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14th December 2020

Submission to the Environmental Protection Authority for the Southern Alignment of the Bunbury Outer Ring Road

Comments on Main Roads WA Updated Environmental Referral Supporting Document and Additional Information



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Gelorup Corridor Walk, 2018

1. Introduction

Thank you for the opportunity to comment on Main Roads WA Updated Environmental Referral Supporting Document and Additional Information. This is a submission by Friends of the Gelorup Corridor Inc. (FOTGC Inc.) We are an incorporated association with a membership of 71 people which has been in existence since 1995. Our aim is to protect the Gelorup Corridor. To this end, we engage with decision makers and stakeholders and discuss with residents on the environmental, indigenous and social impacts that the proposed BORR will have on the Gelorup and Stratham communities, empowering them to also speak out.

Main Roads WA proposal (the “GBRS Route”) bisects residential Gelorup and will destroy the Gelorup Corridor. We believe that this route has an unacceptable high impact on Matters of National Environmental Significance, native vegetation, home demolitions, pollution and visual impacts. We believe that there has not been a genuine attempt to find an alternate route away from the environmentally fragile Gelorup Corridor and residential Gelorup.

The South West of Western Australia is recognized as one of the world’s biodiversity hotspots, however only 40% of vegetation remains. We have in the Gelorup Corridor, the critically endangered Western Ringtail Possum, three species of vulnerable and endangered black cockatoos and a range of other vulnerable flora and fauna found no-where else in world that are in danger of becoming extinct due to clearing of their habitat.

The objectives of the Environmental Protection Authority (EPA) are set out in Section 4A of the Environmental Protection Act (EP Act, 1986). The objectives relating to this proposal are:

- **The precautionary principle**

Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, decisions should be guided by

- (a) careful evaluation to avoid, where practicable, serious or irreversible damage to the environment; and
- (b) an assessment of the risk-weighted consequences of various options.

- **The principle of intergenerational equity**

The present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.

- **The principle of the conservation of biological diversity and ecological integrity**

Conservation of biological diversity and ecological integrity should be a fundamental consideration.

We believe that these principles have not been prioritized in deciding the best route for the Southern Alignment of the Bunbury Outer Ring Road. Throughout this proposal, Main Roads WA has deemed the clearing and destruction of threatened ecological communities, species and environmentally sensitive areas “not significant”, which does not appear to be defined at a State level. Main Roads WA definition of what is significant, therefore appears entirely subjective and not defined in any quantitative, scientific or objective way.

Section 183 of the Environmental Protection and Biodiversity Conservation Act (EPBCA, 1999) defines a key threatening process if it “threatens or may threaten the survival, abundance or evolutionary development of a native species or ecological community. ... adversely affect two or more listed threatened species or threatened ecological communities”.

Tables in Appendices 1a, 1b and 1c show comparison results from SSASR.

Section 10, Table 12 (pp. 68-69) 10 clearly shows that the alternative green alignment has less impact on Flora and Vegetation. (Appendix 1a).

Section 10, Table 13 (p.69) clearly shows the alternative green alignment has less impact on fauna (Appendix 1b)

Section 10, Table 18 (pp. 73-75) the GBRS alignment has the greatest impact on MNES. (Appendix 1c)

In fact 96.4% of the vegetation in the Green Route is either degraded or completely degraded (BORR IPT, 2019)

The Alternate Route Environmental Impact Assessment (BORR Team, 2019) also shows that the impact on habitat for three conservation significant fauna species is lower along the Green Alignment:

Species	Listing	GBRS Route	Green Route
Quenda	P4	73 ha	46 ha
Phascogale	P6	33 ha	26 ha
Snake Necked Turtle	Near threatened IUCN	11 ha	7 ha

A high level Multi Criteria Analysis was used to assess and compare the GBRS and Green Routes. In addition to environmental impacts, it also evaluates a range of social, engineering and economic aspects (p.63 BORR IPT, 2020). Table 8 of this report is tabled in Appendix 2. Yet the Federal Environmental legislation required an investigation of alternate routes comparison and assessment of the impacts with regards to environmental impacts, and in particular MNES. While Green Route has potential impacts on non-environmental factors which may be considered significant, that was not the purpose of the report under the EPBC Act. It is clear that on environmental factors alone, the Green Route should have been selected as the proposed route.

The Green Route has never been formally assessed by the EPA. Appendix B of the UERSDAI (BORR IPT, 2020) outlines additional information that the EPA required from Main Roads. Issue 1 is to “provide further detail of consideration given to alternative routes, and justification for the chosen alignments in accordance with the EPA’s objectives for Flora and vegetation, terrestrial fauna, inland waters and social surroundings”. Main Roads WA has not provided any additional data or information, only referrals to the original Southern Section Alignment Selection Report.

2.2 Quality of Data and Assumptions

The SSASR (BORR IPT, 2019b) was based on a number of unpublished reports and data not available to the public. In the references of UERSDAI (pp. 201 – 202, BORR IPT, 2020) a significant number of unpublished reports are referenced that the public do not have access to and cannot comment on.

Updated data in the UERSDAI (BORR IPT, 2020) highlight considerably inaccurate or incomplete data in the original SSAR report. This includes:

- the number of suitable trees of diameter at breast height (DBH -a surrogate marker for Black Cockatoo Breeding trees) were counted at up to 588 in the surveyed project area (p. 51 BORR, 2019). Updated information in the UERSDAI show a count of 1109 of these trees (p.iv BORR IPT, 2020).
- One third of the GBRS Route was unsurveyed (100 ha of 300 ha project area), compared to 22% of the Green Route (BORR IPT, 2019). This leaves room for a concerning margin of error.
- The Gelorup wetland was surveyed in summer when the area is dry.
- Flora surveys were conducted out of season.

- Heritage consultants hired to investigate individual features such as culturally modified scar trees did not do so, and in fact did not get out of the car.

While some of the gaps in information have been completed in the 2020 updated reports, the decision to choose the GBRS Alignment was based on this incomplete and incorrect data in the Alternate Alignment Environmental Impact Assessments (BORR, 2019).

AS part of the Multi Criteria Analysis (MCA), an additional 12% “residual capacity” was scored, due to an “overinvestment of infrastructure” (BORR IPT, 2019b). The increased economic impact of building through a current peri-urban area, such as land acquisitions (\$20-26 million); additional infrastructure including Yalinda Bridge (\$30 million) and sound walls do not appear to have attracted a similar additional score.

2.3 Route Selection South West Highway to Hasties Road

The high level review of the section of the Southern BORR Alignment from Southwest Highway to Hasties Road concluded that “the there was no significant benefit in deviating from the GBRS Alignment”. (p.12, BORR IPT, 2020). The data used to make this decision was based on information from a 1995 HGM Report and a 1997 ERM Report, in addition to desktop surveys. (p.12 & p. 42).

We believe that data from twenty-five years ago is out of date. There have been significant changes in the surrounding environment, demographics and economics of the area since then. The decision to keep that route now limits the alternate route options available from Hasties Road to Bussell Highway. It is possible, that if the same MCA was used with detailed, updated surveys and data that the results may have been different.

Therefore, we request that Main Roads WA complete a full assessment of alternate routes in the Southwest Highway/Hasties Road section, using up to date, on-ground surveys rather than destop surveys and 25 year old reports.

2.4 Wetlands/Inland Waters

The SSAR concluded that the Green route has significantly higher impact on wetlands. The majority of these wetlands, however, are classified as multiple use. According to Geomorphic mapping, (Dept BDC&A, 2020) Five Mile Brook is listed as conservation category wetland up to the point of intersection with the Southern BORR along Yalinda Drive. The suggestion that the conservation category of a continuously flowing creek changes, and stops being Conservation Category Wetland is spurious. We contend that Five Mile Creek is one continuous waterway, and that Five Mile Creek in its entirety should be re-classified and recognised as a Conservation Category Wetlands, and the impact formally reassessed.

The future health of all the wetlands to be affected by the BORR is of grave concern. We note that the route selection document failed to appreciate the opportunities to utilise established transport corridors which would have had limited or no impact on Five Mile Brook. From our perspective, the sand fill and engineering requirements to traverse Five Mile Brook can and should be avoided.

2.5 Land use

As part of the MCA, two of the constraints are large farm lots with Dairy, and stock operations, and Agricultural activities. The 2017 GBRS Priority Agricultural Land Policy does not classify land within the Green route as in the “Priority Agricultural Land Policy” area (DPLH, 2017) This land is classified as the Spearwood and Bassendean soil systems. The 1999 Shire of Capel Land Use strategy states that “The Spearwood and Bassendean Soil Systems have only ‘moderate capability for grazing’, with the farmland requiring ‘extra nutrients and ... supplementary feed’. (p.25, Shire of Capel, 1999)

Therefore, the farmland along the green route and to the east is quite clearly not as valuable ‘farmland’ as was first categorized and should be considered as less of a constraint and given less weight that calculated in the 2019 SSAR. Furthermore, it would appear that the voices of 13 residents along the proposed green route have been given more credence and value than the voices of 33 affected landholders along the GBRs Route.

In conclusion, we submit that the Alternate Route assessment conducted was not a genuine attempt to investigate a route with a lower environmental impact. Main Roads WA had already determined that the GBRs route was the preferred route. Data collection was incomplete, in some cases inaccurate. The methodology used to determine the outcome was faulty, and the factors stated for keeping the GBRs Alignment were not environmental.

Despite this, Main Roads WA has determined an alternate route with lower environmental impacts, as the data clearly shows. The SSASR shows on Figure D-3, (p. 127) that a route shown as G3 Alignment, would have less impact on Environmentally Sensitive Areas and native vegetation than the GBRs Route. We request that EPA perform a formal assessment on the Main Roads Alternate Route analysis to determine the lowest impact route.

3. Impacts on Ecological Communities



According to the UERSDAI (p.iv BORR IPT,2020) the proposal plans to clear 76 hectares of native vegetation, including 24.9 ha of Endangered Banksia Woodland and 4.4 ha of Critically Endangered Tuart Woodlands. Both woodland types are threatened/protected ecological communities (TEC/PEC) that should be valued.

We believe that this proposal compromises the EPAs objective ‘*To protect flora and vegetation so that biological diversity and ecological integrity are maintained*’. The GBRs route has the potential to impact both directly and indirectly on several priority listed ecological communities. There has already been extensive loss of the Swan Coastal Plain vegetation, as can be seen on Table 3.3 of the Flora and Vegetation Study (p. 26, BORR IPT, 2020h).

Of the four vegetation complexes found in the proposal area, three of them (Bassendean, Karrakatta and Southern River) have less than 30% remaining on the Swan Coastal Plain IBRA bioregion, compared to pre-European settlement extent (Table 19). Additionally, the three vegetation associations: Medium Woodlands - Tuart and Jarrah (vegetation association 6); Medium Woodlands - Tuart (association 998) and Mosaic: Medium Forest – Jarrah, Marrie/Low Woodlands – Banksia and Low Forest – Teatree have also less than 30% of pre- European extent. After clearing there will only be 9% of vegetation association 6 (Tuart and Jarrah medium woodlands) in the Capel LGA (p. 77 Table 19). Clearing of native vegetation has clearly not been a priority in previous years.

3.1 Tuart Woodlands and forests of the Swan Coastal Plain (PEC/TEC)

Tuart (*Eucalyptus gomphocephala*) woodlands and forests of the Swan Coastal Plain TEC are currently categorized as a Critically Endangered under the EPBC Act and Priority 3 under the Department of Biodiversity, Conservations and Attractions (DBCA). An ecological community becomes critically endangered when it is 'found to be facing an extremely high risk of extinction in the wild in the immediate future'. (Govt of Western Australia, 2016), and is protected by the Environmental Protection and Biodiversity Conservation Act 2016. (EPBC Act, Part 2.).

Main Roads WA plans to clear 4.5 ha of a 7.4 ha patch. 4.4 ha is identified as *Eucalyptus gomphocephala* woodlands, and 0.1 ha identified as *Eucalyptus gomphocephala* – *Agonis flexuosa* woodlands, (Floristic community Type 25). Table 5.1 in the Flora and Vegetation Study (p.40, BORR, 2020h) shows that within this 7.4 ha, 50% is categorised as Very Good and 40% is categorised as Good to Degraded. Only 10% is Degraded/Completely Degraded. This area is rich in biodiversity, had good faunal habitat, provides habitat for, and contains critically endangered and endangered fauna.

Main Roads has quoted the Approved Conservation Advice for the Tuart woodlands and forests of the Swan Coastal Plain ecological community by the Threatened Species Scientific Committee (TSSC) for 2016. This document has since been updated in 2019, which we have used for this submission, given that the information contained is up to date.

The proposed action by Main Roads WA is in direct contravention of this advice. It states that "All patches great than or equal to five hectares are part of the nationally protected ecological community, regardless of their understorey condition" (p.25). "If the patch that meets key diagnostic characteristics is **5 ha or greater** – and is of any condition – **it is part of the nationally protected ecological community**" (p.20). This entire 7.4 ha clearly fits the criteria for protection so is therefore protected under the EPBC Act (1999).

The project proposal requires the destruction of 4.5ha of this 7.4ha area of Tuart Woodlands (p.40 Table 5.1 Appendix J, BORR 2020). To "only" clear 4.4 ha means that they will clear a significant proportion of an area that is part of a nationally protected ecological community.

The remaining 3 ha becomes a small, patch/fragment that potentially will not survive into the long term. Section 6.2 of the Conservation Advice prioritises preventing full or partial loss of isolated patches, for example, those surrounded by built environments, where these are the last remnants of the ecological community within a local area. (p.44). Fragmentation is continuously listed as a threat to these PEC / TEC communities, and when their size is reduced substantially, viability should not be dismissed as 'no indirect impact is expected'.

The Conservation Advice also states that 'Although very degraded or modified patches of an ecological community are not protected under the EPBC Act, it is recognised that some patches can still retain some important natural values that may be crucial for certain species or habitats.' So it is recognized that all

remaining areas of TEC/PECs have significant value. Although some portion of the 7.4 ha may be of degraded quality, the entire area is considered significant under the EPBC Act.

The Conservation Advice for Tuart Woodlands again states that “the recommended minimum buffer zone is 30 m from the outer edge of the patch (the patch boundary being defined as 30 m past the canopy of established Tuart trees, so the minimum buffer is 60 m past the canopy). This distance accounts for likely influences upon the root zone. A larger buffer zone should be applied, where practical, to protect patches that are of very high conservation value or if patches are located below drainage lines or a source of nutrient enrichment or groundwater drawdown, as Tuart trees are considered likely to be vulnerable to rapid change in groundwater conditions” (p.27). Wider buffers may be required where larger scale landscape change is occurring, for example hydrological modifications (p. 26, Section 3.4.1).

According to Main Roads WA, up to 15% of the remnant patch of 3 ha will be within a 20m buffer zone. Figure 12, Appendix A in the UERSDAI (BORR IPT, 2020), a buffer zone of 60m is not possible in the current development envelope. Main Roads WA has insufficient space in the designated corridor to fulfil the above buffer requirements of avoidance of soil/hydrological disturbance to remnant trees.

Major construction works involves substantial soil disturbance and a major change in the hydrology of the area surrounding the proposal area. So a wider buffer still may be required, which is not attainable with this proposal. Additionally, their plans to move the road around Australia’s largest, registered Tuart tree are unlikely to fulfil these objectives, where there will not be a 60m buffer. Projected possible impacts on the water table during construction combined with the longer term risk of climate change, this action threatens to make this attempt to save this ancient tuart ultimately futile.

Changes in use of the land that falls within this buffer zone must not have a significant impact on the ecological community. If the use of an area that directly adjoins a patch of the ecological community will be intensified, approval under national environmental law may also be required to avoid significant adverse impacts. (p.26, TSSCS, 2019).

Main Roads WA plans to draw down approx. 300 million tonnes of water from the Yaragadee for dust suppression. That act, in line with the effects of climate change could permanently endanger any remnant Tuart woodlands in the Bunbury area, however it is described as “minor temporary dewatering” in the documents. The construction period is estimated at three years, which is a significant period of time over which the hydrology and soil will change.

The Conservation Advice warns that failure to prevent destruction to a significant extent of Tuart forest and woodlands of the Swan Coastal Plain could be catastrophic for the survival of the species. The Committee notes that “the highly fragmented geographic distribution of ecological community, coupled with demonstrable threats, means that it could be lost in the immediate future.”

The EPA itself has stated in this Conservation Advice - “All possible options for avoiding impacts should be exhausted before mitigation and offsets are considered. Further, it is not appropriate to offset losses to this ecological community with any other ecological community.” (p.45). Section 6.1 of the Conservation Advice (TSSC, 2019) states that “It is always more effective to maintain existing remnants of the nationally protected ecological community than to allow their destruction or degradation with the intention of attempting rehabilitation of these or other areas. To meet the conservation objective, it is important to maintain existing areas of the ecological community that are relatively intact and of large and/or at least moderate quality. The State and Federal Government’s own scientists have stated plainly and firmly that Tuart Wodlands must be protected.

The most relevant key threatening processes to Tuart woodlands and forests, as defined by the Conservation Advice is land clearance. We believe that this clearing of a critically endangered ecological

community is avoidable. Thoughtful design of alternative Green Route could destroy absolutely no Tuart Woodlands. Building the GBRS Alignment however, contravenes section 6.1 of the government's own Conservation Advice.

“Ecological restoration is not a substitute for sustainably managing and protecting ecosystems in the first instance. *Standards Reference Group SERA (2016) – Appendix 2.*” (p.42 of 158).

3.2 Banksia Woodlands of the Swan Coastal Plain TEC (Endangered)

Banksia Woodlands of the Swan Coastal Plain TEC are currently listed as Endangered under the EPBC Act and Priority 3 under the Department of Biodiversity, Conservations and Attractions (DBCA). An ecological community becomes endangered when it is “facing a very high risk of total destruction in the near future” (DEC, 2010), and is protected the Environmental Protection and Biodiversity Conservation Act 2016. (EPBC Act, Part 2). Banksia Woodlands were formerly the dominant vegetation type of the Swan Coastal Plain bioregion. “In total, approximately 60 % of the original extent of the ecological community has been cleared.” (DoEE, 2016).

Vegetation

Main Roads WA plans to clear 24.9 ha over the project area, in 3 separate patches. The Banksia Woodlands within the Gelorup Corridor that is earmarked for destruction has been left undisturbed and so has enormous value as an area of extraordinary biodiversity and rich wildlife habitat. The Banksia Woodland Conservation Advice (TSSCS, 2016) states that whilst the Banksia woodlands' canopy is significant, the understorey harbours a diverse mix of ecological communities of which some species 'are locally endemic' and do not occur across the full range of the ecological community. (TSSC, 2016).

Table 4.6 in the Updated Referral Information (p.62 BORR IPT, 2020) shows that within this 29.4 ha, 48% is in Good to Excellent Condition; 50% is in Good to Degraded condition and only 2% is Degraded to Completely Degraded.

Fragmentation

The largest patch, BW-S-D1 affects 23.9 ha, of which 21.5 ha will be cleared. The remaining 2.4 ha will be adjacent to the project area. We dispute the claim that there are no indirect impacts from fragmentation expected (p.69 BORR IPT, 2020), given the nature of construction and possible hydrological changes will cause this fragment to struggle to survive in the long term. Table 4-10 states that this 2.4 ha fragment “forms a part of a larger expanse of Banksia Woodlands in a rural residential setting”, however privately owned land provides no guarantee that this area will not be cleared.

BW-S-2 (1.7ha cleared of 4.6 ha) and BW-S-3 (0.5 ha cleared) are both categorized as being Excellent to Very Good. Given the small area, and the small percentage of Banksia Woodlands rated at this level, it could be argued that these areas should be prioritised, and a greater effort be made to avoid them.

The Conservation Advice (TSSCS, 2016) states that “The greatest threat is clearing and fragmentation (p.30). Pages 111 of the same Advice states “there is an ‘ongoing degradation and fragmentation of native vegetation, from reduced remnant size, proximity to highly modified landscapes, altered vegetation structures and loss of species richness’. and on page 143 professes ‘there is an ‘extinction debt’ inherent in all smaller fragments that is likely to result in ongoing local extinctions and changes in species assemblages.’ Smaller fragments, including this 2.4 ha fragment of Banksia Woodlands will not thrive, due to their smaller area and proximity to the Southern BORR, and will potentially die out in the longer term, despite the “proposed monitoring program”.

The number of small, remnant patches of Banksia Woodlands on the Swan Coastal Plain has increased from 132 to over 12,000 patches. 72.5 % of the number of patches are now less than 5 ha, and 82% are

less than 10 ha. The median patch size has reduced over time by about 99 percent, from 146 hectares to only 1.6 hectare. Smaller patches are less likely to maintain their native species diversity to be able to persist in a recognisable condition in the near future.

Ramalho et al. (2014) have showed that the smaller patches, defined as less than 5 ha in the study, showed a general trend of local extinction, where the richness of native woody and herbaceous plants was halved 50 years after fragmentation. According to Conservation Advice (TSSC, 2018), such fragmentation coupled with intensive threat of clearing and other threats, particularly in the central Swan Coastal Plain around Perth, but also further south, suggest that the ecological community could be lost across much of its range within the near future.

“Patches that provide corridors or linkages within a largely modified landscape are particularly important as wildlife habitat and to the viability of biota within those patches of the ecological community into the future,” (p.25, TSSC, 2016). Patch BW-S-D-1 is not only a thriving Banksia Woodland in its own right, but also forms part of a larger ecological linkage, which will be significantly compromised at the Bussell Highway/Southern BORR Interchange – directly contravening the government’s own advice.

Wetlands

Additionally, while Main Roads WA acknowledge the linkages of ‘vegetation along road reserves, Five Mile Brook and Gynudup Brook they do not recognize the importance of these linkages to the health of the Banksia Woodlands. These linkages are likely to be used by mammals, birds, reptiles and amphibians.’, including critically endangered Western Ringtail Possums (p.132 UERSDAI, BORR IPT, 2020).

The Conservation Advice states ‘The structure and composition (of Banksia Woodlands) vary with three gradients; rainfall, soil and topography.’ (p.9, TSSC, 2018) And that ‘Groundwater levels, groundwater quality, and seasonal fluctuations of groundwater flows interact with (*the above 3 factors*) to influence the structure and composition of the Banksia Woodlands.’

The Conservation Advice identifies “One of the most significant threats to wetland and woodland ecosystems in the Swan Coastal Plain is the reduction of groundwater levels as a result of an increase in groundwater abstraction (including production bores), patterns in water regulation and decreased rainfall and subsequent recharge to the groundwater system. The dominant, deep-rooted Banksia species of the ecological community are considered to be groundwater dependent and are therefore particularly susceptible to impacts from groundwater drawdown (Canham et al., 2009).” (p.88)

It would be reasonable to expect that any changes in hydrology will impact the species viability and longevity. While Main Roads WA state that ‘indirect impacts from changes to hydrology is not expected’ they also acknowledge that ‘altering existing flow paths has the potential to negatively impact the hydrological regime’ (p. 72, BORR Team, 2020).

For example, two species of Banksia, *Banksia littoralis* and *B. ilicifolia* occur in seasonal damp lands where the water table is less than five metres deep throughout the year. (p.10). *Banksia attenuata*, are groundwater dependent and cannot access groundwater in areas where the water table depth is more than about 30m. (Zencich et al., 2002). Impacts related to groundwater drawdown range from a gradual change in the structure and composition of the ecological community to sudden and widespread vegetation death (Groom et al., 2000). (p.7)

There is a predicted, permanent reduction in rainfall due to climate change. From a 1990 baseline, the Water Corporation predicts a 20% decline by 2030, and a further 40% by 2050 (Water Corporation, 2009). Coupled with any significant changes in the landscape due to major infrastructure building, significant

changes in hydrology can be expected. Given the dependency on groundwater, any change in hydrology should be seen as a potential threat to the viability of the Banksia woodlands.

Buffer Zones

The Conservation Advice defines a buffer zone as ‘a contiguous area immediately adjacent to a patch of the ecological community that is important for protecting its integrity.’ (p.24 TSSC, 2016). The recommended minimum buffer zone for Banksia Woodlands is between 20-50 m from the outer edge of a patch. Additionally, these buffers must be suitable i.e. a threatened ecological community that is surface water dependant needs water levels and quality to be maintained (DBCA, 2016). There is currently insufficient detail on exactly how these buffers will be maintained and monitored.

The corridor proposal is insufficient to protect remnant vegetation with an appropriate buffer zone and prevent disruption during the construction process. Banksia Woodland Conservation Advice states that buffers of at least 20m-50m from the edge of patches of the ecological community and avoid activities that could cause significant hydrological change or eutrophication. Wider buffers may be required where there is larger scale landscape change, for example hydrological modifications. Given that the Southern BORR would qualify as a large landscape change, we believe Main Roads WA has insufficient room within the development envelope to provide buffers for Banksia Woodlands adjacent to the freeway.

Protect

The Conservation Advice states in Section 5.2 that “it is more practical and cost-effective to maintain existing high quality remnants than to allow their degradation and then attempt rehabilitation of these or other areas. The first key approaches to achieve the conservation objective is to protect the ecological community to prevent further loss of extent and condition. Actions inconsistent with these recommendations that are likely to significantly affect the ecological community should not be undertaken. (p.33). Priorities are:

- Prevent further clearance, fragmentation or detrimental modification of remnants of the ecological community and of surrounding native vegetation, for example ...associated infrastructure development.
- Identify high quality remnants in advance of zoning and development planning decisions and avoid clearing or damaging them.
- Recognise the landscape position of remnants of the ecological community and ensure that planning supports increased resilience within the landscape (for example, by retaining appropriate connectivity between remnants of all naturally occurring ecological communities.
- Prevent impacts to native vegetation, native fauna, hydrology or soil structure from any developments and activities adjacent to or near patches of the ecological community by planning for and appropriately avoiding or mitigating off-site effects. For instance, apply recommended buffers of at least 20–50 m around patches of the ecological community and avoid activities that could cause significant hydrological change or eutrophication. Wider buffers may be required where there is larger scale landscape change, for example hydrological modifications.
- Retain other native vegetation remnants and mature isolated trees near patches of the ecological community where they are important for connectivity.” (p.34, TSSC,2018)

The Banksia Woodlands Conservation Advice state “Avoid the requirement for offsetting by avoiding and mitigating impacts to the ecological community first. The proponent claims to have minimised the impact but in fact has the opportunity to potentially avoid any impact by using the alternative route as outlined

in the Southern Selection Alternative Alignment Environmental Impact Statement (2019). This route has the potential to clear only 4.8ha instead of 24.9ha and has a much wider corridor which could allow for design refinements to avoid further destruction still.

There is significant direct and indirect impact on the Banksia Woodlands from the proposed action that is inconsistent with the recommendations of the Government's own experts. Main Roads WA's proposal to place a 4 lane freeway thorough this Endangered community places it at unacceptable risk of destroying a rare and regionally significant TEC.

3.3 Tuart-Peppermint Woodland:

Tuart-Peppermint woodland is part of 'Supergroup 4 – Uplands centred on Spearwood and Quindalup Dunes.' (TSSC, 2016) The extent of the Tuart-Peppermint woodland is an unknown factor as this has not been mapped within the local area surrounding the Proposal' (p.66, BORR IPT, 2020) and that a 'similarity' approach to Tuart Woodlands has been adopted.

0.1ha were identified as Tuart -Peppermint Woodlands, 4.4 ha overlapping the Tuart Woodlands area and Tuart-Peppermint Woodlands may form a part of the Banksia Woodlands also.

Main Roads WA acknowledges that the 'regional and local extent of the Tuart-Peppermint Woodland PEC has not been mapped.' and that data has been used for Tuart Woodlands TEC/PEC as a 'proxy' and therefore assumed that the direct impact 'is not considered to be significant' (p. 86, BORR IPT, 2020). It is therefore difficult to comment on an area with so little data, and we request further surveys data collection on this threatened ecological community.

4. Impact on Wetlands



Five Mile Brook, Gelorup Corridor

The GBRS Alignment passes through areas characterized by creeklines and wetlands. The proposal objective to 'maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected' (BORR IPT, 2020) will be difficult if not impossible, to implement as the Project area encompasses Geomorphic mapped wetlands of the Swan Coastal Plain (Dept of Biodiversity Conservation and Attractions, 2020), Five Mile Brook which is listed as Conservation Category Wetlands, plus several Resource Enhancement and Multiple Use areas.

Five Mile Brook is classified as conservation category wetlands and an environmentally sensitive area, up to the point of the Southern BORR intersection. As state previously, Under the proposal, potentially 0.16 ha of 'vegetation associated with ESAs designated to protect the values of Conservation Category Wetlands' could be cleared (p.97 Table 4-36, BORR IPT, 2020). Page 82 states that 'although efforts will be made to avoid it, this vegetation could potentially be cleared as a result of construction of interchanges associated with the Proposal.'

Additionally, Table 4-36 shows that potentially, 9.4 ha of riparian vegetation (associated with watercourses or wetlands) could also potentially be cleared. is acknowledged in The Dept of Water and Environmental Regulations acknowledges the significance of riparian vegetation, stating that 'Aquatic and riparian vegetation is important for the health of waterways, contributing to the balance of oxygen, nutrients and sediment, and providing habitat and food for fauna.' (Dept of Water and Environmental Regulation, 2020).

The Waters and Rivers Commission states that, that "Fringing vegetation plays an important role in the maintenance of a biologically balanced and healthy waterway. It provides a wide range of functions which are essential for supporting plant and animal life and for maintaining the quality of the environment." (Water and Rivers Commission , 1997). Additionally, 'Recent research indicates that for a riparian buffer zone to effectively act as a habitat corridor, a minimum width of 30 metres, and up to 100 metres in some cases, is desirable, in order to achieve the full range of plant communities needed for a range of species and to link effectively with adjacent terrestrial ecosystems' (Waters and Rivers Commission, 2000).

The common types of disturbance are 'Clearing of riparian and floodplain vegetation for rural and urban purposes' and as a result of this, many 'states and local councils in Australia are now reacting to this by introducing legislation and planning restrictions on streams.' In Western Australia 'landholders and developers are encouraged to understand the benefits of retaining and maintaining a healthy riparian zone'. (Waters and Rivers Commission, 2000).

Despite an abundance of research that states otherwise, Main Roads WA lists this potential loss as 'Residual impacts that are not significant' in the Offsets Strategy document, (p.35 BORR IPT, 2020). There is no intention to offset the loss of this habitat in a meaningful way. This is particularly disturbing, given the uncertain distribution of the vulnerable Black Stripe Minnow, which is clearly susceptible to any changes in wetland environment. Equally, the Western Ringtail Possum depends on riparian vegetation.

As stated previously in this submission, we purport that Five Mile Brook should be listed and considered as conservation category wetland in it's entirety, given that it is one continuously waterway. That said, given that construction works would be 'upstream' of the current Conservation Category Wetlands, A 2016 Guidance Notes from the Department of Biodiversity, Conservation and Attractions should apply. Authorisation to modify an occurrence, is required when:

- 'Indirect and offsite impacts include:
 - 'Downstream' or 'downwind' impacts. For example, impacts on wetlands that are threatened ecological communities from water extraction, altered surface drainage or diversion, sediment, fertilisers or chemicals that are washed or discharged into drainage lines.
 - 'Upstream impacts' such as impacts associated with the extraction of water, raw materials and other inputs that are used to undertake the action.
 - 'Facilitated impacts' which result from further actions (including actions by third parties) which are made possible or facilitated by the action. For example, the construction of a dam for irrigation water facilitates the use of that water by irrigators, with associated impacts from

engineering works (for example culverts). Likewise, the construction of basic infrastructure in a previously undeveloped area may, in certain circumstances, facilitate the urban or commercial development of that area. Other facilitated impacts may include increased predation due to the clearing of access routes through bushland, introduction of plant disease, increased weed incursions due to increased boundary to area ratio of an occurrence, and increased fire frequency in urbanised areas.’ (Dept of Biodiversity, Conservation and Attractions, 2016)

Our community has not seen any management plans with regards to potential chemical spills, pesticide use, construction pollution and associated contamination risk.

The ‘Water Quality Protection Note’ from the Department of Water, in relation to infrastructure corridors near sensitive water resources, requires a “Notice of Intent” (NOI) in relation to development proposals near sensitive water resources. Where facilities are to be constructed or upgraded nearby a sensitive water resource, including PDWSA, waterway management areas, the Swan River Trust area, or within 500 metres of any Conservation Category Wetland, proponents should supply a Notice of Intent (NOI) to the Department of Water.’ (Department of Water, 2007) Has such a Notice been supplied by MRWA to the Department of Water?

Wetlands, waterways and fringe vegetation play an important role in the ecological community’s survival. Any clearing and/or contamination would be catastrophic.

5. Impact on Flora



White Sandplain Spider Orchid

5.1 Flora Species

In response to the EPA’s Request for Additional Information, subsequent surveys revealed the presence of ‘threatened and priority flora taxa present in the proposal area previously not recorded’ (p.59, BORR IPT, 2020h). These surveys found individuals of three species categorized as threatened. *Acacia semitrullata* and *Caldenia Speciosa* are listed as priority 4 and *Lasiopetalum membranaceum* is listed as Priority 3.

The survey revealed 104 individuals in the proposal area of *Caladenia Speciosa* (White Sandplain Spider Orchid). This represents approximately 3% of the total population. We refute main Roads WA claim that this is not significant.

One each of *Acacia semitrullata* and *Lasiopetalum membranaceum* were found in the surveys. Table 5-7 (p. 64, BORR IPT, 2020h) lists 14 conservation significant species with DBCA Priority Listings of P2, P3 and P4 as possible or definitely found in the project area. The report also describes these species as ‘typically cryptic’. These species are difficult to find and identify, even in season. So it is possible that there are more individuals in the proposal area, especially given that these species are found in the area, and the habitat is suitable.

Main Roads states that ‘the impact to a single individual is considered unlikely to affect the representation, diversity, viability or ecological function of the species’ and the impact is ‘not considered to be significant’ because of the species having either ‘recorded’ or ‘known’ locations within a 5 km radius (BORR IPT, 2020). However the evidence of one individual does point to likelihood of more being in existence.

The Southern Section Additional Information for Preliminary Documentation (SSAIPD, BORR IPT, 2020) lists 7 additional endangered and vulnerable flora identified as MNES that potentially could occur in the proposal area. While no single specimen was identified, these species are also difficult to identify and find, so it is also possible for a population to exist in the project area. This table listed the flora species and the habitat to be cleared that may contain further individuals.

Table 2.11 King Spider-orchid (Endangered)	12.1ha of suitable habitat to be cleared Recorded population 600m from proposal area
Table 2.12 Tall-Donkey Orchid (Vulnerable)	8.5ha of suitable habitat to be cleared Recorded population 730m from proposal
Table 2.13 Dwarf Bee-orchid (Vulnerable)	8.5ha of suitable habitat to be cleared
Table 2.14 Glossy-leafed Hammer Orchid (Endangered)	12.1ha of suitable habitat to be cleared
Table 2.15 Dwarf Hammer orchid (Vulnerable)	12.1ha of suitable habitat to be cleared
Table 2.16 Keigherys Eleocharis (Vulnerable)	8.5ha of suitable habitat to be cleared
Table 2.18 <i>Austrostipa jacobiana</i> (Endangered)	8.5ha of suitable habitat to be cleared Recorded population 1.06km from proposal

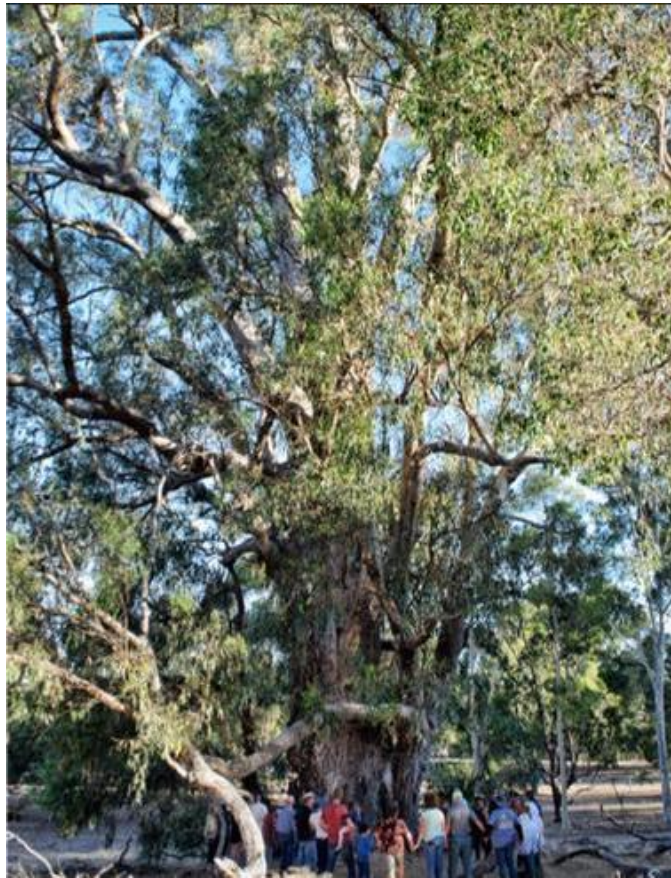
The Southern Section Additional Information for Preliminary Documentation (pp. 64 – 84, SSAIPD, BORR IPT, 2020)

The definition of Flora includes algae, fungi and lichens (DPCA, 2019), however these are not mentioned in any information provided. We ask that an assessment be completed on any potential fungi or lichen that may be present in the proposal area, in particular the likelihood of any species being endangered, vulnerable or threatened.

In conclusion, there is a potentially significant impact on 21 Priority listed, endangered or vulnerable flora taxa. Given that these species are difficult to find and identify (described as cryptic by Main Roads), it is possible that the populations of these rare fauna species are higher than stated. A low number of

specimens identified, within an area that they are known to grow previously, and is suitable habitat, surely just affirms their low population and the need for protection of suitable habitat.

5.2 Trees



The Large Tuart

Friends of the Gelorup Corridor Inc. under the direction of the Wildflower Society of Western Australia. conducted a tree survey in August 2020, the summarized results of which are in Appendix 3. The survey area covered publicly available area of approx. 2.5 km of the 10.8 proposal area to be cleared, in the heavily wooded Banksia Woodlands of the Swan Coastal Plain.

Trees were classified as significant trees if they met any of the following criteria:

- Diameter >500mm at breast height (DBH)
- Hollow diameter >300mm
- Likely spouts visible from ground level
- Visible evidence of nests or dreys
- Significant evidence of cockatoo foraging nearby.

More than 2350 significant trees were surveyed over this small area, the results listed below:

Species	Tree count
Jarrah	285
Marri	462
Peppermint	448
Woody Pear	312
Moodjar	76
Candlestick Banksia	693
Tuart	8

Bull Banksia	13
Snottygobble	41
Other	14
TOTAL	2352

Details of the largest trees were as follows:

- Tuart: height 30m, circumference 6.10m, diameter 1940mm.
- Jarrah: height 25m, circumference 6.44m, diameter 2040mm, age 345 years. Average: circumference 1.91m, diameter 610mm, age 150 years.
- Marri: height 30m, circumference 5.62m, diameter 1790mm, age 441 years. Average: circumference 1.60m, diameter 510mm, age >136 years.
- Peppermint: height 25m, circumference 4.44m, diameter 1415mm. Average: circumference 1.22m, diameter 390mm.
- Candlestick Banksia: Largest: height 20m, circumference 2.40m, diameter 760mm. Average: circumference 1.03m, diameter 330mm.
- Bull Banksia: height 12m, circumference 1.40m, diameter 440mm.
- Snottygobble: height 8m, circumference 1.03m, diameter 330mm.
- Woody Pear: height 15m, circumference 1.65m, diameter 525mm.
- Moodja: height 11m, circumference 2.35m, diameter 750mm

Within the Gelorup Corridor, there are 5 Champion trees, being the largest recorded tree of their species. All five are listed on the National Register of Big Trees (McIntosh, 2020) and 3 are listed as Heritage Trees (National Trust of Significant Trees, 2020).

These include:

1. The Giant Woody Pear
2. The Ancient Moodjar
3. The Victory Moodjar
4. The Giant Tuart
5. The Holly-leaf Banksia

Additionally, there are 2 massive Paperbark trees listed, and although these are not in the direct path of the road, they become part of an extraordinary area of Biodiversity and ancient trees that should be preserved for future generations.

All but the Giant Tuart are definitely or likely to be cleared as they are within, or very close to the proposal area. The Giant Tuart, which requires a buffer of at least 60m, will also be at risk. These majestic, ancient giants are hundreds of years old. With predicted, permanent changes in climate we are unlikely to see trees grow to this size again, which makes it imperative that they are not destroyed. Especially when there is an alternative, and their destruction can be avoided.

The tree count is not specifically addressed in Main Roads WA data, however the destruction of 2352 in just 2.5km length of the Gelorup Corridor is both astounding and grim. These trees provide shelter, breeding ground and food for vulnerable, threatened and endangered species, in addition to the crucial role they play in absorbing carbon dioxide and releasing oxygen. They are a vital and precious part of our Gelorup community to be cherished and protected.

6. Ecological Linkages



Gelorup Corridor Trees

The proposal does not just permanently destroy a currently in-tact environmental corridor. It also intersects with two significant Ecological Linkages of the South West Regional Ecological Linkages (SWREL):

1. Maidens Preston River Linkage at the northern end of the proposal; and
2. Dalyellup/Gelorup/Crooked Brook Linkage at the southern End of the proposal (Figure 13 p. 1 and 3.) The enormous impact on the southern SWREL in Figure 13 page 3 shows that not only will significant good quality vegetation be cleared but the BORR/Bussell Highway interchange will severely compromise this SWREL.

According to the Greater Bunbury Region Ecological Linkages Plan (p.5, Appendix 4, 2003)

“g. Naturally vegetated areas (in particular the larger relatively intact remnants) in the area of the linkages will be priorities for retention and protection, being expected to meet the criteria for regional significance against at least two criteria, that is 'Representation of ecological communities' and 'Maintaining of ecological processes or natural systems'.”

Previous proposals for development have been rejected by the EPA due to the potential impact on the Dalyellup Gelorup Crooked Brook Linkage and the topography of the Dune system in the region (EPA, 2005). The EPA has set a precedent by rejecting developments in the area due to the significance of this linkage. We ask that the EPA do the same again this time.

7. Fauna

This proposal will clear up to 65.4 ha of habitat for critically endangered Western Ringtail Possums (WRP) and endangered and vulnerable Black Cockatoos, 5.5ha of habitat for the endangered Black Stripe Minnow and. 43.7ha of habitat for the vulnerable Brush-tailed Phascogale (p iv, BORR IPT, 2020).

The recovery plans for both the WRP and all three Black Cockatoos species specifically state that no further clearing of habitat, foraging or nesting sites should occur. (TSSC, 2017; TSSC, 2008). The GBRS Alignment potentially contravenes both State and Federal environmental Conservation Advice.



7.1 Black Cockatoos

***Calyptorhynchus latirostris* (Carnaby's Cockatoo or Black Cockatoo) (Endangered);**

***Calyptorhynchus baudinii* (Baudin's Cockatoo) (Endangered);**

***Calyptorhynchus banksii naso* (Forest Redtailed Black Cockatoo) (Vulnerable)**

Three species of Black Cockatoos are endemic to Australia and live within the proposal area. Since all three taxa have similar distribution and habitat, they are considered together. They are all listed as threatened under State and Commonwealth legislation. Carnaby's cockatoo and Baudin's cockatoo are endangered, the Forest Red Tailed Cockatoo is listed as Vulnerable. Carnaby's Cockatoos have a Recovery Plan, while a different recovery plan covers both the Baudins and Forest Redtailed Black Cockatoos. All are listed internationally with IUCN Red List.

According to the Carnaby Black Cockatoo Recovery Plan (TSSC, 2013), they have suffered a 50% decline in population since the 1940s primarily due to the loss and fragmentation of habitat as the result of clearing of native vegetation since the middle of the 20th century. (Saunders 1979b, 1980, 1986, 1990; Saunders and Ingram 1987, 1995, 1998; Saunders et al. 1985; Mawson and Johnstone 1997). Approximately 56% of their habitat has been cleared since European settlement (p.5)

The Baudins and Forest Redtailed Black Cockatoo Recovery Plan (TSSC, 2008) states that numbers have declined over more than 50 per cent of its range over the last 50 years (Garnett and Crowley 2000), with

50% or more projected population decline in the next 10 years for Baudins, and 30% projected decline for Forest Red Tailed. (p.6)

Main Roads' project proposal threatens to clear up to 65.4ha of the three species of Black Cockatoos' habitat. The cumulative impact for their entire BORR is 103.2 ha. Under section 40(2)(a) of the EP Act Main Roads WA have been asked to provide a Threatened Fauna Environmental Management Plan for conservation significant fauna (Appendix B, p.217) but have failed to do so for these Endangered and Vulnerable Black Cockatoos. The UERSDAI states "that the impact of the proposal is not considered significant on the foraging habitat or nesting hollows." (p.123 BORR IPT, 2020).

Habitat

The Carnabys Cockatoo Recovery Plan (TSSC, 2008) states that although they are highly mobile, breeding success is highly dependent on the quality and proximity of feeding habitat within 12km of nesting sites, and night roosting sites. (Saunders. 1977, 1986, Saunders & Ingram 1987). A critical requirement of success is the protection of both foraging/feeding habitat and trees that provide both nest hollows during breeding season and night roosting during non-breeding season" (p12-13).

Activities that may have an impact on Carnaby's cockatoo include anything that results in a reduction in their Eucalypt Woodland habitat for foraging, watering breeding or roosting; and changes in land use and hydrology within catchments that leads to the cumulative loss or degradation of habitat areas that are used by them. Recovery action priority is to identify, protect and manage crucial Eucalyptus Woodland habitat for breeding, foraging and night roosting so that the quality and quantity are maintained (p.22)

We maintain that the GBRS Alignment can be classified as a 'threatening process', since it destroys both critical foraging habitat and ancient, rare trees that support nesting hollows suitable for breeding that are within 12km of their foraging habitat. The Conservation Advice states that "While planting of species that support Carnaby's cockatoo is effective over the long-term, retaining existing habitat is significantly more efficient and effective." (TSSC, 2013)

Trees

It takes 100-200 years to create a hollow bearing tree suitable for nesting, which are scarce (p.15 TSSC, 2013). Conservation Advice for the Redtailed Forest and Baudins Black Cockatoos state that Baudins cockatoos nest in large tree hollows, 30-40 cm in diameter and more than 30 cm deep (Saunders 1974a). Nests are extremely difficult to locate. Inter-species competition in addition to competition from other Black Cockatoos for nest hollows reduces breeding. The feral Honeybee can form hives in tree hollows that can kill nesting females and chicks in the nest by stinging. After illegal shooting, feral Honeybees are the most significant current threat to the ability of Forest Black Cockatoos to survive and breed (TSSC, 2008)

Main Road WA surveys have stated that 1,096 trees over the 10.8km GBRS Alignment with DBH >500mm and up to 13 trees considered to have Potentially Suitable Nest Hollows for Black Cockatoos will be removed in the proposal area, though no known nest hollows have been identified in their surveys. This is a staggering number of habitat trees that will be lost. Although those trees may not have suitable hollows right now, they may be suitable in the next 10, 20 or 30 years. Clearing those 1,096 trees puts at risk the long term future generations of Black Cockatoos, as those trees will no longer be available at all for food, breeding, roosting, food or protection. Offset tree planting will not be ready for over 100 years. The Black Cockatoos cannot wait that long.

Friends of the Gelorup Corridor Tree Survey (Appendix 3) found 152 trees that are potentially suitable as nesting hollows in only the 2.5km surveyed, rather than the 13 that Main Roads found. These trees were

carefully identified using a range of strategies, including the use of cameras attached to poles (see photo below). These trees have identified hollows which need further investigation as either active or potential breeding sites for black cockatoos or possums. We believe this area of the Gelorup Corridor has more value to the Black Cockatoos than Main Roads surveys have shown.



Gelorup Corridor Tree Survey, 2020

It is vital that we maintain these older trees as nesting hollows for Black Cockatoos that is close to their foraging habitat. Given that there is no management plan for Black Cockatoos, there are no plans by Main Roads WA to build artificial nesting hollows in adjacent trees that may assist the critical shortage of hollows that the proposal will create.

Water

The Recovery Plan for Carnaby’s cockatoos (TSSC, 2013) states that they are dependent on water being available in the vicinity of roosting sites (Shah 2006; Johnstone and Kirkby 2008; Burnham et al. 2010). There is evidence that natural water bodies in the south-west are drying up (Wilson and Valentine 2009). Excessive groundwater drawdown results in the lowering of the watertable has the potential to impact habitat quality through vegetation decline on the Swan Coastal Plain” (p.16). When Main Roads draws down 300,000kL of water from the Yaragadee aquifer, this has the potential to lower the water table and change the hydrology of the surrounding area. The long term impact of climate change potentially exacerbates this impact of habitat quality decline.

Vehicle Strike

“Vehicle strike has been recognised as being an important threatening factor for black cockatoos and is likely to increase in significance as the number of vehicles on roads in Western Australia grows (Le Souëf 2012).” (p.19 TSSC, 2013). As the numbers of vehicles on the road are increased and travelling at high speeds, it is inevitable that the number of deaths will increase when the BORR is built, especially if existing populations of Black Cockatoos live in areas within 12km of the BORR.

Recovery Plans

The Carnaby's Cockatoo Recovery Plan will be deemed unsuccessful if, within a 10 year period:

- The area of occupancy declines by more than 10% below 60,525 km²
- The number of breeding pairs of Carnaby's cockatoos at monitored breeding sites across the breeding range decreases by more than 10% averaged over three consecutive years.
- The estimated number of adult and proportion of juvenile Carnaby's cockatoos at known night roost sites decreases by more than 10% averaged over three consecutive years.
- The extent of nesting habitat (trees with nesting hollows), feeding habitat (as defined by vegetation complexes), and night roosting habitat ... decreases by more than 10% throughout the species range.

The Forest Black Cockatoo Recovery Plan will be deemed unsuccessful if, within a 10 year period:

- The extent of occurrence of Forest Black Cockatoos in Western Australia decreases by more than 10 per cent in the next ten years;
- The number of breeding pairs of Forest Black Cockatoos in Western Australia decreases by more than 10 per cent in the next ten years;
- The number of Forest Black Cockatoos in each roosting flock decreases by more than 10 per cent in the next ten years; and
- The proportion of juvenile Forest Black Cockatoos in each roosting flock decreases by more than 10 per cent in the next ten years.

The long-term survival of a robust population of all three black cockatoos depends on the availability of suitable woodland breeding habitat with suitable tree hollows, and foraging habitat capable of providing enough food to sustain the population. A widespread decline in the health of canopy species and the ecosystems they support would have consequences for Carnaby's cockatoos in terms of available nesting, food and roosting sites.

The Carnaby Cockatoo Recovery plan states:

“When making planning and environmental approval decisions and decisions on management of areas, decision makers should ensure consistency with this Recovery Plan as well as guidance provided by the EPA and SEWPAC, **and seek to fully protect Carnaby's cockatoo habitat.** If additional clearing of large areas of habitat critical to survival continues and if there is not significant success in replacing important habitat approved for development it is likely there will be further reductions in the population of Carnaby's cockatoo resulting in a failure to achieve the success criteria of this Recovery Plan. (p. 23)”

The clearing of 65.4 ha of critical foraging, nesting and night roosting habitat in the in conjunction with the clearing of 100+ year old trees that are currently very scarce has the potential to contribute to both these recovery plans failing.



7.2 Western Ringtail Possums (Critically Endangered)



Western Ringtail Possum

The Western Ringtail Possum (WRP) is endemic to the southwest of Western Australia. It is one of 20 mammals that the Australian Government has prioritised resource allocation to support the species recovery effort. Its population has dropped to such low levels, they are now listed as Critically Endangered under both the State Biodiversity Act and the EPBC Act federally. The IUCN Red List of Threatened Species states that evidence suggests that WRP are generally short lived (on average 3 years). The Recovery Plan states that reproductive output is directly correlated to habitat quality – in particular, low nitrogen content in foliage is linked to a lower number of births. Therefore, it is crucial to maintain quality habitat for the survival of the species.

According to the Western Ringtail Possum Recovery Plan (TSSC, 2017), major threats to the species include habitat loss and fragmentation. Other relevant threats include habitat tree decline resulting in competition for nesting hollows, reduced rainfall from climate change, groundwater depletion and altered hydrology, and predation (DPW, 2017).

Proposal impacts

Main Roads' project proposal threatens to clear up to 65.4ha of Western Ringtail Possum habitat plus 9.4 ha of riparian vegetation that WRP also utilise. The home ranges of 53 to 79 WRP individuals will be disturbed. This equates to 0.57% to 0.85% of the WRP population, according to estimated WRP population (p .18 Appendix G, BORR IPT, 2020d). The Biota 2019 study is based on estimated population only and includes urban population estimates. The cumulative impact on WRP with the Northern and Central BORR added is a loss of 109.3 ha and impacting 0.6% to 0.94% (p.122 BORR IPT, 2020a). Given that the WRP is critically endangered, we believe that this impact is significant.

Habitat

The Recovery Plan describes habitat suitable for WRPs. They required "high nutrient foliage availability for food, suitable structures for protection/nesting, and canopy continuity to avoid/escape predation and other threats. Long-term survival of the species requires linkages between suitable habitat patches and as such habitat critical to survival incorporates this. Vegetation communities critical to the species include long unburnt mature remnants of peppermint (*Agonis flexuosa*) woodlands with high canopy continuity

and high foliage nutrients...; jarrah (*Eucalyptus marginata*)/marri (*Corymbia calophylla*) forests and woodlands with limited anthropogenic disturbance ... and have low indices of fragmentation; coastal heath, jarrah/marri woodland and forest, peppermint woodlands, myrtaceous heaths and shrublands, dominated riparian zones and karri forest. **Any habitat where western ringtail possums occur naturally are considered critical and worthy of protection.**" (p. v, TSSC, 2017)

"The extent of fragmentation between remnant patches and continued loss or degradation has important implications on the long-term viability of the populations that depend on them. The Swan Coastal Plain has much less remnant vegetation, with most in non-conservation estates (p.10). The Conservation Significant Fauna Action Management Plan (AMP) recognises that a reduction in habitat from fragmentation, barrier and edge effects may impact the WRP. The long-term viability of populations is further compromised by the size of, and connectivity between, habitat remnants (p.18, BORR IPT, 2020d).

The WRP Recovery Plan states that "It is possible that western ringtail possums ... adapted to the urban setting (Shedley and Williams 2013), however there are also risks that are potentially associated with urban environments." (p.9) Susceptibility to predation is increased in western ringtail possums when animals need to come to the ground, possibly due to a lack of continuity in canopy cover. Both domestic dogs and cats predate on native fauna. In the City of Busselton, the density of domestic dogs is four to eight times higher in urban areas than foxes in the south west forest/vegetation (p.15, TSSC, 2017).

While there are WRP possums in urban areas, there has been no scientific, quantitative survey that can give a reliable population estimate; and no evidence to suggest that urban settings provide a similar quality of habitat and vegetation than remnant native vegetation, or indeed intact ecological linkages and corridors like the Gelorup Corridor. While there is evidence that WRP live in urban areas, there is no detailed, scientific evidence that they have adapted.

The AMP recognizes that urban features along the proposal such as light spillage, noise pollution and barrier/edge effects reducing connectivity will negatively impact the Gelorup WRPs relocating to adjacent habitat areas (p. 18, BORR IPT, 2020d). Additionally, the replacements of weeds (and non native vegetation) will reduce food sources and habitat suitability for WRP. Habitat patches within the urban areas are also surrounded by roads, which cause direct habitat loss, facilitate feral predator movement, and increase the risk of road kills.

Tree hollows are important across the range of the western ringtail possum. Hollow abundance has been positively correlated with possum abundance in peppermint/tuart (*Eucalyptus gomphocephala*) associations (Jones and Hillcox 1995) and generally constitutes more than 70 per cent of the refuges used by western ringtail possums in the jarrah forest (Wayne *et al.* 2000, Wayne 2005). The removal of 2,350 significant trees (Appendix 3, FOTGC, 2020) in just a 2.5km corridor of densely wooded Banksia Woodland would be catastrophic to the WRP population in that corridor. WRP are highly dependence on mid-storey and overstorey vegetation for food, shelter and protection from predators (Appendix G, BORR IPT, 2020d).

Recovery plan & legislation

The ten year goal of the WRP Recovery Plan (TSSC, 2017) is to "slow the decline in population size, extent and area of occupancy through managing major threatening processes affecting the subpopulations and their habitats, and allowing the persistence of the species in each of their identified key management zones" (p.vi). The criteria for failure are listed below (p. vii)

Criteria for failure:

This recovery plan will be deemed unsuccessful if, within a 10 year period, any of the following occur:

- there is loss of habitat that results in localised extinction or contraction of western ringtail possums in any of the key management zones;
- threatening processes result in localised extinction or contraction of western ringtail possums in any of the key management zones;
- an evidence-based management approach is not applied to populations in any of the key management zones;
- displaced and rehabilitated western ringtail possums do not contribute to the recovery of the species; or
- there is no increased community support for western ringtail possum conservation.

If the GBRS Alignment is built, the WRP Recovery Plan would fail at a minimum on the first three accounts. Additionally, it is unlikely that there will be increased WRP support given that the Main Roads WA and the WA government have consistently, in public acted as though the environmental impacts are not significant in the Southern BORR, despite their own legislation and Main Roads WA clearly stating otherwise.

This action will also contravene the EPBC Act: “A Commonwealth Agency must take all reasonable steps to act in accordance with a Wildlife Conservation Plan” (EPBC Act, 1999, Ch.5 part 13, Div.5.8 Clause 286 s. 286)

Areas not assessed

Given the above stated importance of habitat, Table 1-1 in the AMP (p.5, BORR IPT, 2020d), states that 33 % of the WRP habitat area within the proposal has not been assessed according to the Shedley and Williams habitat quality classification (2014). The previous environmental data provided for the EPA and for the Alignment selection has been found to be largely incomplete and inaccurate. Given the critical nature of habitat to the survival of WRPs, surely it would be a priority to assess the entire area?

Relocation

The AMP (BORR IPT, 2020d) also states that the approach to WRP management is to allow WRP to self-relocate to adjacent vegetation rather than traditional methods of relocation. Main Roads WA’s acknowledgement that previous translocation efforts have been poor is backed up multiple scientific studies. No successful method has yet been developed or implemented (TSSC, 2017; BORR IPT 2020d). Table 6.1 (pp.24-27, BORR IPT, 2020d) outlines protocols for clearing vegetation with an existing fauna population. Whilst Main Roads WA has planned to minimize the stress and impact on WRP, there is no scientific evidence or proof that this will work. In particular, the “bumping of trees with machinery”, bumping a 300 year old jarrah tree without pushing it over (even with a loader) is unlikely to move the WRP inside, and if that does not work, the tree will still be felled with the WRP still inside the tree, which undoubtedly will cause an enormous amount of stress. Based on personal experience with a frightened WRP, fleeing is not their first response if they are trapped inside. The most likely response is that they will stay still. The assumption that there will be zero fatalities of Western Ringtail Possums as a result of construction and use of the GBRS Alignment is unlikely and naïve.

Main Roads plan is still relocation which has been shown to be unsuccessful. While Western Ringtail Possums are highly mobile, their home range is less than 5 ha and they are also highly territorial (p.5, TSSC, 2017). Clarke (2011) reinforced previous studies by finding translocation largely unsuccessful, due

to predation and lower habitat quality/lower nutrient intake. In their relocation actions, no mention is made of predator control actions, especially of foxes.

While it is stated (based on the mapping of Shedley and Williams in 2014) there is approximately 6,147 ha of WRP habitat adjacent to the proposal area (p.128, BORR IPT, 2020d), no mention is also made of the quality of that habitat, or how much of it is privately owned farmlands, or residential. Additionally, that mapping was completed six years ago and the habitat may have changed substantially in that time.

WRPs shepherded into these areas will have additional risks of predation by domestic dogs, vehicle strikes on local roads and potential clearing of habitat by owners. For example, in 2013 Benini & Chambers, during a study to track WRP found that critical habitat trees for WRPs had been cleared by a private company who owned the land, apparently to build a possum proof fence along the road. (p.9), which did not require approval or notification.

Clarke also mentions interspecies competition, specifically with the larger, more aggressive Brush tailed possums who compete for the same resources and are resident in the habitat before the WRP are located there. No survey of Brush Tailed possums in these adjacent areas have been mentioned.

Clarke concludes “the most efficient use of funds and the best option for the species in its current coastal strongholds might be to put greater effort into conserving *P. occidentalis* in its natural environment” ... there is no quantitative scientific information from which to judge whether the survivorship of displaced *P. occidentalis* that are forced to disperse into neighbouring areas following habitat removal is any better than that of translocated animals. It is possible that ensuing territorial conflicts could result in equally poor survivorship of displaced individuals, or deleterious effects upon those whose territories are invaded. The consequences of localised habitat destruction on extant populations need to be studied in a scientifically rigorous manner similar to that used to examine translocation outcomes” (p.364)

Underpasses and rope bridges

Fragmentation of habitat may lead to the isolation of populations, reduced population sizes and/or genetic decline. The maintenance of an effective meta population through the retention of adequate habitat area and connectivity is likely to be important (p.128 USERAI, BORR IPT, 2020). Current WRP populations in the proposal area live in remnant vegetation connected by linkages. The proposal will fragment two areas of significant habitat with increased risk of injury or death from road traffic, and loss of habitat.

The planned mitigation strategy is the building of eight rope bridges, seven fauna passes and seven dual use fauna culverts. Main Roads WA has conducted studies of existing rope bridges (p.55, EPBC Additional Information, BORR IPT, 2020). Yokuchin & Benini commented that the 88m Central BORR only observed 2 crosses in 13 months. This was likely to be due to the discontinuous vegetation canopy cover, longer bridge length and greater street lighting, leaving fauna more exposed to predation. In contrast, a 26.5m rope bridge in Caves Road Busselton has been more successful.

Rope bridges for the Southern BORR will need to be significantly longer than the bridge in Caves Road, which is a rural, 2 lane road with tree canopy overhang. Figure 16 in Appendix A shows that the possum rope bridges will cross 4 lanes of traffic, a dual purpose path on either side and across the possum fencing. The distance will be closer to 80m, similar to the Central BORR rope bridge. It is also placed near a well lit intersection. The dual use culverts and fauna underpasses will be a similar length. Through residential Gelorup, these rope bridges will have to cross over the noise walls also. The only rope bridges in WA that have been built that approximate the rope bridges that will be built for the Southern BORR has not been successful, and therefore is unlikely to be useful in the Southern BORR.

Fencing

Main Roads WA plan to install possum fences adjacent to known WRP habitat to limit access to the proposal area, to a height of 1.5m. While this will prevent vehicle strike for a range of native fauna, fences are not without negative impacts. These fences will require maintenance and monitoring of both the fence and the fauna populations if they are to be successful.

According to Hawyard & Kerley (2008), “Fences separate biodiversity from threatening processes... Conversely, they ... have ecological costs through blocking migration routes, restriction of biodiversity range use which may result in overabundance, inbreeding and isolation; restriction of evolutionary potential; management; amenity and ethical costs.” (p. 5) In the long-term, fences may ultimately prove to be as much a threat to biodiversity as the threats they are meant to exclude.”(p.6).

They **continue**: “Fencing that prevents the immigration of individuals into a population will lead to a collapse in gene flow between populations, which will threaten the genetic processes critical to the maintenance of heterozygosity and the evolution of such populations. Such isolation of populations, associated with increased inbreeding, genetic drift and ultimately the “extinction vortex” (Caughley, 1994), would threaten the future of these populations”. (p.9)

Hayward & Kerley conclude “Ultimately, fencing for conservation is an acknowledgement that we are failing to successfully coexist with and conserve biodiversity, and existing conservation management actions are not working” (p.9).

While we acknowledge that Main Roads WA have allocated significant resources to mitigation measures, all existing, scientific evidence overwhelmingly shows that clearing WRP habitat, and using mitigation to balance the loss of habitat is largely unsuccessful. The evidence clearly shows that the best outcome for this critically endangered possum is to leave them in place and find another way around. If these significant resources allocated to mitigation had been allocated to an alternate route, the outcome may be more positive for the WRP.

7.3 Black Stripe Minnow



The Black Stripe Minnow was once endemic to the South West but due to loss of habitat, is now listed Nationally as Endangered with the EPBC Act 1999, and at a State Level in Schedule 2 of the Wildlife Conservation (Specifically Protected Fauna Notice 2018) and Internationally as Endangered on the international IUCN Redlist. (p.2 WRM, 2020b). Their biggest threat is loss of habitat, of which 5.5 ha will be cleared with the GBRS alignment. Reduced rainfall causing drying wetland habitat from climate change is also a threat. (p. 15 Appendix G, BORR IPT, 2020d).

The WRM Survey found Black Stripe Minnows are present at wetlands within and adjacent to proposal area. While distribution appears limited to a small wetlands chain, these wetlands appear hydrologically linked to the chain of wetlands in Gelorup, which is likely to connect during periods of high rainfall (p.13,

WRM, 2020b). Other investigation areas that revealed no specimens were recorded, but the habitat and conditions are suitable for Black Stripe Minnows. Given the high mobility of Black Striped Minnows, and seasonal rainfalls, it is also possible that these areas may repopulate, given the chance (WRM, 2020b). Low populations recorded also appear to verify the status of the Black Striped Minnow as endangered.

This study was the first record of the species and extends the Swan Coastal Plain distribution approximately 30 km further south than previously noted. (p.19, WRM, 2020b). There is a very real chance for this endangered fish to recover its population if left alone. The WRM Report concludes by stating: “Changes to water inundation extent and duration could alter the length of aestivation (dormancy), thus adversely impacting reproduction and recruitment success” (p.19, WRM, 2020b)

According to the Environmental Offset Strategy (Appendix H) Main Roads does not consider the clearing of 5.5 ha of habitat as well as 9.4 ha of riparian wetland that Black Striped Minnows also rely on as habitat.

There does not appear to be any offsets for the Black Striped Minnow, as the impact is not considered “significant” (p.30, Appendix H, BORR IPT, 2020). Destroying 5.5 ha and 9.4 ha of habitat, and potentially impacting the hydrology of the wetlands adjacent to the proposal may just cause the local extinction of this endangered species instead.

7.3 Brush Tailed Phascogale

The Brush Tailed Phascogale is listed as near-threatened on the IUCN Red List of Threatened Species and Conservation Dependent (Schedule 6) of the EPBC Act. The biggest threat to Brush Tailed Phascogales is habitat clearing and fragmentation, which leads to predation by foxes and reduced genetic diversity (p.114, BORR IPT, 2020). The GBRS Alignment will result in the clearing of up to 43.7ha of Brush-tailed Phascogale habitat, representing approximately 0.9% of the Brush-tailed Phascogale habitat within a 5 km radius (p.127, BORR IPT, 2020). The Phascogale’s habitat is closely correlated to both Western Ringtail Possum and Black Cockatoo habitat, with connectivity of habitat a crucial element (p.8 Appendix G BORR IPT, 2020d). Main Roads WA has asserted that the impact on the Brush-tailed Phascogale is not significant (p.127, BORR IPT, 2020), with no quantitative, scientific evidence as to what constitutes significant.

7.4 Other fauna

In addition to the fauna listed above, the GBRS Alignment would result in the loss of habitat for a further seven conservation significant fauna species likely or possibly found in the proposal area (p.105). These all have priority listing under the Biodiversity Conservation Act, or the EPBC Act

- Quenda – Schedule 4 BC Act
- Chuditch – Schedule 3 BC Act; Vulnerable EPBC Act
- Peregrine Falcon – Schedule 7 EPBC Act
- Blue-billed Duck – Priority 4 BC Act
- Western Brush Wallaby – Priority 4 BC Act
- Western False Pipistrelle – Priority 4 BC Act
- Coastal Plains Skink – Priority 3 BC Act

Further, a desktop NatureMap database search listed a species inventory of 223 vertebrate fauna species comprising 25 mammals (14 native non-volant, one bat and ten non-native), 159 birds (63 of which are largely reliant on freshwater or marine habitats), 29 reptiles and ten amphibians (p.103). We submit that this is indicative of an area rich in biodiversity and of high environmental value.

The South-Western Snake-necked Turtle is on the IUCN Redlist of Threatened Species as Near Threatened (IUCN, 2019). It is endemic to the south-west of WA, yet there is no mention in the updated Referral Information.

The BORR Southern Selection criteria, (BORR, 2019) states that the species is 'known to occur in both permanent and seasonal habitats, including rivers, lakes, farm, dams, swamps, damplands and natural and constructed wetlands (Balla, 1994; Guyot & Kuchling, 1998)'. It is clearly possible that South-Western Snake-Necked Turtles occur within the Project Area and yet there is no mention in this revised proposal.

Invertebrates

Australia has 100,000 documented invertebrate species, of which most do not occur anywhere else in the world. They perform vital roles in every ecological system on earth, including a food sources to endangered and native fauna - yet no mention is made of invertebrates in any documentation regarding the Southern BORR. There has been no assessment, surveys or discussion on the impact to invertebrates, and yet the clearing of land will inevitably lead to the deaths of thousands of invertebrate species. A field survey and impact assessment should be completed to determine the impact on invertebrates.

7.6 Conservation Significant Fauna Action Management Plan

The data and surveys used to inform Main Roads WA on their Action Management Plan (in Appendix G) has some serious limitations and exclusions. Pages 15 -16 list the key assumptions and uncertainties and assumptions:

Direct impacts to fauna during construction are limited to habitat loss and mortality. The construction period is three years, a long time for habitat to be disrupted by the additional noise, lighting, earthmoving and construction is required for freeway building. Populations adjacent to, and near construction sites will be impacted for an extended period.

It is assumed that mobile fauna will disperse in front of clearing activities – there is no scientific evidence that this will happen. It is highly likely that there will be a mortality rate.

The method described in the AMP for clearing (p.25, BORR IPT, 2020d) has some major occupational health and safety risks. A basic workplace risk assessment would show a significant risk being to the pedestrian (zoologist/fauna spotter) moving in the vicinity of large mobile plant while it is moving. Vision is limited in these vehicles, and at most workplaces, the area where loaders operate are pedestrian free zones, and visibly signed as such.

The only way to safely work is for the fauna spotter to keep out of the way of the loader while it is moving. Falling trees and debris will also constitute a major risk to anyone on the ground, which means that fauna spotters will be unable observe during clearing operations, rendering the entire process unworkable. Procedures for leaving trees if an animal is spotted would result in major delays for clearing. The details and logistics of exactly how this will work have not been considered, and obviously no Occupational Health and Safety professional has reviewed this plan.

8 Offsets



Offsets are defined as “measures that compensate for the residual (unavoidable) adverse impacts of an action on the environment”. (WA Government, 2014). They are designed to counterbalance significant, unavoidable environmental impacts. We recognize that Main Roads WA has identified areas near the current proposal as offsets to the significant impacts from the proposal, as described in their Environmental Offsets Policy (Appendix H, p.33 BORR IPT, 2020).

According to the Offsets Strategy (p. 39, BORR IPT, 2020) five properties have been identified as offset. Two properties are not yet owned by Main Roads WA, and one has not been assessed for the presence or quality of Banksia Woodlands or Tuart Woodlands. How can Main Roads quantify this offset with any confidence?

Offsetting in the Ludlow property with replanted areas is inadequate as there is no guarantee that Banksia Woodlands reconstruction will be successful and, given the long ecological lags in the potential recreation of a resilient and functioning patch of the ecological community, the loss of mature banksias and other trees, for example, severely compromises the viability of the ecological community.” (TSSC, 2016). Additionally, offset details in section 4.5.5 of the Offsets Policy specifically excludes the quantifiable value of these offsets, which is required under the Banksia Woodlands Conservation Advice (TSSC, 2016).

Main Roads states that it operates on a hierarchy of avoid, mitigate, minimize, reduce, rehabilitate and offset. Offsets as set out in both the Federal and State legislation should be considered as a last resort. They should only be utilized when the other 5 options are not available to them.

Professor Graeme Samuel’s interim report on the Independent Review on the EPBC Act (2020) states that “The stated intent of the offsets policy is to encourage proponents to exhaust reasonable options to avoid or mitigate impacts. In practice, offsets have become the default negotiating position, and a standard condition of approval, rather than only used to address residual impacts” (p.13).

It continues on page 87: “The Review has noted proposals where proponents have placed linear infrastructure through habitat, rather than considering all opportunities to site it through adjacent already disturbed or cleared lands. In other cases, proponents have identified multiple prospective areas for extraction activities and have chosen sites for solely commercial reasons (such as lower costs due to proximity to transport hubs), despite generating potentially high environmental impacts (Samuel, 2020). We believe that Main Roads has not fully investigated all potential options, rather just planned for offsets as a default position from the outset.

The review also states “Offset conditions are not adequately monitored and efforts to enforce compliance are weak. There is no transparency of the location, quality or quantity of offsets. There is no 'register of offsets' and, in the absence of such a tool it may well be possible that the same area of land has been 'protected' more than once” (p.88).

Main Roads plans to preserve and manage these offset areas into the future (p.39 BORR IPT, 2020). Some of these offsets will become Regional Open space in the GBR. However previously offset land which is now the Kalgalup Regional Park will be being partly cleared to build the Northern BORR. (Figure 29). With no genuine accountability or audit, what assurances does the public have that Main Roads will protect and manage these offset areas responsibly, and not just destroy them for future development at a later date?

This proposal has an unconscionably high impact on a large area of endangered Banksia woodlands. All possible precautions to be taken to avoid the destruction of this rare and regionally significant area of an endangered TEC, rather than the default position of providing offsets as the easier option.

9. Water Issues



Five Mile Brook, Gelorup

9.1 Domestic water supply

There is no scheme water available in Gelorup, so most residents rely solely or largely on rainwater collected from rooftops and stored in rainwater tanks. There is a concern that this source of water may become contaminated from construction and operation of the GBR Route, particularly for those residents living approximately 100m from the proposal.

According to the DWER website, a site contamination risk must have a source; a pathway and a receptor (DWER, 2020). In the case of rainwater contamination in Gelorup, these three elements are present:

- a source: airborne pollution – diesel particulates
- a pathway – rooftop collection of rainwater into tanks
- a receptor - residents

Diesel engine exhaust emitted from diesel powered vehicles is a Group 1 carcinogen which causes cancer to humans (WHO, 2012). The Cancer Council of Australia states that these particulates increase the risk of long-term health problems, including lung cancer, decreased lung function and chronic obstructive pulmonary Disease (COPD).

Consuming such carcinogenic particulates can cause long term health conditions, including cancer. They fall on nearby rooftops, potentially contaminate the collected rainwater which is then consumed. This risk of drinking water contamination needs to be investigated prior to any construction of this proposal. Once the road is constructed and vehicular movements allowed, it is too late to do the analysis, and there is no easy, alternative water source, especially where the bore water in some areas of Gelorup is not potable.

Ground water Contamination

The other source of water in Gelorup is bore water, which has the potential to be contaminated when acid sulfate soil is disturbed. It is not sufficient to state that no direct discharges of stormwater runoff will affect wetlands & water courses (BORR IPT, 2020). Main Roads WA is required to demonstrate that it can comply with the conditions of the Country Areas Water Supply Act 1947 Section 12, whereby the Bunbury Water Reserve is a Proclaimed Protection Area.

With reference to the Department of Water Quality Protection Note, Roads Near Sensitive Water Resources, Main Roads WA must demonstrate the “scientific investigation and contaminant modelling” carried out to ensure that the catchment is not compromised as stated in Note 10, during construction and operation.

The disturbance of sulphates is a further concern and one that almost certainly will not be controlled during the construction phase. To date, the community has seen no design drawings indicating the height of the road above ground water resources and there is also the potential for excavations that will not comply with the Country Areas Water Supply Act or the Bunbury Water Reserve Catchment Protection Strategy. To date, soils sampling has only been in certain, specific areas. We believe that there should be testing over a wide area, given the drastic consequences of polluting a community’s water source.

Friends of the Gelorup Corridor Inc. submission to the Department of Water and Environmental Regulation (Appendix 4) discusses the impacts of acid sulfate soil:

“The GHD 2019 Report “Environmental Impact Assessment for the Southern BORR” states there are acid sulphate soils in the Gelorup area where the Southern BORR is planned. The Department of Environmental Regulation 2015 Report “Treatment and Management of Soil and Water in Acid Sulfate Soil Landscapes” states that the disturbance of acid sulphate soil and its exposure to oxygen, has the potential to cause significant environmental impacts including fish kills and loss of biodiversity in wetlands and waterways, contamination of groundwater resources by acid, arsenic, heavy metals and other contaminants and corrosion of concrete and steel infrastructure by acidic soil and water. Projects involving the disturbance of acid sulphate soils must assess the risk associated with disturbance through the consideration of potential impacts. Wherever possible,

management measures should be governed by the guiding principle of avoidance of disturbance over any other measure.” (FOTGC Inc., 2020)

The contamination of ground water is covered by legislation and the protection of water resources with which Main Roads WA must comply. To date, they have not made public its strategies to be employed to achieve compliance.

9.2 Regional water supply

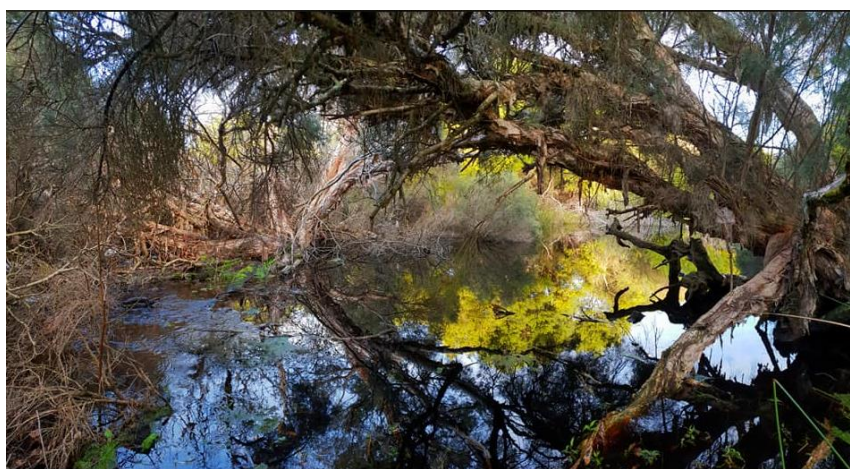
Main Roads has made an application for a licence under s5C to take 333,062 kilolitres of water from the Yarragadee Aquifer for road construction and dust suppression at the Bunbury Outer Ring Rd - Southern Section, under the Rights in Water and Irrigation Act 1914.

Friends of the Gelorup Corridor’s public submission outlining their concerns is in Appendix 4 and forms part of this submission.

9.3 Hydrology and Vegetation Monitoring Program

We have grave concerns about the groundwater monitoring. MRWA have documented that they have listed a 25 % variance from baseline as a trigger and threshold. (Table 9 Appendix J). Given that this groundwater is used in residences, we would suggest that this monitoring threshold is too high and must be reviewed.

10. Climate Change



Effect on environment

Climate change is recognized as a very real threat to biodiversity. A workshop sponsored by the Biological Diversity Advisory Committee (Howden et al, 2002) states that “There is evidence suggesting that the rate of climate change will be faster than the rate at which most species can adapt, either by migration or by changing their behaviour, physiology or form. Hence, one short-term goal for management is to ensure the survival of species in spite of additional threats resulting from climate change. A first step is to identify threatening processes and threatened species or communities.”

The Water Corporation’s 2009 Report “Water Forever – Towards Climate Resilience” projects a likely 20% decline in rainfall by 2030 from the 1990 baseline. A further 40% decline in average annual rainfall by 2060 from the 1990 baseline to less than 500mm a year would further reduce yields to appoint where dams would cease to be a reliable part of the water supply.

As discussed earlier in this document, we submit that this proposal is a “threatening process”. The significant changes in the landscape, coupled with the predicted permanent reduction in rainfall may push our local ecological communities already under stress to the point of extinction. For example, a permanent reduction in the water supply to ancient champion trees whose hydrology and soil has already been changed may put at risk its long term survival; drying of the wetlands of Five Mile Brook coupled with the clearing of riparian vegetation may impact the survival on the Black Stripe Minnow, a fish who is already at the brink of extinction. Rather than downplaying the role of climate change and greenhouse gases, we believe that further studies and modelling should be completed to allow a complete and accurate assessment of the impact of this proposal.

The WRP Recovery Plan (pp.15 -16, TSSC, 2017) states that Western ringtail possums are most likely to be impacted by recent and predicted climate change in the south-west because they have very specific habitat requirements, a poor ability to migrate and have lost large areas of habitat (de Torres 2009; Molloy *et al.* 2014). Species distribution modelling using bioclimatic variable predicted a reduction of up to 60 per cent in the range of western ringtail possums and its habitat towards the south-west by 2050 (Molloy *et al.* 2014).

Habitat destruction, or loss of quality in woodlands or riparian vegetation may result from to heat and drought-induced stress, elevation in atmospheric carbon dioxide (CO₂) is known to lead to reduced nitrogen concentrations in foliage, increased fibre content of leaves and higher levels of toxic secondary metabolites (Lawler *et al.* 1997, Coley 1998, Kanowski 2001) may also impact on the survival of all local fauna.

It is recognized that this proposal will have a significant detrimental impact on the biodiversity and health of the ecological community around the Southern BORR. While climate change does fall outside the scope of this proposal, it should be acknowledged and factored in that the impact of climate change may exacerbate and magnify these impacts.

Greenhouse Gases

Table ES-1 (p. xiii) shows that Greenhouse Gas emissions will be assessed where they exceed 100,000 tonnes of scope 1 emissions each year and claim that the proposal does not need any mitigation. However they clearly note that the greenhouse gas emissions both during construction, maintenance and operation of the freeway will be increased – in direct conflict with the stated EPA objective of reduction in emissions.

Raw material procurement for construction is a significant area where carbon footprint and greenhouse gas production could be reduced but is outside the scope of the project (s. 2.3.2 p10.) Unless Main Roads WA has a management plan in place whereby contractors and suppliers are required to follow a policy of greenhouse gas reduction, procurement of recycled or low impact materials where possible and minimisation of waste, the project will not comply with the EPA objective “to reduce net greenhouse gas emission in order to minimise the risk of environmental harm associate with climate change” (p.xiii, BORR IP, 2020). This is an achievable way to make a real impact, however Main Roads WA has not included this in the proposal.

The sterilization of 13.75 million tonnes of Gelorup basalt (Shire of Capel, 2020). has been recognised during the planning stages. The Coastal Erosion Hotspots in Western Australia Information Sheet (DPLH, 2019) and the Climate Change in Western Australia Issues Paper (DWER, 2019) both call for all levels of government to cooperate in identifying and preserving basic raw material resources for future use, especially in light of the increasing frequency and severity of coastal erosion events. Given the increased significance on remnant vegetation and biodiversity in general, it makes sense to continue utilizing existing raw material sites rather than develop alternative sites.

Bunbury has been identified as a key area vulnerable to rising sea levels due to climate change. Gelorup basalt has been identified as a key resource for coastal mitigation (DPLH, 2019). The basalt in the Gelorup quarries are recognised as having strategic importance to the region. The WAPC study into the Gelorup Basalt (WAPC, 2002) state that

“It is of particular importance to the State and the South West Region as it is a near-surface deposit with high and consistent quality , has good access to the Greater Bunbury and South West markets. It is considered to be in the state’s interest to maintain mining access to the resource”. This local resource required less resources to extract, and less transport to bring it to the market, therefore less greenhouse gases.

The EPA principle of intergenerational equity states that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations (p.41, BORR IPT, 2020). We believe that it is likely that there will be significant long term environmental and social costs that will be passed on to future generations as a result of wasting this resource.

11. Social Aspects



Meeting at the Gelorup Hall

11.1 Noise

The Transport Noise Assessment in Appendix C of the additional documentation (Lloyd George Accoustics, 2020) outlines the significant noise impact of this freeway through a rural residential area. The required installation of noise walls between Jilley Road and Bussell Highway will not meet the noise target in one residence along that proposal area. In addition, there are 19 properties that will exceed outside noise levels following all available noise wall and road treatment mitigation measures. These individual houses are proposed to have architectural upgrades offered (p.41 Lloyd George Accoustics, 2020). This will not, however, reduce the noise outside.

All residents should be able to have access to the outdoors of their property and enjoy the amenity. What makes Gelorup unique, adds value to properties and is a major drawcard is the peace and

tranquility on acreage. The construction of noise walls will significantly impact the visual amenity of the property (as discussed in Appendix D) and the excess noise as detailed in Appendix C will adversely impact affected property owner's outside amenity.

Main Roads operates on a hierarchy of avoid first, however in this instance they have not prioritized avoid, instead gone straight to mitigate. The Green Route has no sensitive receptors within 100m and would potentially impact 10 residents before mitigation (BORR Team, 2019b), rather than 63 residents before mitigation and 19 after mitigation the GBRs Route (Lloyd George Acoustics, 2020).

11.2 Air Pollution

As previously stated, diesel engine exhaust emitted from diesel powered vehicles is a Group 1 carcinogen which causes cancer to humans (WHO, 2012). The Cancer Council of Australia states that breathing in such particulates increases the risk of long-term health problems, including lung cancer, decreased lung function and chronic obstructive pulmonary Disease (COPD). A study by Finklestein & Jerret (2002) found that subjects living close to a major road had a significant increased risk of mortality. The mortality advancement rate compared to the rest of the population was 2.5 years. For those with pre-existing conditions, (such as asthma) the situation is even worse because the pollution exacerbates symptoms. The mortality advancement rate for those with pre-existing conditions increases to a range of 3.1 to 4.4 years. A number of Gelorup residents will be living within 200m of this major, urban design freeway and are at risk of developing long term, chronic health conditions due to pollution from vehicles.

11.3 Visual amenity

The Landscape and Visual Impact Assessment (Appendix D, BORR IPT, 2020f) was conducted in response to EPA requirements for additional information. According to State Legislation and Policy, it is important to "ensure that new development is consistent and sensitive to the character and quality of the landscape". (p.13, BORR IPT, 2020f). The Greater Bunbury Strategy objectives include to "ensure that development occurs in a way that safeguards and enhances the existing environmental, biodiversity and scenic assets", and "to protect and enhance waterways, heritage areas, remnant vegetation" (p.14). Shire of Capel Planning Scheme No. 7 is also referenced and states that in the areas of "Special Rural" – "to make provision for retention of the rural landscape and amenity" (p 15).

Shire of Capel Urban Landscape Strategy 2011 applies to the areas of Dalyellup and Gelorup and the principle aim of this strategy is to "enhance the amenity, environmental sustainability and cultural outcomes" and the relevant objectives are to "retain existing native vegetation for its environmental, landscape amenity and cultural heritage values." (p16, 3.1.3.4 Appendix D). There is no way that mitigation can counterbalance the significant loss of visual amenity in Gelorup after a major, urban design freeway bisects this per-urban and rural community, in addition to all the bridges, ancillary roads and associated building.

The objective of the Visual assessment is to have "the road alignment and associated built forms sited within the natural topographic context" (p31, BORR IPT, 2020f). Section 5.1.2 outlines the protection of landscape character, with key protection issues being retention of dense native vegetation, retention of low lying and dunal topography and that no built form should be visible above the tree line or interrupting more open views.

Section 6.2 (p35) describes over multiple areas how this road will not conform with the above stated objectives. The elevated interchanges at Centenary Lilydale Roads (6m clearance from above the road), the bridge at Five mile Brook (4.6m clearance with retaining walls), the bridge at Yalinda Drive (6m above the road) and two bridges at the Bussell Highway interchange (6m above the road).

In addition, planned sound walls along the entire proposal area through residential Gelorup (2.4m – 5m high) to minimise noise, and required retaining walls and fencing (up to 5m) will cause significant interruption to the visual and landscape amenity and are out of keeping with the natural low lying landscape.

The impact to Landscape Character Units 2 (Peri-urban) and 3 (Rural) have been identified as having high to moderate impacts (Table 17 p.40). Four out of five LCU's also have high to moderate impacts.

Section 8 of the report describes how significantly the proposal will impact on visual amenity:

Section 8.1.1 “proposed grade separated interchanges would be in conflict with the natural landform, imposing cut and fill batters, retaining walls and new elevated structures”.

Section 8.1.2 “due to the nature of the proposal It would not be possible to retain much of the existing valued vegetation” and “the proposal includes cut and fill batters and grade separated interchanges within low lying and dunal areas which would be uncharacteristic withing the existing landscape context” (p. 66).

An extensive area of dense vegetation would be cleared inside the proposal area. Mitigation measures in no way counterbalance the loss of dense bushland and ancient trees. Revegetation planting cannot occur with the same species, as it would take hundreds of years to replace, if at all. The photomontages display this. After 5 years, the regrowth of understory is minimal.

The construction impacts were addressed through a “general discussion” (p. iii), and as such the details (and therefore impacts) remain unknown until construction details are completed, at a much later date, as passed the date that the public can comment. The impacts are described as “temporary” however two to three years of construction is a considerable time period.

The scope of this assessment does not include consideration of landscape and visual impacts from lighting or during night conditions. For residents along Woods Road and near the Bussell Highway/BORR interchange, this has the potential to be a major issue, given that the area will be lit continuously.

The report also discusses a lack of access to potentially affected private properties (p.12). We have spoken to residents that will be affected in a major way, and they have told us that Main Roads WA has not contacted them to ask permission to come on their land for an assessment. Most would certainly have been agreeable if they had known the reasoning.

11.4 Loss of amenity and connectivity

With road closures and new interchanges, the connectivity of the communities of Stratham and Gelorup will be changed forever. (BORR Team, 2019). It not only bisects a community, but also reduces access. For example:

- Schoolchildren on the east side of Bussell Hwy will be unable to safely access north bound school bus services. Bus services In Gelorup are very limited and it is likely that this will limit public transport access even further.
- Residents on the west side of Bussell Highway wishing to travel south will have to exit left onto Bussell Hwy, negotiate the roundabout at the Woods Rd interchange and then travel south.
- Residents of northern Stratham wishing to visit South Gelorup will have to turn right at Jaymon Rd across the merging traffic travelling at 110 km /hr both north and south bound to enter the Calinup Rd slip Rd and then head north once more into Gelorup.
- Main Roads has no plans to upgrade the intersection at Jaymon Rd which will become the main entry and exit point for North Stratham with the road closure of Lakes Road. This is a major safety concern in an area with a high bushfire risk.

- Residents of northern Gelorup were not consulted about the changes in design to incorporate upgrades to Jules Rd and Centenary Rd. The road is planned to pass through a local play ground and public open space where community members can exercise their dogs. Residents of Sleaford Park Drive are likely to experience a significant increase in traffic as people use this road as a “rat run” rather than continuing on to the BORR/Centenary Rd roundabout. The design changes will significantly reduce these residents’ amenity.
- It is mentioned that there will be a shared path along the freeway, but presumably no access for local residents given that the sound walls must be continuous along the residential areas.

During the CRG meetings, Main Roads WA did not discuss these social issues, but consistently referred to a report that was to look at these various social impacts. When the Report was released in January 2020, the community had some serious misgivings.

- The Socio-Impact Assessment (KPMG, 2019) was completed before the final road selection was finalized, and so could not possibly have assessed the impact correctly.
- The Report was supposed to be prepared using the methodology of the NSW Roads and Maritime document (p32, Table 3-3, KPMG, 2019) which was provided by the BORR Team’s Project Director to the CRG members. KPMG’s SEIA Report should have been a **comprehensive and quantitative** assessment of the social and economic impacts caused by the BORR Project. Instead it is a qualitative assessment that relied primarily on minimal interviews by KPMG’s Project Manager with just a few CRG representatives, community members and local government stakeholders. In fact for the largest infrastructure project ever proposed in the South West, the KPMG report interviewed just 8 people (Appendix B p46).

Despite this report being commissioned specifically for the BORR Project, it is not referenced at all in the Social or Amenity impacts section of the documentation. One conclusion the report did reach was that the impact on Gelorup was “moderate”. This took into consideration that the Gelorup resident population was only 2.6% of the Greater Bunbury resident population, and the greatest negative impact was for a subset of Gelorup residents. There is no further detail.

12. Planning Issues

The proponent has consistently stated that this road has been gazetted in the Greater Bunbury Region Scheme (GBRS) as a road reserve and that this has informed planning decisions over many years. Main Roads states in their selection criteria (p.48 UERSDAI p.iv BORR IPT,2020) that “Land owners affected by the primary regional road corridor should have been aware of the planning status”. This does not take into account of the substantial design changes to a much bigger, urban design freeway, and adjustments to the route bringing to closer to residential areas.

Main Roads map of the current status of the GBRS shows this road impacting on the recently declared areas of Regional Open Space identified as the Kalgulup Regional Park at the northern end of the development envelope, as well as impacting land that has been zoned urban. In addition, the Northern Route has been changed to account for a community that has not yet been built. The GBRS Route can, and has been adapted from time to time. The reason given to residents that “its always been there so it cannot be changed is a spurious and incorrect one. Additionally, Main Roads WA has not yet applied for any variation to the GBRS to allow for appropriate community consultation.

There has been significant opposition from the local community for the GBRS Alignment. Families have been forced out of their long term homes, other residents are facing the prospect of a significant devaluation in their property without compensation, due to unexpectedly being so close to major infrastructure. The residents adjacent to the Bussell Highway/ Southern BORR interchange were told up

until last October that the intersection would be a Y junction. Instead it is a much larger, elevated, continuously lit interchange. The plan as it stands is not compatible with the peri-urban community surrounding it.

The community consultation process is a difficult one. Despite requesting that this not happen, the State and Federal Submission periods intersected. Reading, absorbing and analysing over 2, 000 pages of unfamiliar text and write a meaningful, well informed submissions in a period of almost 9 weeks is unrealistic. Genuine consultation requires a longer time frame.

13. Conclusion

The GBRS Route for the Southern BORR, if built, will result in unacceptably high environmental and social costs. For the last 6 years, our community has been told that the GBRS Route was already decided and could not be changed, despite there being no environmental approval at a State or Federal Level. It is public knowledge than Main Roads WA has been supremely confident that this road will proceed in its current route, despite the enormous environmental, social and economic costs.

While an Alternative Route Assessment was completed, we do not believe this was a genuine attempt to find an alternative. Even with incomplete and incorrect data and erroneous assumptions, the report did indeed demonstrate that there was a better route, with a lower environmental impact. Instead of choosing the lower impact route, however, Main Roads have chosen to stay with the Red Route for reasons that are not related to environmental issues. We submit that this Alternate Route Assessment be formally assessed by the EPA, because of the reasons above. As part of that assessment, we ask particularly to review the South West Highway to Hastie Road using current data.

In this proposal, there is a high level of unknown direct and/or indirect impacts, requiring further surveys and studies. Since the EPA objectives state in the Precautionary Principle that where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, decisions should be guided by

- (a) careful evaluation to avoid, where practicable, serious or irreversible damage to the environment; and
- (b) an assessment of the risk-weighted consequences of various options.

The following details have not been supplied:

- Further details of consideration to Alternate Routes, as requested by the EPA
- EMP for Black Cockatoos as requested by the EPA (although this has been provided in the Federal documentation)
- No mention of the impact on invertebrates, funghi, lichen or algae
- No mention of management plans for potential water contamination
- Offsets have not been quantified
- 33% of WRP habitat is unsurveyed, and none of the adjacent habitat where the WRP are expected to relocate to has been surveyed for quality.

We submit that this information be supplied to the EPA and be submitted for public comment before the EPA makes its decision.

The GBRS Route contravenes both Conservation Advices for Banksia and Tuart Woodlands; plus it contravenes the Recovery Plan for the Western Ringtail Possum, and the three Black Cockatoos, in multiple areas. Impacts for conservation significant fauna such as Black Cockatoos, Phascogales and the

Black Striped Minnow have been described as “not significant”, with no quantifiable, objective, scientific reasoning stated for that decision. Details of mitigation actions for the Western Ringtail Possums are either unproven, have been proven not to work (rope bridges and relocation) or will contravene Occupational Health and Safety Laws (clearing procedures).

The environmental impact of this project is too high and cannot be mitigated or offset in any meaningful way. Friends of the Gelorup Corridor ask that the GBRs Alignment be refused on these grounds, and thoroughly investigate the alternative that Main Roads has already identified.

Thank-you for the opportunity to comment.

Yours sincerely,

Ms Joanne Munro
On behalf of
Friends of the Gelorup Corridor Inc.



Mural along Bussell Highway, Gelorup

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15. Appendices

Appendix 1a: GBRS and Green Route Comparison Table - Flora and Vegetation

Section 10 Table 12 (pp. 68-69) Bunbury Outer Ring Road Southern Section Alignment Selection Report

10.2 Key Environmental Factor – Flora and Vegetation

The assessment of flora and vegetation impacts for the two alignments are summarised in Table 12.

Table 12: Flora and vegetation comparison table

ASPECT	BORR SOUTHERN SECTION GBRS (RED) ALIGNMENT	BORR SOUTHERN SECTION ALTERNATIVE (GREEN) ALIGNMENT
Total Area	190 ha	222 ha
FLORA AND VEGETATION		
Total Native Vegetation	Approximately 73 ha (40 ha surveyed, 33 ha unsurveyed)	Approximately 46 ha (30 ha surveyed, 17 ha unsurveyed)
Total non-native / cleared area	Approximately 120 ha	Approximately 176 ha
Total native Good or better condition	Approximately 18 ha (~9 % of the Project Area)	Approximately 6 ha (~3 % of the Project Area)
Total areas in Good – Degraded or worse condition	An estimated 172 ha (~91 % of the Project Area) (Includes Cleared/parkland areas, which are classified as Completely Degraded)	An estimated 216 ha (~97 % of the Project Area) (includes Cleared/parkland areas, which are classified as Completely Degraded)
Threatened and Priority Communities	Present: 1. Banksia woodlands of the SCP TEC – approximately 21 ha 2. Banksia woodlands PEC – up to 3.5 ha 3. Tuart woodlands PEC – approximately 28 ha.	Banksia Woodlands of the SCP TEC (up to 4.5 ha) Banksia dominated woodlands of the SCP IBRA region PEC (FCT 21a) (up to 6.9 ha) The Tuart (<i>Eucalyptus gomphocephala</i>) woodlands of the SCP PEC (FCT25) (up to 0.4 ha).
Other significant	Approximately 4 ha of riparian vegetation	Approximately 13 ha of riparian vegetation
Conservation significant flora	One Priority Flora recorded – <i>Caladenia speciosa</i> (Priority 4), of which 71 individuals occur within the Project Area. No Threatened flora recorded during the filed investigations.	12 conservation significant flora species previously recorded or likely to occur within the Project Area, from desktop investigations. No EPBC or BC Act species recorded during field investigations. No Priority Flora recorded during field investigations.

Appendix 1b: GBRs and Green Route Comparison Table – Fauna

Section 10 Table 13 (Page 69) Bunbury Outer Ring Road Southern Section Alignment Selection Report

Table 13: Fauna comparison table

ASPECT	BORR SOUTHERN SECTION GBRs (RED) ALIGNMENT	BORR SOUTHERN SECTION ALTERNATIVE (GREEN) ALIGNMENT
FAUNA		
EPBC / BC Fauna - confirmed - Black Cockatoos	Approximately 71 ha of potential Black Cockatoo habitat (38 ha surveyed and 33 ha unsurveyed). Up to 443 Suitable DBH Trees, including eight Trees with a Suitable Nest Hollow, four Known Nesting Trees and three that could not be assessed by drone.	Approximately 38 ha of potential Black Cockatoo habitat (including 21 ha surveyed and 17 ha unsurveyed) Up to 588 Suitable DBH Trees, one of which is a Tree with a Suitable Nest Hollow, two showed evidence of past use as Known Nesting Trees and two could not be assessed by drone.
- Western Ringtail Possum (Critically Endangered)	Approximately 71 ha of WRP habitat (including 37.9 ha surveyed and 32.6 ha unsurveyed) and displacement of an estimated 100 individual WRPs, representing less than 2 % of the regional population.	Approximately 38 ha of potential Western Ringtail Possum habitat (including 21 ha surveyed and 17 ha unsurveyed), supporting up to 15 individual possums.
- South-western Brush-tailed Phascogale (Schedule 6)	-	Approximately 26 ha of potential Southern Brush-tailed Phascogale (including 9 ha surveyed and 17 ha unsurveyed).
Priority Fauna – confirmed - Southern Brown Bandicoot / Quenda (Priority 4)	Approximately 73 ha of potential Southern Brown Bandicoot, Quenda (Priority 4) habitat (including 40 ha surveyed and 33 ha unsurveyed).	An estimated 46 ha of potential Southern Brown Bandicoot habitat (including 30 ha surveyed and 17 ha unsurveyed).

Appendix 1c: GBRs and Green Route Comparison Table – MNES

Section 10 Table 18 (pp. 73-75) Bunbury Outer Ring Road Southern Section Alignment Selection Report

Table 18: Assessment against Matters of National Environmental Significance

MNES	IMPACT ASSESSMENT - GBRs (RED) ALIGNMENT	IMPACT ASSESSMENT - ALTERNATIVE GREEN CORRIDOR
Threatened Species and ecological communities	Impacts to one Threatened Ecological Community (TEC) was confirmed within the Project Area during field investigations: <ul style="list-style-type: none"> Banksia Woodlands of the Swan Coastal Plain (SCP) TEC (approximately 21 ha). 	Impacts to a TEC was confirmed within the Project Area during field investigations: <ul style="list-style-type: none"> Banksia Woodlands of the SCP TEC (approximately 5 ha). No EPBC Act or BC Act listed flora were recorded within the Project Area during

	<p>No Threatened flora species 'known' or 'likely to occur' in the Project Area.</p> <p>Impacts to Carnaby's Cockatoo (Endangered), Baudin's Cockatoo (Endangered) and the Forest Red-Tailed Black Cockatoo (Vulnerable), including:</p> <ul style="list-style-type: none"> • Removal of approximately 71 ha potential habitat (38 ha surveyed and 33 ha unsurveyed) • Removal of 443 Suitable DBH Trees, including eight Trees with a Suitable Nest Hollow, four Known Nesting Trees and three that could not be assessed by drone <p>Impacts to Western Ringtail Possums (Critically Endangered), including:</p> <ul style="list-style-type: none"> • Removal of approximately 71 ha potential habitat (38 ha surveyed and 33 ha unsurveyed), providing habitat for an estimated 100 individuals, which represent less than 2 % of the regional population. <p>Loss of less than 0.3 ha wetland habitat hydrologically connected to wetlands where Black-stripe Minnow were recorded.</p>	<p>the surveys conducted in October and November 2018 (BORR IPT 2019a and b).</p> <p>Impacts to Carnaby's Cockatoo (Endangered), Baudin's Cockatoo (Endangered) and the Forest Red-Tailed Black Cockatoo (Vulnerable), including:</p> <ul style="list-style-type: none"> • Removal of approximately 38 ha (21 ha surveyed and 17 ha unsurveyed) potential breeding and foraging habitat • Removal of 588 Suitable DBH Trees, one of which is a Tree with a Suitable Nest Hollow, two showed evidence of past use as Known Nesting Trees and two could not be assessed by drone. <p>Impacts to Western Ringtail Possums (Critically Endangered), including:</p> <ul style="list-style-type: none"> • Removal of approximately 38 ha (21 ha surveyed and 17 ha unsurveyed) breeding and foraging habitat, providing habitat for an estimated 15 individuals, which represent up to 0.3% of the regional population. <p>Loss of less than 0.3 ha wetland habitat hydrologically connected to wetlands where Black-stripe Minnow were recorded.</p>
Migratory Species	<p>The PMST identified 42 migratory species including:</p> <ul style="list-style-type: none"> 26 bird species (Inc. 9 wetland species) 15 marine species 1 terrestrial species. 	<p>The desktop assessment (PMST) identified 42 migratory species potentially occurring within 5 km of the Project Area, including:</p> <ul style="list-style-type: none"> • 26 birds (including 9 wetlands species) • 15 marine species • 1 terrestrial species. <p>Impacts to these species are not considered likely from the Project.</p>
Commonwealth Marine Areas	<p>The Project will not impact any Commonwealth Marine Area.</p> <p>The closest is Geographe Commonwealth Marine Reserve, approximately 14 km west of Project Area.</p>	<p>The Project will not impact any Commonwealth Marine Area.</p> <p>The closest is Geographe Commonwealth Marine Reserve, approximately 14 km west of Project Area.</p>
World Heritage Properties	<p>The Project will not impact any World Heritage Properties.</p>	<p>The Project will not impact any World Heritage Properties.</p>
National Heritage Properties	<p>The Project will not impact any National Heritage Properties.</p>	<p>The Project will not impact any National Heritage Properties.</p>
Wetlands of International Importance	<p>The Project will not impact any wetlands of international importance.</p> <p>The closest is the Vasse-Wonnerup System, approximately 20 km south of the Project Area.</p>	<p>The Project will not impact any wetlands of international importance.</p> <p>The closest is the Vasse-Wonnerup System, approximately 20 km south of the Project Area.</p>

Appendix 2 – Multi Criteria Analysis Objectives and Priorities

Environment and Ecology	Community and Social	Engineering	Economic
<ul style="list-style-type: none"> • Wetlands (CCW and Resource Enhancement) • Remnant Native Vegetation • Rare and Priority Flora Sites • Fauna Habitat • Rare Fauna (WRP) • TECs • European Heritage • Aboriginal Heritage 	<ul style="list-style-type: none"> • Impact on residential properties (Direct Impact and Severance) • Impact on commercial properties • Noise and visual amenity 	<ul style="list-style-type: none"> • Acid sulphate soils and contaminated sites • Network operations • Road geometry • Geology • Constructability 	<ul style="list-style-type: none"> • Whole of life cost • Utilities impact costs • Strategic agricultural resources and basic raw materials



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TREE SURVEY

SOUTHERN SECTION

BUNBURY OUTER RING ROAD

GELORUP CORRIDOR



September 2020

Background

Main Roads WA has proposed the Bunbury Outer Ring Road (BORR) as a necessary piece of road infrastructure to allow improved access to Bunbury Port, grade separation of vehicles and reduced travel times.

The Northern and Central Sections have been approved and are due to start construction in early 2021.

The Southern Section has not yet been approved and is subject to much Community concern about the socioeconomic and environmental damage that the proposed route will cause.

This tree survey has been performed to inform our group about the nature, type, age and number of trees in the proposed Southern section of the BORR (SBORR)

Methodology:

The tree survey along the Gelorup Corridor was organised by Stephanie Crowe who invited Dr Eddy Wajon to provide direction and training for a planned tree survey. Participants included Sue Chapman, Kieran Noonan, Debrah Lim, Stephanie Crow, Helen Oostryck, Saibra Twigg, Neil Davies, and Natalie Adams.

Dr Wajon attended the Gelorup corridor between Monday 13th July and Thursday 16th July 2020. A group of volunteers were given thorough instruction in tree identification, measurements (height, circumference at breast height and canopy width) and location (GPS) by Dr Wajon. The focus was on documenting large, old, habitat, culturally significant or aesthetic individuals of a range of tree species. These species were as follows:

- Tuart: *Eucalyptus gomphocephala*
- Jarrah: *Eucalyptus marginata*
- Marri: *Corymbia calophylla*
- Peppermint: *Agonis flexuosa*
- Woody Pear: *Xylomelum occidentale*
- Common (Candlestick) Banksia: *Banksia attenuata*
- Snottygobble: *Persoonia longifolia*
- Swamp Paperbark: *Melaleuca raphiophylla*
- WA Christmas tree (Moodjar): *Nuytsia floribunda*
- WA Flooded Gum: *Eucalyptus rudis*

The first 4 days of the survey were undertaken with Dr Wajon in the corridor checking data and assisting with queries from local participants. Data collection with the trained local participants continued over the subsequent weeks until its completion on 2nd August 2020.

The areas surveyed were informed by local knowledge, Google Earth and Main Roads WA (MRWA) maps. The exact boundaries of the road are subject to change. The sites surveyed is in the proposal area as at 2nd August 2020. Most attention was spent on the areas from the junction of farmland and reserve near Yalinda Drive to Bussell highway. These areas remain publicly accessible and are the most heavily treed. It is estimated that the survey covered almost 1/4 of the total area for the Southern BORR, or

approximately 2.5km length of the Corridor. The full length of the Southern BORR is approximately 10.5km from South West Highway to Bussell Highway.

The data was entered into an excel spreadsheet in a standardised format, listing tree number, location, height, circumference, calculated diameter, canopy width, presence, height, width and number of hollows, with evidence of use (if any) by nesting birds, particularly cockatoos. If a “grove” of trees was identified then they were listed as separate trees in the database.

Trees were classified as significant according to a number of criteria. These were as follows:

- Tuart (*Eucalyptus gomphocephala*): circumference >940mm
- Jarrah (*Eucalyptus marginata*): circumference >500mm
- Marri: *Corymbia calophylla*: circumference >500mm
- Peppermint: *Agonis flexuosa*: circumference >500mm
- Common (Candlestick) *Banksia attenuata*: circumference >300 mm
- Snottygobble: *Persoonia longifolia*: circumference >140mm
- Woody Pear (*Xylomelum occidentale*): circumference >300mm
- Moodja: (Christmas Tree, *Nuytsia floribunda*): circumference >400mm
- Culturally significant trees: trees with scars, twists, leans

Trees were classified as habitat trees if they met any of the following criteria:

- Diameter >500mm at breast height (DBH)
- Hollow diameter >300mm
- Likely spouts visible from ground level
- Visible evidence of nests or dreys
- Significant evidence of cockatoo foraging nearby

During and prior to the present tree survey, a number of large trees were identified which have been submitted for entry into the National Trust and Champion tree Registry. Several variants of known trees were also found with different bark structures or notable associations.

Results:

The main findings were as follows:

1. **Habitat trees.** We identified 161 Habitat trees vs MRWA markings of only 71 trees. We have the GPS coordinates of these trees so we can verify their position if requested by the EPA or Main Roads WA.
2. **Black Cockatoo potential breeding trees**
Our Study found 487 trees had DBH >500mm (criteria used in MRWA Commonwealth EPBC submission for Northern and Central BORR). We identified hollows in 152 trees which need further investigation as either active or potential breeding sites for black cockatoos or possums.

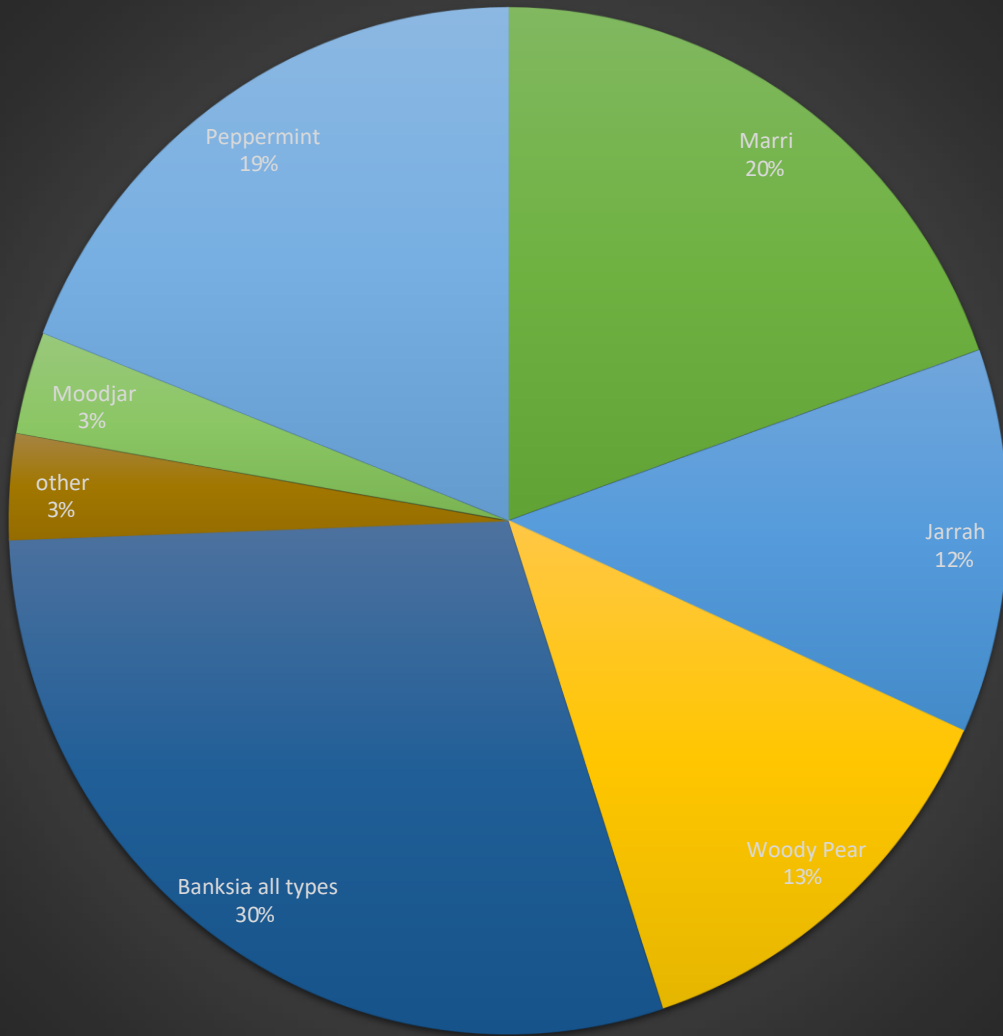
This is in comparison with the information submitted to the Commonwealth EPBC by MRWA which indicated: “538 Suitable Diameter at Breast Height (DBH) Trees (Black Cockatoos) in the Surveyed Area, of which 18 had a Suitable Nest Hollow for Black Cockatoos, of which eight are Known Nesting Trees in the surveyed areas”

Significant trees: 2352

The count returned 2532 significant trees. These represent trees that provide critical habitat, food, protection for flora and fauna. Results are in the table below:

Species	Tree count
Jarrah	285
Marri	462
Peppermint	448
Woody Pear	312
Moodjar	76
Candlestick Banksia	693
Tuart	8
Bull Banksia	13
Snottygobble	41
Other	14
TOTAL	2352

Tree Count



Marri: 462.



- Largest circumference 5.62m, diameter 1.81m
- Average circumference 1.60m, diameter 510mm
- Average age >136 years using DPAW calculator $AGE = 2.35 \times (\text{Tree diameter over bark in cm} + 6.97)$
- **Estimated oldest tree 441 years**

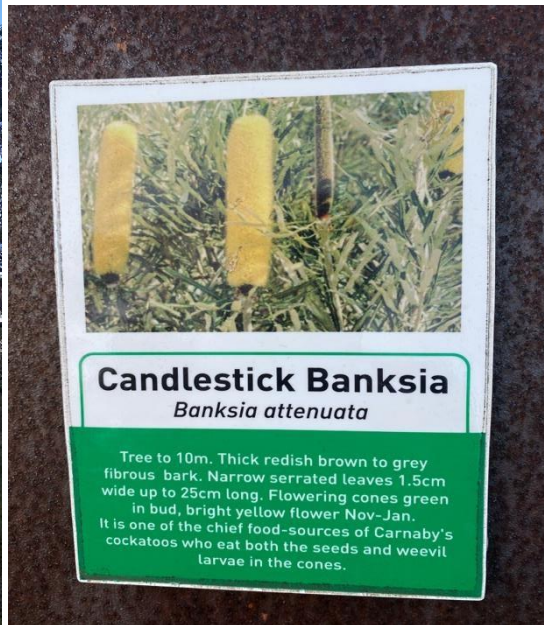
Jarrah 285.



- Largest circumference 6.44 m, diameter 1.40m
- Average circumference 1.91m, diameter 610mm

- Average age 160 yrs using DPAW Calculator $AGE = 2.35 \times (\text{Tree Diameter over bark in cm} + 6.97)$ •
Estimated oldest tree 345 years

Candlestick Banksia 693.



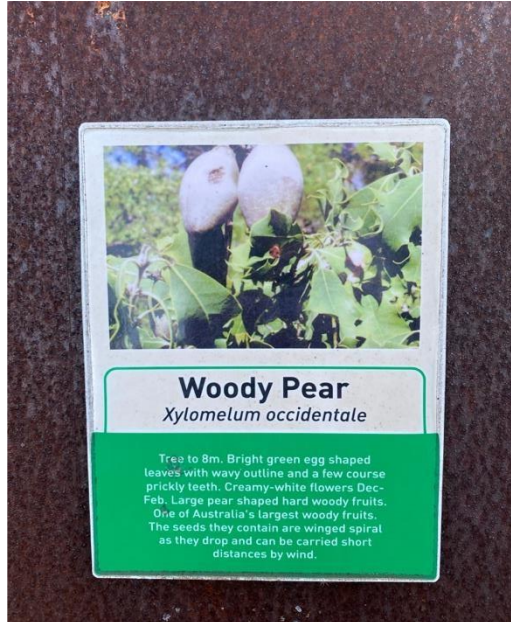
- Largest circumference 2.40m, diameter 760mm
- Average circumference 1.03m, diameter 330mm

Peppermint 448.



- Largest circumference 4.44m, diameter 1.41m
- Average circumference 1.22m, diameter 390mm

Woody Pear 312.



Moodja 76



Trees entered into National Register of Big Trees

We have 5 Champion Trees in the Corridor.

From the South west end on Bussell Hwy moving North east, the champion trees listed in the National Register of Big Trees in the corridor are

1. The Giant Woody Pear
2. The Ancient Moodjar
3. The Victory Moodjar
4. The Giant Tuart
5. The Holly-leaf Banksia

Culturally Significant Trees have been registered with Department of Planning, Lands and Heritage and are awaiting assessment. These are the following:

30 scar trees
17 spiral trees 4
directional trees 1 resource
hollow tree.

Some trees are both spiral and directional.

Conclusions

This survey has covered a section of the proposed route for the SBORR and has found a wealth of trees-significant in numbers, size, age and aesthetic features. A large number of habitat trees have been identified, as well as trees potentially culturally significant for the local indigenous community.

This corridor provides resources for endangered animals such as the Western Ringtail Possum and a number of species of endangered black cockatoos, both listed as Matters of National Environmental Significance. The recovery plans for both these species specifically state that no further loss of habitat, and particularly nesting sites, should be allowed to occur.

The trees and seasonal waterways of this corridor should be preserved as an A class reserve for future generations. This survey is testament to the value of this area.

Appendix 4: FOTGC Inc. Public Submission to DWER



*Friends of the Gelorup Corridor Inc.
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2nd March 2020

Department of Water and Environmental Regulation
Bunbury.admin@dwer.wa.gov.au

Dear Sir/Madam,

REF: RF8242-02-1

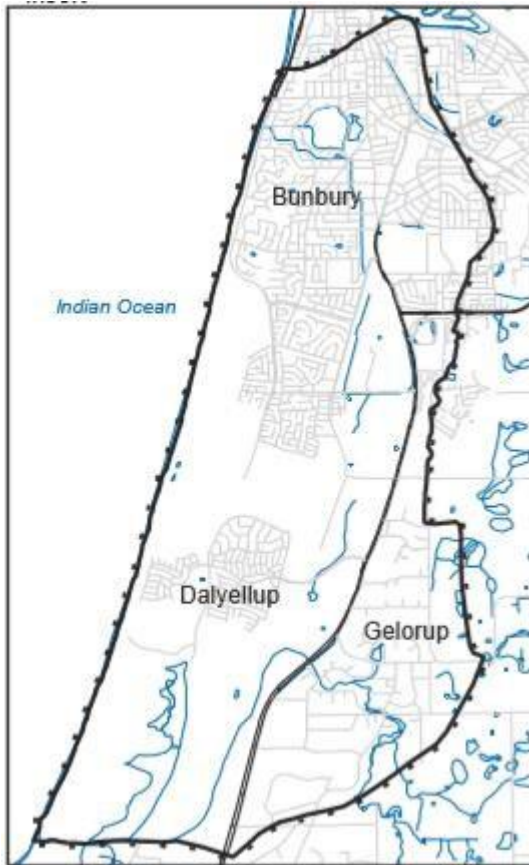
Application: Main Roads WA - Groundwater Licence for the Southern Section of the Proposed Bunbury Outer Ring Road (BORR) Project

Thank you for the opportunity to comment on the above Application for a Ground Water Licence. This is a submission by Friends of the Gelorup Corridor Inc. (FOTGC Inc.) We aim is to protect our community and the Gelorup Corridor, an environmental sanctuary where many species of native flora and fauna thrive. The Bunbury Outer Ring Road Southern Alignment will bulldoze straight through this corridor. Below are listed our community's concerns/objections for this proposal:

Protection of Drinking Water Supplies

According to the WA Planning Commission's 2008 report, "Bunbury Water Reserve: Drinking Water Source Protection Plan" the proposed southern section of the BORR traverses Bunbury's drinking water catchment boundary line. The Department of Water's 2007 publication "Water Quality Protection Note 83: Infrastructure Corridors" states that drinking water protection sources proclaimed under the Country Areas Water Supply Act 1947 are classified as sensitive water resources requiring stringent protection measures. In 2009, this Bunbury Water Reserve was proclaimed under the Country Areas Water Supply Act 1947.

The Yarragadee aquifer is the ONLY drinking water source currently available for all of the towns in the wider Bunbury area for Mains water, including Dalyellup, Capel, Eaton Australind, Peppermint Grove Beach, Burekup, Boyanup, Dardanup, Donnybrook and Bunbury. There is no alternative water supply. Additionally, Gelorup has no Mains Water supply so residents depend totally on bore water and rainwater. Any contamination or shortage of potable water from this supply would be disastrous.



From Bunbury Water Reserve: Drinking Water Source Protection Plan

Land clearing, Acid sulfate soils and Potential Contamination of the Yarragadee

The GHD 2019 Report “Environmental Impact Assessment for the Southern BORR” states there are acid sulphate soils in the Gelorup area where the Southern BORR is planned. The Department of Environmental Regulation 2015 Report “Treatment and Management of Soil and Water in Acid Sulfate Soil Landscapes” states that the disturbance of acid sulphate soil and its exposure to oxygen, has the potential to cause significant environmental impacts including fish kills and loss of biodiversity in wetlands and waterways, contamination of groundwater resources by acid, arsenic, heavy metals and other contaminants and corrosion of concrete and steel infrastructure by acidic soil and water. Projects involving the disturbance of acid sulphate soils must assess the risk associated with disturbance through the consideration of potential impacts. Wherever possible, management measures should be governed by the guiding principle of avoidance of disturbance over any other measure. Activities that have the potential to disturb acid sulfate soils need an Acid Sulfate Soil Management plan (ASSMP). It should be prepared and implemented to effectively manage potential impacts of such activities. If not managed appropriately, environmental harm may result (as defined by the Environmental Protection Act 1986). Areas of disturbed acid sulphate soil that have above background concentrations of contaminants have the potential to present a risk to human health and the environment.

The construction of this route will require the clearing of 190 hectares, including 73 hectares of endangered Tuart and Banksia Woodlands. There are over 5,000 trees along this route, so clearing will expose this acid sulphate soil and potentially contaminate the only water supply available to Gelorup residents.

Additionally, this has the potential to contaminate the lower Yarragadee aquifer which supplies water to the wider Bunbury area. The 2008 report, "Bunbury Water Reserve: Drinking Water Source Protection Plan" states that in many areas this aquifer is classified as confined by basalt and clay layers. However some areas, such as in the Dalyellup, Capel and Boyanup region can be classified as unconfined or partly confined. These semi confined and unconfined areas (such as in the locality of the Dalyellup bores) are vulnerable to contamination from current, historical and future land uses in the area. There is the potential to contaminate the lower Yarragadee aquifer from acid sulphate soil runoff.

These water contamination risks can be eliminated by moving the route away from the drinking water supply catchment zone through Gelorup, to already largely cleared land.

Predicted Reduced inflow to the Yarragadee Aquifer and increased Demand for Water

The drawdown of the equivalent of one town's (Boyanup) annual water usage has the potential to permanently alter the water table in the region for where there is no substitute water supply. The south west of Western Australia is expected to experience further declines in rainfall due to climate change. This will have a significant impact on water availability for households, business and industry, local government, mining and agriculture.

The Water Corporation's 2009 Report "Water Forever – Towards Climate Resilience" projects a climate scenario based on CSIRO and the Bureau of Meteorology data. This scenario projects a 20% decline in rainfall by 2030 from the 1990 baseline. A rainfall reduction of this magnitude is estimated to reduce yields from existing dams and groundwater sources to approximately 165 gigalitres a year, from average yields of 260 gigalitres a year since 2001. Further, a 40% decline in average annual rainfall by 2060 from the 1990 baseline to less than 500mm a year would further reduce yields from existing dams and groundwater sources to an estimated 55 gigalitres a year. At these levels, dams would cease to be a reliable part of the water supply. Less rainfall will result in less recharge of the aquifer.

Significant land clearing for housing developments and infrastructure projects will also result in less rainfall. McAlpine et al's paper published in Geophysical Research letters in 2007 found that replacing native woody vegetation with crops and grazing in southwest Western Australia and eastern Australia has resulted in significant changes in regional climate, with a shift to warmer and drier conditions.

Approximately 70 per cent of the total 213 GL/yr allocation limit is already licensed or reserved for future public water supply. There is currently 44 GL/yr available for licensing for general use made up of small volumes spread across the plan area mostly in shallow superficial aquifers.

In addition to farmers, several large industrial facilities eg Holcim and Hanson Quarries and Cristal Industries are reliant on a substantial, sustained water allocation to operate their businesses which support our local economy.

Other recreational users, including major sporting facilities (for example, Hay Park) three golf clubs, the Bunbury Turf/Trotting club and over 35 schools rely on a significant water allocation for the long term viability of their operations.

Additionally, if the drawdown on the Yarragadee is too great there is the potential for contamination by ocean salinity, particularly in areas where the aquifer is close to the ocean (eg near Dalyellup and Bunbury).

If water usage is over-allocated from our deep Groundwater aquifers in the face of ongoing reductions in rainfall, and increasing population there is a very real risk of the Yarragadee aquifer ceasing to be a reliable water supply for this area.

For Gelorup residents using bores, residents have noticed water levels are dropping in the area in recent years. It is of great concern that bore water supplies will be diminished by the amount of water that will be needed during construction of the project, potentially leading to a drop in the water level and domestic bores running dry. If this happens, there is also no back-up water supply.

Use of Recycled or Reused Water

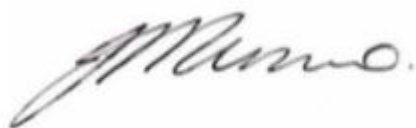
If allocations are agreed, would consideration be given to requiring Main Roads to replenish the aquifer with the same amount of water as is drawn from the aquifer? The Groundwater Replenishment Scheme is operational in Perth, and currently makes up 2% of the integrated water supply. Using our valuable drinking water to construct a road places a significant drain on the aquifer, but this could be replenished with reclaimed water.

In conclusion, the building of the Southern Alignment of the BORR the drawing of 333,062kL from the Yarragadee aquifer creates the potential for the water supply to be contaminated, and (given the current data on climate change) add to the very real possibility of running out of a drinking water supply for the entire Greater Bunbury area.

With the factors listed above, we believe that the proposal is not sustainable, and ask that the Department of Water and Environmental Regulation either reject the application. If the licence is granted, we ask that Main Roads WA provides an Acid Sulfate Soil Management plan, in addition to thoroughly investigating the use of Reused Water, rather than using an entire region's pristine Drinking Water and risking water shortages.

Thank-you for the opportunity to provide this submission.

Yours sincerely,



Ms Joanne Munro
Chairperson
Friends of the Gelorup Corridor Inc.

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