

16 June 2020

То	Neil McCarthy		
Copy to	Julia Roberts; Hannah Ruprecht		
From	Emilie Stenmark	Tel	+61 413 415 584
Subject	GHG Information – BORR Northern and Central Section	Email	Emilie.stenmark@ghd.com

Bunbury Outer Ring Road – Northern and Central Section (EPA Assessment 2215): Request for Greenhouse Gas Information

1. Introduction

The Bunbury Outer Ring Road Integrated project Team (BORR IPT), on behalf of Main Roads WA (Main Roads), has undertaken high level modelling of Greenhouse Gas (GHG) emissions in tonnes carbon dioxide equivalent (tCO_2 -e) for the construction of the Bunbury Outer Ring Road Northern and Central section (the Project), using the Carbon Gauge Tool. The Carbon Gauge Tool was developed by the Transport Authorities Greenhouse Group for assessment of road projects across Australia and New Zealand. This modelling work was undertaken to provide a prediction of GHG emissions for the purpose of addressing the EPA Environmental Factor Guidelines – Greenhouse Gas Emissions (2020). The modelling considered Scope 1, 2 and 3 emissions across the construction phase of the project. Operational and maintenance emissions have not been considered as part of this assessment.

This memo has been prepared to provide to Main Roads the results of the GHG modelling for the construction phase of the Project. The modelling was undertaken in response to a request from the EPA in June 2020 to provide GHG emissions data as part of the environmental assessment of the Project.

2. Methodology

The data inputs to the Carbon Gauge Tool were taken from the current Bill of Quantities (BoQ) for the Project, dated May 2020. The BoQ is based on the project case scope of works which is currently proposed. The initial step in determining the relevant Carbon Gauge Tool inputs, requires a materiality checklist to be completed, responding to a number of questions regarding the construction methodology and processes. The checklist is based on 'typical' road construction processes, as defined in the Greenhouse Gas Assessment Workbook for Road Projects (Transport Authorities Greenhouse Group, 2013). Aspects within the BoQ were categorised against the required Carbon Gauge Tool inputs, and calculated using a number of assumptions noted below. The BoQ accounted for values across the scope of the Project including drainage, road furniture, earthworks pavements and road surfacing inputs.

Input was also sought from BORR IPT pavement designers and environmental advisors to ensure the BoQ items were captured using the most current data, against the assumptions of the Carbon Gauge Tool. This involved mapping of proposed clearing areas against the vegetation classes defined in the



Carbon Gauge Tool, as well as a review of civil design reports to extract relevant data relating to structures and pavement types.

3. Assumptions

The assumptions utilised for the Carbon Gauge Tool inputs are outlined in the Greenhouse Gas Assessment Workbook for Road Projects (Transport Authorities Greenhouse Group, 2013). These are built into the functionality of the tool and are unable to be modified by the Project. The construction period for the Project was assumed to be three years.

Other assumptions around the transport of materials to site (Scope 3 emissions) were made based on discussions with Main Roads and the BORR IPT during a Project Resource Efficiency workshop, held in December 2019, using information available at the time. The outcomes of the workshop assumed that some materials, including pavement materials, will be required to be sourced from Perth rather than the South-West region due to limited local availability and capacity to supply.

3.1 Vegetation Removal

Detailed methodology for the assumptions underlying the emissions associated with removal of vegetation are documented within Appendix C of the Supporting Document for Greenhouse Gas Assessment Workbook for Road Projects (Transport Authorities Greenhouse Group, 2013a). The Maximum Potential Biomass Class 2 was selected based on the mapping provided within this Supporting Document. The National Vegetation Inventory System (NVIS) Major Vegetation Groups (MVGs) were used to define the classes within the Carbon Gauge Tool (Transport Authorities Greenhouse Group, 2013a).

The vegetation to be removed has been summarised in Table 1 against the vegetation classes from the Carbon Gauge Tool. This includes native and non-native vegetation, and revegetation. A limitation of the tool was noted with the selection of the Biomass Class – Class 2: 50-100 (t dry matter/ha) not allowing data entry against vegetation Class G. In consultation with Main Roads, it was decided to allocate the Class G vegetation under Class F (Mallee and Acacia Woodland and Shrubland), for the purposes of the Carbon Gauge Tool calculations. This is not expected to have any significant impact on the associated emissions, particularly given the extent of clearing for this class (0.8 ha).

 Table 1
 Summary of vegetation in the BORR North and Central section to be removed

Vegetation Class	Extent within Proposal Area (ha)	
C (Open Forest)	1.7	
D (Open Woodlands)	113.9	
G (Open Shrublands)	0.8	
Total	116.4	

It is important to emphasise the numbers presented in Table 1 account for all vegetation removal as part of the Project, and not just the native vegetation. To provide assurance against the figures provided in other documents, such as environmental referral documentation (specifically Flora and Vegetation and Terrestrial Fauna Environmental Factors), the total native vegetation to be removed has been summarised in Table 2. While the Carbon Gauge Tool calculation includes all vegetation to be removed (including non-native vegetation and most revegetated areas), only remnant native



MEMORANDUM

vegetation and revegetation areas approaching the characteristics of native vegetation are included in calculations for environmental referral documentation. Thus the area calculated for the Carbon Gauge Tool is greater than that calculated for the environmental approval documentation.

Table 2 Summary of native vegetation in the BORR North and Central section to be removed

Vegetation Class

Extent within Proposal Area (ha)

C (Open Forest)	1.7
D (Open Woodlands)	70.8
G (Open Shrublands)	0.8
Total	73.3

4. Summary of Emissions

A summary table has been provided to demonstrate the breakdown of emissions from the various activities during the construction phase, Table 3. A description has been provided of each activity to demonstrate the factors considered within the calculations.

- Site office and general areas refers to the fuel combustion associated with electricity generation and use of site vehicles, based on Carbon Gauge tool assumptions.
- Vegetation removal refers to the fuel combustion by the plant and equipment used for removal, and the lost carbon sink from vegetation removed. The Carbon Gauge Tool does not differentiate between vegetation condition, nor the difference between native and non-native vegetation, and revegetation.
- Demolition and earthworks accounts for fuel combustion for demolition and earthworks plant and equipment, based on the cut to fill, cut to spoil, and the import and placement of fill materials.
- Construction accounts for the production of construction materials, fuel combustion from construction and the transportation of manufactured materials to site.

Activity	Scope 1 (tCO ₂ -e)	Scope 2 tCO ₂ -e)	Scope 3 (tCO ₂ -e)
Site Offices/ General Areas	754	-	57
Vegetation Removal	24,702	-	24
Demolition and Earthworks	52,414	-	3,997
Construction	15,264	-	226,823
Total	93,134	-	230,901

Table 3 Emissions breakdown based on construction activities

5. Conclusion

The modelling undertaken estimates that construction of the Project will result in total Scope 1 emissions of 93,134 tCO₂-e over the three year construction period, or 31,045 tCO₂-e per annum. This falls below the annual 100,000 tCO₂-e criteria for Scope 1 emissions as defined in the EPA



Environmental Factor Guidelines – Greenhouse Gas Emissions (2020), as the point where GHG emissions are generally considered for assessment.

6. References

Environmental Protection Authority (2020), *Environmental Factor Guidelines: Greenhouse Gas Emissions*. EPA, Western Australia.

Transport Authorities Greenhouse Group (2013), *Greenhouse Gas Assessment Workbook for Road Projects*. Transport Authorities Greenhouse Group Australia and New Zealand (TAGG).

Transport Authorities Greenhouse Group (2013a), *Supporting Document for Greenhouse Gas Assessment Workbook for Road Projects*. Transport Authorities Greenhouse Group Australia and New Zealand (TAGG).

Sincerely

BORR Team

Emilie Stenmark Sustainability Advisor