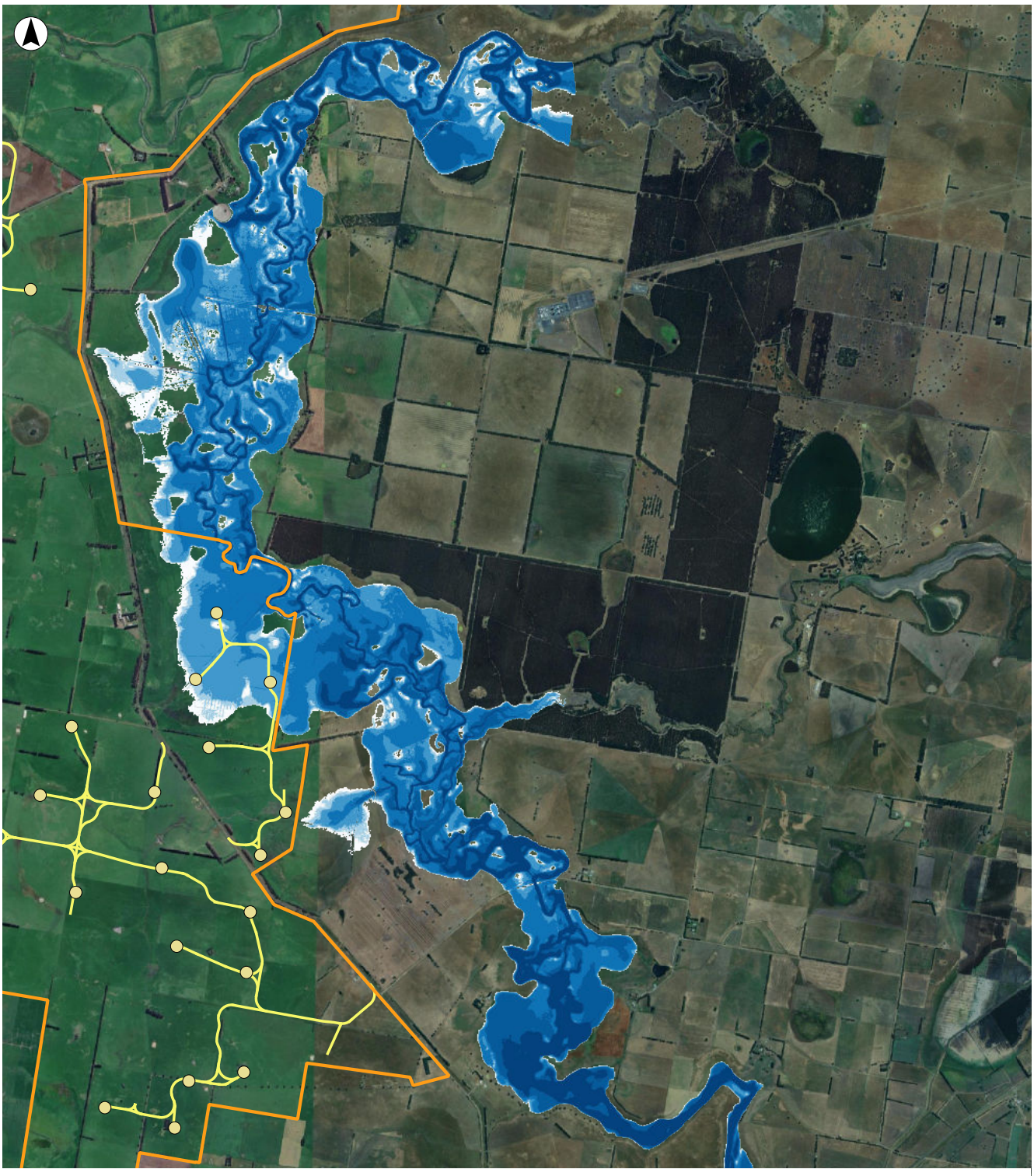

Data: State of Victoria (DECCA/Land Use Victoria), Commonwealth of Australia, Wind Prospect, and specialist studies/reports. Data is indicative only; accuracy and completeness are not guaranteed. © State of Victoria and other data providers

Figure 12.6 Modelled 1% AEP inundation for Hopkins River – existing conditions

Water quality

Previous water quality observations for the Hopkins River at the Wickliffe gauge (236202) indicate that nutrient values (Total Nitrogen and Total Phosphorus) exceeded the 75th percentile guideline trigger values. Both the Wickliffe gauge (236202) and Framlingham gauge (236210) for Hopkins River recorded significant elevations in electrical conductivity when compared to the 75th percentile guideline trigger value, and the upper limit for pH was observed to slightly exceed guideline trigger values. Turbidity levels were observed to significantly rise during or immediately after rainfall events at both locations.

Water quality samples for the Hopkins River, collected by Water Technology, were also found to exceed the 75th percentile trigger values for electrical conductivity and Total Phosphorus (for the upstream sample location).

Environmental values

Floodplain Riparian Woodland (EVC 56) occurs along the bank of Hopkins River near the New Bridge Road crossing. Common Reed, Rushes, Water Ribbons and Marsh Club-sedge are found within the watercourse.

Summary

Fourteen reaches assessed in the Index of Stream Condition report are within the Hopkins River. The Index of Stream Condition parameters for these sites shown in Table 12.7

Table 12.7 Hopkins River Index of Stream Condition

Hopkins River reach no.	Hydrology	Physical form	Streamside zone	Water quality	Aquatic life	Index of Stream Condition
2	2	10	4	3	Not assessed	Very poor
3	2	9	3	4	4	Very poor
4	2	10	5	Not assessed	5	Poor
5	2	9	5	Not assessed	6	Poor
6	2	8	4	3	7	Very poor
7	3	7	4	Not assessed	6	Poor
8	4	7	4	Not assessed	3	Poor
9	3	9	3	Not assessed	4	Very poor
10	3	9	5	Not assessed	6	Moderate
11	3	8	6	Not assessed	3	Poor
12	3	8	4	Not assessed	Not assessed	Poor
44	3	7	6	Not assessed	Not assessed	Poor
201	2	9	4	Not assessed	Not assessed	Poor
202	2	10	5	Not assessed	Not assessed	Poor

Mustons Creek (and its tributaries)

Mustons Creek, a tributary of the Hopkins River, is a designated waterway by Glenelg Hopkins Catchment Management Authority (Waterway 36/1-29) and covers an area of approximately 510 square kilometres. The creek originates north-east of Penshurst and is fed by tributaries including designated waterways Burchett Creek (Waterway 36/1-29-10) and Tea Tree Creek (Waterway 36/1-29-5) before joining the Hopkins River east of the investigation area (Figure 12.3). Mustons Creek likely has sustained flows, with lower flows in summer. Tea Tree Creek also has the potential for sustained flows.

Figure 12.7 shows Mustons Creek within the project site. Figure 12.8 and Figure 12.9 show Burchett Creek and Tea Tree Creek at the northern boundary of the project site.

Figure 12.7
Mustons Creek 1.5 kilometres south of confluence with Tea Tree Creek (within project site)
(Source: Water Technology)

Figure 12.8
Burchett Creek at Caramut (northern-most extent of the project site)
(Source: Water Technology)

Figure 12.9
Tea Tree Creek at Hamilton Highway, 10 kilometres west of Hexham (adjacent to northern project site boundary)
(Source: Water Technology)

Physical form and hydrology

Mustons Creek at Hexham (236214) is the only stream flow gauge on Mustons Creek. This gauge is located 8.8 kilometres north-east of the project site and recorded flow data from 1975 to 1982.

Hydraulic modelling indicates that Mustons Creek breaks out of its banks and inundates a wider floodplain up to 400 metres wide during a 1% AEP flood event. The inundation from Tea Tree Creek, Lyall Creek and Drysdale Creek is less widespread, with pooling of water occurring in local depressions at various locations (Figure 12.6).

The peak 1% AEP and 10% AEP flows were modelled for two locations along Mustons Creek where infrastructure crossings are proposed. The modelling indicates 1% AEP flows of 166.0 and 191.7 cubic metres per second, and 43.3 and 48.4 cubic metres per second for 10% AEP flows (Appendix B – ***Surface Water and Groundwater Impact Assessment***).

Water quality

The water quality sampling undertaken by Water Technology for Mustons Creek and its tributaries (Burchett Creek and Tea Tree Creek) found that:

- Some of the water quality samples for Mustons Creek (upstream), Burchett Creek and Tea Tree Creek exceeded the 75th percentile trigger values for pH.
- All water quality samples for these waterways exceeded the 75th percentile trigger values for electrical conductivity.
- All water quality samples for Mustons Creek (downstream), and Tea Tree Creek exceeded the 75th percentile trigger values for Total Phosphorus.
- The water quality samples from Tea Tree Creek exceeded the 75th percentile trigger values for turbidity.

Environmental values

Sections of Mustons Creek are associated with areas mapped as 'current wetlands' by DEECA. These wetlands are considered to provide medium to high quality habitat for Growling Grass Frog (*Litoria raniformis*) (listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and the *Flora and Fauna Guarantee Act 1988* (FFG Act)) and migratory bird species such as Latham's Snipe (*Gallinago hardwickii*) (EPBC Act listed). During the ecology surveys, Growling Grass Frog and Latham's Snipe were observed along Mustons Creek. Southern Bent-wing Bat (*Miniopterus orianae bassani*) (EPBC Act and FFG Act listed) calls were also recorded from treed and wetland habitats along Mustons Creek.

Based on the ecology survey findings, Growling Grass Frog may use Mustons Creek for most parts of the year, in the sections that retain sizable water pools. As Mustons Creek connects to the Hopkins River, it provides continuous habitat for this species. Other smaller tributaries of the Mustons Creek within the investigation area may also provide habitat for Growling Grass Frog during the wet season.

Summary

Three reaches assessed in the Index of Stream Condition report are located on Mustons Creek and Burchett Creek, with the Index of Stream Condition parameters for these sites shown in Table 12.8.

Table 12.8 Mustons Creek and Burchett Creek Index of Stream Condition

River	Hydrology	Physical form	Streamside zone	Water quality	Aquatic life	Index of Stream Condition
Mustons Creek downstream	2	10	3	Not assessed	5	Very poor
Mustons Creek upstream	2	8	3	Not assessed	8	Poor
Burchett Creek	3	8	3	Not assessed	4	Very poor

Drysdale Creek (and its tributaries)

Drysdale Creek and its main tributary, Lyall Creek, are classified as designated waterways by Glenelg Hopkins Catchment Management Authority (Waterway 36/2-14 and Waterway 36/2-14-4, respectively). The upper parts of the catchment where these creeks originate is located within the investigation area. Drysdale Creek covers an area of around 200 square kilometres. Figure 12.7 shows Drysdale Creek east of the southern boundary of the project site.

Figure 12.10
Drysdale Creek at Gordons Lane, 3.5 kilometres west of Ellerslie (east of southern project site boundary)
(Source: Water Technology)

Drysdale Creek receives low flows in summer, while Lyall Creek has more sustained flows. Hydraulic modelling at three proposed infrastructure crossing locations at Drysdale Creek indicates that the 1% AEP peak flows range from 2.8 to 5.8 cubic metres per second, and the 10% AEP peak flows range from 0.8 to 2.0 cubic metres per second. The peak flows modelled at one proposed infrastructure crossing location at Lyall Creek are 2.3 cubic metres per second for the 1% AEP flow and 1.3 cubic metres per second for the 10% AEP flow.

Summary

One reach assessed in the Index of Stream Condition report is located on Drysdale Creek, with the Index of Stream Condition parameters for this site shown in Table 12.9.

Table 12.9 Drysdale Creek Index of Stream Condition

River	Hydrology	Physical form	Streamside zone	Water quality	Aquatic life	Index of Stream Condition
Drysdale Creek	2	10	4	Not assessed	4	Very poor