

Appendix E – Turkey Point Access Bridge Greenhouse Gas Assessment (GHD, 2021b)

Our ref: 12531043

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Turkey Point Access Bridge Greenhouse Gas Assessment

Background

The Southern Ports Authority, Port of Bunbury (the Port) referred the Turkey Point Bridge and Access Road Project (the Project) to the Environmental Protection Authority (EPA) for assessment under s38 of the *Environmental Protection Act 1986* (EP Act).

The EPA advised the Port on 15 January 2021 that the Project is to be formally assessed, and that further information is required to be provided to the EPA for assessment, including further detail on greenhouse gas (GHG) emissions.

The EPA Factor Guideline: Greenhouse Gas Emissions (the Guideline) states that GHG emissions from a proposal will be assessed where they exceed 100,000 tonnes of Scope 1 emissions each year measured in CO₂-e. The purpose of this assessment is to determine whether emissions from this Project will exceed this threshold.

Scope of Work

A quantitative assessment of the estimated GHG emissions from the construction and operation of the access bridge and access road. The assessment considers emissions from the following sources:

Construction

- Vehicle use
- Site office use
- Demolition and earthworks (including vegetation removal)
- Pavement
- Stationary plant and equipment use
- Structures i.e. bridges
- Retaining walls
- Drainage management
- Street lighting
- Maintenance
- Pavement maintenance

Methodology

This assessment has been undertaken in accordance with the general principles of:

- 2006 International Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories; and
- National Greenhouse Gas and Energy Reporting (Measurement) Determination 2008.

The assessment was completed using the Transport Authorities Greenhouse Group (TAGG) Carbon Gauge GHG Assessment Calculator for roads projects. The TAGG members include representatives from transport authorities across Australian States as well as New Zealand, including Main Roads Western Australia.

Emissions estimated are in carbon dioxide equivalents (CO₂-e), the method used for determining CO₂-e is multiplying the amount of a GHG by its global warming potential (GWP). The GWPs from the IPCC Fifth Assessment report were used in this assessment for consistency with the IPCC guidelines.

Table 1 Greenhouse gases and 100 year global warming potentials

Greenhouse Gas	Global Warming Potential
Carbon Dioxide (CO ₂)	1
Methane (CH ₄)	28
Nitrous Oxide (N ₂ O)	265

Default quantity factors determined by the TAGG and included in the Carbon Gauge tool have been used.

Assumptions

General assumptions

- All measurements are from preliminary drawings provided by the Port.

Activity data used for the GHG assessment was provided by the Port. Assumptions used in estimating the GHG emissions for the project are listed in Table 2.

Table 2 Assumptions for the GHG assessment

Parameter	Assumption
Fuel Consumption	– No biodiesel used
Bridge Construction	– Height taken from highest bridge surface to lowest point in river
Concrete retaining wall construction	– Widest and tallest abutment measurements applied across whole project
Pavement Construction	– Roundabout areas will be deep strength asphalt
Traffic Signals	– Assumed that traffic signals will not be used
Lighting	– 50-year operation of street lighting is included

Limitations

At the time of assessment, the project had reached a 15% engineering design level (preliminary design), all input data reflects this level of detail. In respect of this a conservative estimate on emissions is made at the end of the report which doubles the Scope 1 construction footprint.

Assessment Results

Estimated emissions were calculated using the Carbon Gauge tool, with input data from the Port and TAGG default quantity factors, shown in Table 3.

Table 3 Summary of estimated GHG emissions

Emission Source	Scope 1 (t CO ₂ -e)	Scope 2 (t CO ₂ -e)	Scope 3 (t CO ₂ -e)	Total Emissions (t CO ₂ -e)
Construction				
Site Offices / General Areas	270		21	290
Demolition and Earthworks	605		39	644
Construction – Pavements	186		2,252	2,438
Construction – Structures	113		1,557	1,670
Construction - Drainage	38		123	162
Construction – road furniture			1	1
Construction Total	1,212		3,992	5,204
Operation				
Lighting		793	97	890
Operational total		793	97	890
Maintenance (by pavement type)				
Full Depth Asphalt	415		533	948
Deep Strength Asphalt	99		127	226
Maintenance total	514		660	1,174
Project Total	1,726	793	4,749	7,268

The most recently available Western Australia GHG emissions summary is presented in Table 4. This data was sourced from the National Greenhouse Gas Inventory: March 2020, accessed 27 May 2021.

Table 4 Summary of GHG Emissions for Western Australia by Sector for 2019 (DISER, 2021)

Sector	Mt CO ₂ -e
Energy	84,337
Industrial Processes	4,344
Agriculture	9,874
Waste	1,903
Land Use, Land-Use Change and Forestry UNFCCC	-8,606
Total	91,852

Impact Assessment

Based on available data, the total GHG emissions (Scope 1, 2 & 3) for the project are estimated as approximately 7,268 t CO₂-e. When compared to Western Australia's total GHG emissions of 91,852 Mt CO₂-e, the emissions from the Project are negligible.

The combined construction and annual maintenance Scope 1 emissions for the Project are 1,726 t CO₂-e, below the threshold of the Factor Guideline at approximately 2% of the 100,000 tCO₂-e (Scope 1) limit.

In response to the preliminary stage of design, a 50% up lift to the construction footprint would still put the resultant Scope 1 emissions at 2,938 t CO₂-e, several orders of magnitude below the threshold.

Conclusions

Greenhouse gas emissions were estimated for the construction and ongoing operation of the Turkey Point Access Bridge. Scope 1 Emissions were estimated as 1,726 t CO₂-e, which are negligible compared to the annual emissions from Western Australia and do not trigger the threshold of 100,000 t CO₂-e for the EPA Factor Guideline: GHG Emissions for further assessment.

References

Department of Industry, Science, Energy and Resources (DISER) 2021, State Greenhouse Gas Inventory, retrieved May 2021, from <https://ageis.climatechange.gov.au/sggi.aspx>

Environmental Protection Authority (EPA) 2020, Environmental Factor Guideline, Greenhouse Gas Emissions – Air, retrieved May 2021, from https://www.epa.wa.gov.au/sites/default/files/Policies_and_Guidance/EFG%20-%20GHG%20Emissions%20-%2016.04.2020.pdf

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