts on species and EECs.

Border Thick-tailed Gecko

A permanent impact on 0.26ha of habitat results from the partial inundation of the western (upstream) face of the dam wall due to the augmented FSL. A temporary impact of approximately 0.2ha results from the removal of rocks at the crest of the existing wall in order to construct the vertical wall addition.

The Border Thick-tailed Gecko is listed as vulnerable under the TSC Act and the EPBC Act. It is found on the northern slopes and tablelands of NSW and adjacent areas of Queensland, at elevations of between 500 and 1,100 metres in dry eucalypt forest or woodland. The population at the application site is towards the south-eastern extent of the species' range. The dam wall and Goat Mountain to the immediate north of the dam wall are known gecko habitat. Sightings of the gecko in the broader vicinity of the site are relatively common.

Planning and Infrastructure's Consideration

The proposal removes a small amount of the gecko's habitat. Chaffey Dam provides approximately five hectares of artificial habitat for the Border Thick-tailed Gecko. The permanent habitat loss is 5.2% of the habitat on Chaffey Dam, and the temporary loss is a further 4%.

There have been recorded sightings of the gecko on Goat Mountain, which suggests that the gecko's local habitat is not limited to Chaffey Dam. Given that this additional local habitat exists, the project is not considered to have a significant impact on the Border Thick-tailed Gecko. The OEH and Department of the Environment have not advised that the project will have a significant impact on the species and have not recommended any offsetting requirement.

In order to reduce the risk to the species, the Proponent has committed to mitigate the residual impact on the Gecko through measures such as disturbance of rocks in summer months to correspond with the species' active period, pre-clearing surveys to establish the presence of individuals, specific site training for employees regarding the species, and employment of an ecologist if individuals need to be moved to unaffected areas of the dam wall. These measures will be detailed in a management plan to be implemented during construction (Condition C2(a)). Planning and Infrastructure considers that these measures, subject to refinement in the post-determination management plan, appropriately mitigate impacts on the Border Thick-tailed Gecko.

Conclusion

The application is expected to have a significant impact on the Booroolong Frog. As the impact is predominantly the result of the inundation to the augmented FSL, Planning and Infrastructure accepts that the impacts cannot be avoided or completely mitigated. Mitigation strategies to be implemented during construction are recommended by Condition C2(a). The proposed offset plan adequately offsets the impacts of the application on the Booroolong Frog, in accordance with Commonwealth and NSW offset guidelines and principles to the

extent required to allow determination of the project. Confirmation that the offset site has been secured and further details regarding management actions is recommended prior to construction. Condition B8 requires a Biodiversity Offset Package containing these details.

In regards to the Border Thick-tailed Gecko, the application impacts a small proportion of the habitat on the dam wall (9.2 per cent), of which half is temporary, and is unlikely to place the local population of the species at risk. Consequently, the proposal it is not considered to have a significant or unacceptable impact on the Border Thick-tailed Gecko. Residual impacts are considered to be adequately addressed through the proposed mitigation measures.

5.2. Water Allocations and Dam Operation

Potential Temporary Drawdown

The proposal includes a potential drawdown of water from 518.6m AHD to 516.6m for a maximum of 6 months to enable works to the existing morning glory spillway and to reduce the risk of flood flows through the spillway while works occur. Drawdown will only be required if the water level at the time of construction is above 516.6m AHD, or if long term weather projections show a risk of the water level rising. If the draw down is required, the Proponent will seek a variation of its Water Supply Work approval under the *Water Management Act 2000* for the dam to enable the draw down and any necessary variation to the *Water Sharing Plan for the Peel Valley Regulated, Unregulated, Alluvium and Fractured Rock Water Sources 2010* from of Primary Industries.

If the temporary draw down is required, it will reduce water availability to downstream users, particularly general security licence holders. A 2m drawdown would temporarily reduce the FSL volume from 62,000ML to approximately 51,000ML or by 17%. A deliberately reduced capacity reservoir could impact on the availability of general access water, as full allocation of licence entitlements only occur when a reservoir is full. The submission from the Department of Primary Industries (NSW Office of Water) raised concern and noted that the draw down could reduce general security allocations by up to 28% compared to likely allocations if the reservoir was at its FSL.

Planning and Infrastructure's Consideration

If required, the drawdown will have a temporary impact on water availability to downstream users by reducing the likely general security water allocations. The current level of the reservoir is 512.7m AHD (34,000ML volume). The current dam level would not require a draw down for the spillway works.

Based on daily storage levels for the period February 1984 (the first instance of the reservoir reaching the current FSL after the dam's construction) to March 2012, the reservoir level was below the 516.6m FSL on 3,678 of 10,263 days, or on 36% of days.

Approval for a draw down would not be granted by this SSI determination. Drawdown requires approval under the *Water Management Act 2000*.

Mean Regulated River (General Security) allocations since the current *Water Sharing Plan* commenced on 1 July 2010 have been 0.78ML per share. This mean has been reduced by the 2013/14 allocation, which was 0.45ML per share (45% of a full share). The mean for 2010-2012 (i.e. excluding the 2013/14 allocation) was 0.88ML per share. The mean allocation since 1981 (when the previous volumetric system commenced) has been 75%. The maximum reduction to 2010-2012 allocations (based on DPI (NOW)'s advice of a potential 28% reduction) would reduce allocations from the 2010-2012 average of 0.88 ML per share to approximately 0.6 ML per share. This is lower than recent and long term average allocations, although it is acknowledged that it is higher than the 2013/14 allocation was without a draw down.

In order to mitigate impacts of the potential draw down on allocations and the impact of releasing a large amount of water in carrying out the drawdown, DPI (NOW) requires the preparation of a Drawdown Management Strategy (Condition A14). The purpose of this strategy would be to provide measures to reduce impacts of temporary allocations and a procedure for general security users to access released water. Although this proposal will not grant approval for the drawdown, Condition A14 is considered appropriate as it is triggered only if a drawdown is required, and the strategy will form part of the decision making process for the *Water Management Act* approval.

Notwithstanding the temporary impacts if a drawdown is required, Planning and Infrastructure acknowledges that the long term impact of the augmentation would be to increase general security water availability as Tamworth's town water demand grows. The probability of long term general security water allocations of 80% under medium to high town water demand growth scenarios increases from zero at the current FSL to over 70% at the augmented FSL.

Planning and Infrastructure considers that the long term benefit of the proposal in increasing the likelihood of general security allocations and maintaining the viability of irrigated agriculture and related industries in the regional economy outweighs the temporary impact.

Downstream Flooding From Spillway Operation

The existing auxiliary spillway will remain in place, but its height relative to the top of the reservoir will reduce with the augmented FSL. As such, the existing auxiliary spillway would trigger at a 1 in 1000 AEP rain event rather than a 1 in 10,000 AEP event. A 1 in 1000 AEP event with the augmented FSL will result in greater flooding than a 1 in 1000 AEP event at present.

The primary impact of additional flooding will be at Woolomin, which is located in the Peel River floodplain approximately 6km downstream of the dam. Peak flood levels following a 1 in 100 AEP event in which the existing fuseplug is triggered are expected to be approximately 300mm higher than a 1 in 1000 AEP event under current circumstances. Due to the topography of Woolomin (i.e. a narrow, steep sided river valley), there is little difference in the area flooded by a 1 in 1000 AEP event with and without the triggering of the auxiliary spillway. Incremental flooding impacts within the broader Peel Valley are expected to be limited. Modelling of a 1 in 1000 AEP event with the augmented FSL does not show any additional flooding at Tamworth.

A flood of this magnitude with the augmented dam and unchanged auxiliary spillway would lead to an additional 15 houses exposed above floor level (51 in total, compared to 36 under the current situation). Above floor flooding would range between 44 and 2100mm.

Planning and Infrastructure's Consideration

The flooding caused by the operation of the auxiliary spillway is a deliberate response to a major rainfall event. This flooding allows for sufficient water to be released to safely pass a peak maximum flood. It is a consequence of ensuring that catastrophic failure of the dam wall does not occur and is a calculated outcome of the safety upgrade.

The proposed retention of the existing auxiliary spillway fuse plug increases the annual likelihood of its triggering, and therefore creates a greater depth of flooding than would occur if that spillway was not triggered. The annual likelihood increases from 0.01% to 0.1%.

A 1 in 1000 AEP auxiliary spillway trigger is not unprecedented. For example, the auxiliary spillway at Warragamba Dam is triggered at a 1 in 750 AEP event.

The 1 in 1000 AEP event at which the auxiliary spillway will trigger is an extremely rare flood event that would create widespread flooding and substantial damage within the Peel Valley. The impact to 15 additional houses at Woolomin by the additional release of water from Chaffey Dam would occur in the context of the damage caused by a flood amongst the

largest recorded in Australia. The additional property damage is not considered to be unacceptable in that context, and given the rarity of the 1 in 1000 AEP event, is considered to be outweighed by the proposal's dam safety and water supply benefits.

While the operation of the auxiliary spillway at the augmented FSL will cause flooding in additional houses above floor level, there is not expected to be any additional risk to human life than would otherwise occur in a 1 in 1000 AEP flood. Woolomin is recognised as being flood prone, and would be flood affected prior to the operation of the auxiliary spillway. The Tamworth Regional Council Local Disaster Plan notes evacuation of Woolomin residents in a 1 in 100 AEP or greater flood as a risk associated with flooding. Given the extreme rarity and likely damage of a 1 in 1000 AEP flood, it is likely that Woolomin and surrounding areas would be evacuated in advance of the auxiliary spillway triggering.

While the operation of the auxiliary spillway has a negative impact on flooding in Woolomin, the property damage is not considered to be unacceptable in the context of the likely damage caused by the flood that would accompany the rain triggering the spillway. More importantly, the triggering of the spillway is not expected to cause additional loss of life. These are significantly lesser impacts than those of the potential flooding caused by a catastrophic dam failure, which would be expected to cause widespread additional property damage and loss of life.

5.3. Land Use and Socio-Economic Impacts

The proposal will affect public land used for recreational purposes through inundation of existing facilities, and private land and leasehold land used for agriculture (grazing and dairying). Impacted recreational uses include the Bowling Alley Point Recreational Area and the South Bowlo Fishing Club facilities. Approximately 18ha (30%) of the Bowling Alley Point Recreation Area will be inundated, and the existing facilities at South Bowlo Fishing Club will be replaced above the augmented FSL. Nundle Fishing Club, on the south-eastern shore, is outside the proposed FSL and road works area.

Impacted agricultural uses include parts of four freehold properties through inundation and road realignment works, and inundation of leasehold land owned by the Proponent which is currently used as a dairy farm.

Planning and Infrastructure's Consideration
While the proposal will reduce the size of the Bowling Alley Point Recreation Area, it will retain a large camping and public recreation area (42ha). Moreover, the Proponent has committed to relocating or reconstructing building amenities at the Bowling Alley Point Recreation Area and is understood to be in discussions with the Bowling Alley Point Recreation Area Trust regarding the enhancement of the area. The EA contains plans for relocated facilities for the South Bowlo Fishing Club.

The approach to relocation and replacement of recreational facilities is considered appropriate. Condition B23 requires that recreational facilities are relocated or rebuilt to a type and standard agreed with the relevant trust or lessee prior to the level of the reservoir exceeding 518.6 metres AHD (i.e. before inundation to the augmented FSL occurs). Condition B24 requires that details of the replacement facilities at the Bowling Alley Point Recreation Area must also be developed in consultation with the DPI (Crown Lands) and approved by the Director General. Condition C2(f) requires that the Construction Environment Management Plan consider procedures to manage recreational use of the reservoir during construction.

The Proponent also intends to acquire up to 11ha of privately owned land that will be directly affected by the project. The acquisition of this land is not expected to significantly reduce the agricultural capacity of the affected properties.

The leasehold land controlled by the Proponent to the south-west of the reservoir is leased to the adjoining freehold landowner (currently a dairy farm). The viability of the farm is compromised by the inundation. The lease is understood to provide for its termination for purposes related to Chaffey Dam, including inundation.

Overall, the recreational and agricultural significance of affected land is retained, with the exception of the dairy farm occupying the Proponent's land on the south-western edge of the reservoir. Given that the project is not expected to significantly reduce the availability of agricultural land in a regional context, and that impacts on individuals are mitigated by acquisition of affected land, the impacts are considered to be acceptable.

5.4. Other Issues

Aquatic Biodiversity
Three aquatic species and one community found within the Peel River near the site are listed as endangered or vulnerable under the Fisheries NSW *Management Act 1994*. These species are the Silver Perch (*Bidyanus bidyanus*) (vulnerable), Murray-Darling population of the Eel-tailed Catfish (*Tandanus tandanus*) (endangered), and the aquatic EEC in the natural drainage system of the lowland catchment of the Darling River. An additional species, the Murray Cod (*Maccullochella peelii peelii*) (vulnerable) is protected under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. Impacts to water quality during construction and downstream cold water pollution may occur during and after construction.

Planning and Infrastructure's Consideration
The Murray Cod and Silver Perch are found in the reservoir and are known to occur in the Peel River. They are periodically stocked in the reservoir, and the Peel River provides potential habitat for these species. The Peel River is not identified as an important Murray Cod habitat in the *National Recovery Plan for the Murray Cod*. The nearest important habitat is on the Namoi River downstream of the junction with the Peel, which is approximately 100km downstream of the site. The proposed augmentation is not expected to change the volume or temperature of water released from the Peel River system into the Namoi. Therefore, the proposal is therefore not expected to have a significant impact on the Murray Cod and Silver Perch threatened species and community.

Cold water pollution is not expected to have a major impact on the threatened species and community. Chaffey Dam is rated as a low priority dam for cold water pollution compared to other major dams in inland New South Wales as it is relatively small and shallow; the downstream flow of the Peel is shallow; and Chaffey Dam has a variable offtake allowing water to be taken from different depths providing control over release temperatures. The augmentation is not expected to change these factors. When cold water pollution does occur downstream of Chaffey Dam, it is outside the spawning period of the threatened fish species. Notwithstanding, cold water pollution controls are required by the Proponent's Water Supply Works approval.

While construction activities close to waterways present a risk of erosion, spills, and removal of aquatic habitat, proposed mitigation measures such as locating stockpiles away from waterways, installing sediment control, and minimising removal of woody debris are considered to be appropriate and acceptable mitigation. Detailed measures will be required in a Construction Environmental Management Plan.

Aboriginal Heritage

The proposal would impact 28 Aboriginal heritage sites or potential sites. Of these sites, 23 would be inundated and 5 affected by road works close to the augmented FSL. The EA included a specialist Aboriginal cultural heritage assessment, which was refined in the PIR to reflect the reduced works area. The results of the assessment are shown in **Table 6**.

Table 6 : Impacted Aboriginal cultural heritage items and sites

Significance	*Item Type/Number*	*Impact*
Moderate to high archaeological significance (three sites)	CDAS6: An artefact scatter and potential archaeological scatter (PAD) on a basal slope on the northern shore of the reservoir	Inundation
	CDQ1: A potential quarry on a knoll on a point sticking into the south-western corner of the reservoir	Potential inundation
	CDIF12: An isolated find and PAD located on basal flats on the southern shore of the reservoir	Inundation
Moderate archaeological significance (10 sites)	Five scatters, four scatters with PADs, one isolated find	Seven inundation, three road works
Low archaeological significance (seven sites)	Seven isolated finds	Five inundation, two road works
Unranked/classified	Eight PADs	Inundation

Planning and Infrastructure's Consideration

Consultation was undertaken with 26 potential Aboriginal stakeholders, of whom 10 (8 organisations and 2 individuals) registered interest and 7 attended a site visit.

The revised road works area in the PIR removes some Aboriginal cultural heritage impacts. Impacts from road works now occur to item/sites that would be impacted by inundation in the absence of these road works. The reduced works area represents a reasonable degree of avoidance within the scope of the project.

Proposed mitigation actions include fencing off sites near the boundaries of road and bridge construction work; salvage of artefacts that will be inundated; and development of a 'Back to Country' protocol for the methodology and location of relocated artefacts. In response to a submission from the OEH, the PIR includes an additional mitigation action to create a 10m fenced buffer zone around Aboriginal heritage sites adjacent to construction areas. The PIR also commits to submit site cards to OEH for known sites, and has confirmed that the required 2005 consultation protocol has been followed.

Planning and Infrastructure acknowledges that the proposal is likely to have an impact on Aboriginal heritage items/areas/artefacts. In this case, the Proponent's suggested mitigation techniques of surface salvage of all known Aboriginal sites are considered appropriate for areas subjected to inundation and consistent with the feedback provided by some registered stakeholders. Planning and Infrastructure is also satisfied that the consultation is consistent with government policy, and the feedback from stakeholders has been appropriately considered.

Historic Heritage
The proposal may affect the listed heritage items referred to in **Table 7** and 14 non-listed items/sites of significance.

Table 7 : Impacts of the proposal on listed heritage items

Item	*Significance*	*Impact*	*Mitigation*
Iron Footbridge	Local	Direct – inundation	Relocation above augmented FSL, installation of stone or timber approach steps
Bowling Alley Point School (former)	Local	Indirect – construction	Construction controls: dust suppression and hoardings
Union Church (former)	Local	Indirect – construction	
Chaffey Dam	Local	Direct – construction	Nil

Planning and Infrastructure's Consideration
Planning and Infrastructure considers the footbridge relocation acceptable, as the footbridge is not in its original location, having been washed away from its original upstream location by floods in the 1980s. The proposed new location immediately above the proposed FSL is considered appropriate as it retains the bridge's visual connection to the water, and retains the current location within a public reserve, so that public access to the bridge is retained. It is also recommended that specific details and methods of the relocation be included in the Heritage Interpretation Strategy (Condition B14).

No mitigation of heritage significance is proposed for Chaffey Dam itself. The Section 170 inventory listing attributes the dam's heritage significance to its impact on agriculture, the local economy, the natural and cultural landscape, and its social and recreational uses. The change to the built form of the dam is not considered to significantly affect the reasons for this listing and the project will retain the dam as a prominent built structure in a predominantly agricultural landscape. The heritage assessment concludes that no mitigation to the dam is considered necessary. Planning and Infrastructure concurs with this position.

The proposal is not expected to directly impact the Union Church and Bowling Alley Point buildings as these buildings are above and set back from the proposed road works. The proposed mitigation techniques are considered sufficient to manage potential indirect construction impacts.

Proposed mitigation actions for non-statutory items include relocation of commemorative plaques, an interpretation strategy and seed collecting for the Dulegal Arboretum, and archival recording and mapping of building remnants. Planning and Infrastructure considers the proposed mitigation actions are appropriate and recommends that these are included in the Historic Heritage Management Sub-Plan (Condition C2). Subject to the implementation of proposed mitigation techniques, Planning and Infrastructure considers that the residual impacts on historic heritage are acceptable.

Traffic and Transport
Key traffic and transport impacts include worker and materials movements to the site, and temporary road closures during road realignment works.

Worker movements to and from the site are expected to account for 25 vehicle movements in each direction per day. Concrete for the morning glory spillway addition is proposed to be transported to the site in trucks. This would require the delivery of 20 concrete truck loads, or 40 truck movements per day over 8.5 days. Concrete panels for the dam wall addition will be transported to the site in semi-trailers. This would result in approximately 110 loads over 55 days, or four semi-trailer movements per day.

Planning and Infrastructure's Consideration
Truck movements will not have an unacceptable impact on the local or regional road network. While the concrete delivery would see a significant increase in truck traffic, the short duration of concrete delivery movements is considered manageable. Conversely, the concrete panel delivery will have a longer duration (nearly two months), but the low daily volume of truck movements is unlikely to cause significant congestion or safety impacts.

Truck movements associated with the construction have the potential to impact specifically on school bus operations. Four school bus routes use the Tamworth-Nundle Road between 7.00 and 7.30am and 4.30 and 5.00pm. As this road has narrow verges, there may be limited room for a large vehicle to pull over to allow another large vehicle to pass. Condition C2(d) requires consideration of measures to manage interaction with school bus travel in the project's Construction Traffic Management Plan.

The proposal retains all existing roads (i.e. Tamworth-Nundle Road, Rivers Road and Western Foreshore Road) but includes realignments and bridge works where existing roads may be inundated by the augmented reservoir. Road access to all users would be retained during road alignment works, although some roads would be temporarily closed when realignment works occur in their vicinity. Tamworth-Nundle Road and the existing bridge and intersection with Rivers Road would remain open throughout the majority of realignment works. Part of Western Foreshore Road will be closed during realignment works but will reopen following completion of the proposal. This would prevent through traffic during construction, although access to properties would be retained from the north or south. Access to recreational facilities such as the South Bowlo Fishing Club and Bowling Alley Point Recreation Area would be maintained during realignment works. The access track to the South Bowlo Fishing Club would be inundated by the project, but a new track would be constructed.

Proposed mitigation measures include informing heavy vehicle drivers of school bus routes and times, and narrow verges, implementing standard road safety management procedures, and a communication strategy to advise other road users of closures. The Proponent has nominated the development and implementation of a Construction Traffic Management Plan to detail proposed mitigation and safety measures. The RMS also recommended such a plan in its submission, to be devised in consultation with the RMS.

While the project will have an impact on the local traffic network, this impact is considered to be acceptable as its most intense impacts are short-term or low traffic volume, and some degree of managed traffic impact must be reasonably expected in the construction of a large project.

Noise and Vibration
Noise generating activities will generally be evident during construction. Operational noise is not expected to be different from any existing operational noise. There are 13 sensitive noise receivers, including rural residential, passive recreational, and the State Water Chaffey Dam custodian's residence.

Noise from six scenarios/sources was modelled: construction on the dam wall, morning glory spillway addition, modification to the auxiliary spillway, Bowling Alley Point Bridge works, Hyde's Creek Bridge works, and road realignment. Impacts on residential receivers above the 'noise affected threshold' are anticipated from road and bridge activities.

Predicted noise levels at all of the recreational receivers will be within the management level of 60 or 65 dB(A), LAeq(15 minute). Noise at residential receivers will exceed the 'noise affected' threshold of an LAeq(15 minute) above 40dB(A). Anticipated peak noise levels vary from 48 dB(A) to 71 dB(A). None of these receivers will be subject to noise above the 'highly noise affected' threshold of over 75dBA.

Planning and Infrastructure's Consideration
Standard construction mitigation measures are proposed, such as standard operating hours, plant and equipment management and community consultation. These measures are considered appropriate.

The EPA recommended that alternative piling methods be used to reduce noise impact. The Proponent advised in the PIR that ground conditions appear conducive to the use of bore or vibratory piling rather than impact piling, and commits to doing so where reasonable and feasible. A condition requiring this is recommended.

Planning and Infrastructure considers that the noise exposure would be for a limited time and acceptable for the period. While the EA suggests that road works will occur over a 12 month period, the works are likely to be carried out in a linear fashion, so that works along a particular section of road will likely be completed in less than 12 months. The noise impacts modelled for sensitive receivers are based on a worst case scenario, i.e. when plant is operating simultaneously at the closest works zone to the affected receiver. While modelling based on a worst case scenario is an appropriate approach, impacts are unlikely to occur for this duration or at this intensity for the duration of construction.

The noise and vibration impacts are considered acceptable and manageable, subject to the proposed mitigation measures and the imposition and implementation of appropriate conditions, as recommended.

Air Quality
Dust from road and bridge construction activities was found to exceed EPA guidelines for three receivers. Maximum dust levels at the most impacted receiver could exceed EPA guideline levels.

Planning and Infrastructure's Consideration
In response to concerns received by the EPA regarding maximum dust levels at the most impacted receiver, the Proponent revised the Air Quality Impact Assessment (AQIA) and included mitigation techniques such as watering unsealed access roads, and reducing speed limits, and considering a reduced works area. Despite these changes, EPA guidelines would be exceeded for all receivers against the maximum cumulative impact criteria on one occasion per year by a maximum of 10% (for the most affected receiver). The revised AQIA modelling attributes this exceedence to background air pollution (i.e. background air pollution exceeded the criteria on that day in the year chosen for modelling), and as such is the result of an anomalous day of background pollution. Annual average particulate levels are below the EPA annual average guidelines for all receivers. Planning and Infrastructure accepts this approach.

Planning and Infrastructure considers that air quality can be managed to acceptable levels with the implementation of identified management measures and standard conditions.

6. CONCLUSION

The proposal will ensure that Chaffey Dam meets contemporary dam safety standards by having sufficient flood storage capacity to safely pass a probable maximum flood (PMF). Augmentation of the reservoir will provide for anticipated increased town water demands for Tamworth at acceptable service levels whilst maintaining supply for irrigated agriculture. The proposal is therefore considered to be justified as it meets the safety and water supply objectives of the proposal.

Key issues raised in submissions and assessed in this report include biodiversity, water supply and potential flood impacts associated with the operation of the reservoir, and impacts on surrounding land uses. In order to manage potential residual environmental impacts, a set of comprehensive conditions of approval are recommended. Planning and Infrastructure consulted with key government agencies and the Proponent in developing these conditions and some of the key conditions include:

- A revised and expanded Biodiversity Offsets Package that confirms the location and tenure of identified offset sites and details management actions and responsibilities (Condition B7);
- A requirement to vary the Proponent's Water Supply Works Approval under the *Water Management Act 2000*, and considerations to accompany any required application to temporarily draw down the full supply level of the reservoir during construction, notwithstanding that such an application would be subject to a separate regulatory process (Conditions A12 to A15);
- A requirement to rebuild and/or relocate affected recreational facilities, in consultation with relevant stakeholders (Conditions B23 and B24); and
- A Construction Environmental Management Plan (CEMP) to manage potential construction-related environmental impacts, in terms of biodiversity, soil and water, noise and vibration, traffic, heritage, and recreational uses (Conditions C1 and C2).

Planning and Infrastructure considers that, on balance, the proposal is justified and in the public interest. Significant environmental impacts can be managed through mitigation actions and appropriate biodiversity offsets. These actions are included in the Proponent's Environmental Assessment, Preferred Infrastructure Report, and in the recommended Conditions of Approval.

Planning and Infrastructure therefore recommends that this proposal be approved subject to the recommended Conditions of Approval.

7. RECOMMENDATION

It is RECOMMENDED that the Executive Director, Development Assessment Systems and Approvals:

- Consider the findings and recommendations of this report;
- Approve the application subject to the recommended Conditions of Approval; and
- Sign the attached Instrument of Approval.

Director 26.2.14
Infrastructure Projects

27.2.14

Executive Director
Development Assessment Systems & Approvals

APPENDIX A ENVIRONMENTAL ASSESSMENT

See Planning and Infrastructure's website at
http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=5039

APPENDIX B SUBMISSIONS

See Planning and Infrastructure's website at
http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=5039

APPENDIX C PROPONENT'S RESPONSE TO SUBMISSIONS

See Planning and Infrastructure's website at
http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=5039

APPENDIX D OTHER RELEVANT REPORTS OR DOCUMENTS

See Planning and Infrastructure's website at
http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=5039

APPENDIX E RECOMMENDED CONDITIONS OF APPROVAL