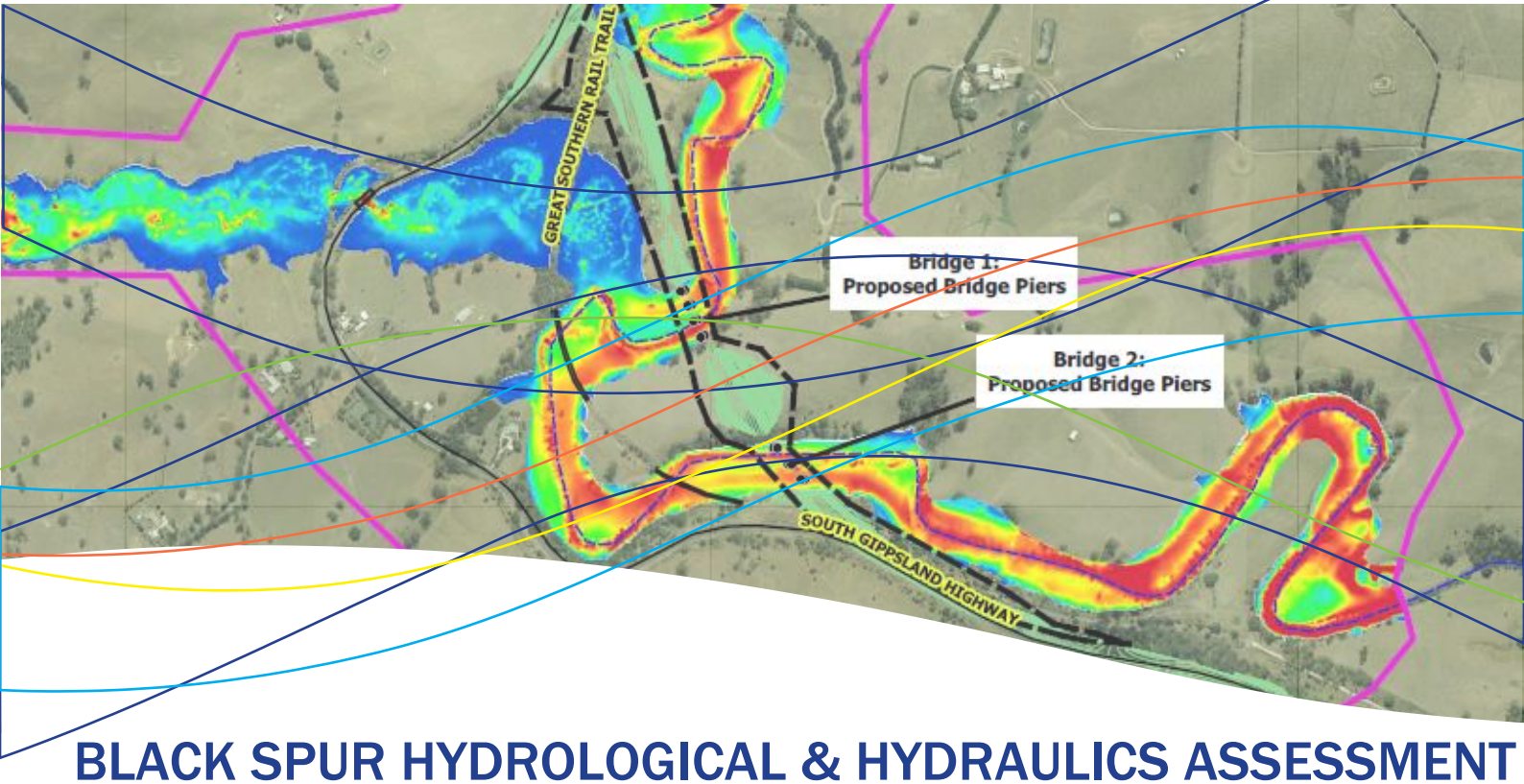

BLACK SPUR HYDROLOGICAL & HYDRAULICS ASSESSMENT

Melbourne Water

CATEGORY: D.1.e Hydrological Modelling and Assessment

PROJECT SCOPE

The South Gippsland Highway Black Spur Realignment project is a project of state significance being undertaken by the Major Roads Project Authority. The objective of the project is to improve safety and travel times for road users through the realignment of approximately 2 kilometres of the existing South Gippsland Highway (SGH) near the township of Koonwara in South Gippsland.

Engeny was engaged by VicRoads / Major Roads Project Authority to undertake a hydrology and hydraulic study to inform the reference design for the proposed SGH realignment that included a new multiple span bridge crossing of the Tarwin River. The following summarises Engeny's scope of work:

- Develop a RORB hydrological model for the 1070 km^2 catchment of the Tarwin River, Tarwin River East Branch and Black Spur Creek to the Meeniyan Gauging Station.
- Calibrate the RORB model to 4 historical rainfall events.
- Validate RORB model results to a flood frequency analysis.
- Develop a 1D/2D TUFLOW hydraulic model for Tarwin River and Black Spur Creek.
- Validate the 1D/2D TUFLOW hydraulic model to historical flood levels.
- Develop a 1D HECRAS hydraulic model to verify the performance of the TUFLOW model for key hydraulic structures.
- Represent proposed bridges and road embankments in the TUFLOW flood model to determine whether the design meets specific hydraulic criteria provided by the West Gippsland Catchment Management Authority (WGCMA).
- Refine the proposed bridge and road design with the Major Roads Project Authority to achieve a reference design compliant with WGCMA's criteria.

Engeny's hydrological and hydraulic modelling was independently peer reviewed and approved by the Department of Environment Land Water and Planning (DELWP).

ENGENY
WATER MANAGEMENT

START DATE
April 2017

COMPLETION DATE
May 2018

CLIENT CONTACT
Stephen Poon

Team Leader Projects

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RELEVANCE TO CATEGORY

Engeny's delivery of the Black Spur Hydrological and Hydraulic Assessment project demonstrates our capabilities in hydrological modelling and assessments, including:

- Streamflow routing for flood models using RORB.
- Large catchment scale modelling.
- Hydrological modelling techniques consistent with Australian Rainfall and Runoff 2016.
- Hydrological calibration to historical flood events.
- Base flow separation.
- Hydrological verification using a flood frequency analysis.
- Hydrological modelling of design storm events up to the 0.05 % Annual Exceedance Probability event.
- Independent peer review and acceptance by DELWP.

PROJECT INNOVATION

Engeny worked closely with VicRoads / Major Roads Project Authority throughout the project for the hydrological model development stage and refinement of the design. Innovative elements of the scope included:

- Use of drone footage to inform modelling of waterway and existing bridge hydrological / hydraulic model parameters.
- Use of YouTube to provide footage of flood events in order to verify the TUFLOW flood model.
- Workshopping modifications to the reference design with VicRoads' bridge designers to achieve an improved bridge design outcome whilst achieving the WGCMA's hydraulic objectives.

PROJECT OUTCOME

Engeny's hydrological and hydraulic modelling enabled VicRoads / Major Roads Project Authority to complete a reference design for the proposed South Gippsland Highway realignment that was fully compliant with the WGCMA's hydraulic criteria.