

Statement of Expert Evidence

Sparrovale Stormwater Ecological Impacts and Opportunities

29-Oct-2024

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Client: Re-Grow Geelong

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1.0 Name and address of expert witness

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2.0 Qualifications, experience and area of expertise

I am an ecologist with a First-Class Honours Degree in Environmental Science from Monash University in Melbourne. I have over 19 years' experience, including working for three major consulting firms in Melbourne and as a research assistant within the Department of Geography and Environmental Science at Monash University. I have been accredited by the Department of Environment, Land, Water and Planning in Vegetation Quality Assessments for the last 10 years (approx.)

My ecological experience has seen me undertake and manage numerous ecological impact assessments across Australia's temperate zone, and across a range of market sectors including land development, Defence, transportation (roads and rail), utilities transmission, extractive industries and renewable energy generation. Delivery of these projects has involved all facets of ecological investigation from survey design and implementation, monitoring, and the development of extensive ecological impact assessment reports. I have also authored many management plans, from species-specific plans, to detailed environmental management plans providing post-approval control of large construction jobs.

Of relevance to the assessment of potential impacts to wetland ecosystems and/or Ramsar sites and the ecological values they support, I have led numerous investigations into the potential ecological impacts of developments within or proximal to several Victorian Ramsar sites, including

Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar Site.

I am currently the ecology technical lead for the Viva Gas Import Facility which proposes to construct a Floating Storage Regasification Unit (FSRU) within this Bellarine Peninsula Ramsar site. Studies are ongoing, but comprehensive migratory bird surveys and marine studies have informed the analyses of the project impacts.

I also led the ecological investigation into the Edithvale and Bonbeach Level Crossing Removal Environment Effects Statement which sought to understand the impact of groundwater drawdown and mounding on the Edithvale-Seafood Wetlands Ramsar site.

Between 2022 and 2023, I assisted the Western Port Biosphere with a 10-year review of their UNESCO heritage listing, a listing underpinned by the significance to Western Port ecology of the Western Port Ramsar site.

3.0 Instructions

This statement has been prepared on the instruction of Maddocks Lawyers who act on behalf of Re-Grow Geelong Pty Ltd. It is intended to be filed for a hearing at Planning Panels Victoria in relation to Amendment C278ggee, and relates to consideration of the suitability of the Sparrovale Wetlands to receive stormwater from both the Marshal Precinct Structure Plan (PSP) area and the North East Industrial Precinct (NEIP).

In completing this statement, I was instructed to:

1. Prepare an opinion in the form of an expert witness report
2. Ensure that the report addresses key environmental and biodiversity issues of Sparrovale with a particular focus on the potential impact on that biodiversity by inundation from any source including Marshall and the NEIP.

3. If required, appear on Re-Grow's behalf at the Panel hearing as an expert and participate in a conclave that may be required.

This expert witness statement has been based on the report highlighted in Section 4 below.

4.0 Information relied upon

- Arthur Rylah Institute (2016) A guide to the water regime, salinity ranges and bioregional conservation status of Victorian Wetland Ecological Vegetation Classes
- Ecology and Heritage Partners (2019) (EHP 2019) Biodiversity Assessment: 1-87 Groves Road, Armstrong Creek, and 109-215 Sparrovale Road, Charlemont Victoria
- Neil Craigie (2013) Armstrong Creek Urban Growth Area Horseshoe Bend Precinct (HBP) Stormwater Management Strategy (HBP SWMS)
- Neil Craigie (2024) Statement of Expert Evidence - Marshall Precinct Structure Plan- Drainage and Flooding (Craigie, 2024)
- Spiire (2022) Marshall Precinct Structure Plan Stormwater Management Strategy (Spiire 2022)
- Thompson Berrill Landscape Design (2021) Sparrovale Ngubiti yoorree Wetlands Master Plan. On behalf of the City of Greater Geelong (Masterplan)
- Venant Solutions (2018) Armstrong Creek Urban Growth Area Sparrovale Wetland Hydrology Final Report. Prepared for the City of Greater Geelong (Venant, 2018)

I had no other support in the preparation of this statement.

5.0 Subject land and ecological setting

The Marshall Precinct is the northern-most precinct with the Armstrong Creek Growth Area and comprises 124 hectares of proposed residential land. Prepared to inform the Marshall Precinct Structure Plan (PSP), the Marshall Native Vegetation Precinct Plan has not been reviewed during the compilation of this statement, and the modelled ecological values of the precinct have been inferred from publicly available datasets.

The 'Naturekit' tool curated by the Department of Energy, Environment and Climate Action (DEECA) (available at <https://www.environment.vic.gov.au/biodiversity/naturekit>) suggests that small, isolated remnants of Plains Grassland Ecological Vegetation Class (EVC) remain across much of the precinct. At the northern end of the precinct toward the Barwon River and its floodplain, small patches of Floodplain riparian Woodland are suggested to persist. No threatened fauna species have been historically recorded from the precinct. Two records exist for the State-significant Melbourne Yellow-gum *Eucalyptus leucoxylon subsp connata* along Reserve Road to the south of the precinct and one record exists for Bellarine Yellow Gum *Eucalyptus leucoxylon subsp connata* toward the centre of the precinct.

The NEIP lies to the immediate east of the Marshall PSP and comprises approximately 180 hectares of land and as its name suggests is proposed to be a business and industry park. The NEIP is bounded by the Barwon River to the north and east, Barwon Heads Road to the west and the future East West Link Road to the south.

The biodiversity values of the NEIP are documented in Ecology Partners (2008) *Keystone Business Park Precinct Structure Plan- Technical Background Report: Flora and Fauna* and reflected in the City of Greater Geelong (2010) *Armstrong Creek North East Industrial Precinct Native Vegetation Precinct Plan*.

In summary, the land within the NEIP is reported to be highly modified, and of low ecological quality. Plant species were dominated by introduced vegetation, and no patches of native vegetation (as defined by under the *Planning and Environment Act, 1987*) were recorded. Fauna habitat values were determined to be low to moderate and no fauna or flora species of national or state conservation significance were recorded.

Sparrovale Wetlands is the proposed stormwater receiving environment and is a 500-hectare area of land next to the Barwon River and the Lake Connemara State Game Reserve (located to the south and south-east of the NEIP) that was compulsorily acquired by the City of Greater Geelong in 2019 to manage stormwater for the Armstrong Creek Urban Growth Area.

In 2019, the City of Greater Geelong engaged Ecology and Heritage Partners to undertake a biodiversity assessment of the Sparrovale Wetlands to determine the presence of significant flora and fauna species and/or ecological communities and address any implications of actions necessary to prepare the site for use as part of the water sensitive urban design of the Armstrong Creek growth area which includes various precinct structure plans including the proposed Marshall PSP, the NEIP and Horseshoe Bend PSP area.

EHP (2019) concluded from their surveys

- a total of five Ecological Vegetation Classes (EVC's) were present, of which some were representative of the *Seasonal Herbaceous wetland of the Temperate Lowland Plains* community, listed as a critically endangered community under the *Environment Protection and Biodiversity Conservation Act, 1999* (EPBC Act).
- No threatened fauna species were present from the study area, and despite targeted survey, only one flora species of state significance Yellow Gum *Eucalyptus leucoxylon*. The specimen observed was an intergrade between two state-significant subspecies *bellarinensis* (Bellarine Yellow Gum) and *connata* (Melbourne Yellow Gum) both of which are considered state significant.

In conclusion, EHP (2019) details the proposed use of Sparrovale Wetland as part of the water sensitive urban design of the Armstrong Creek growth areas and sets out the actions necessary to prevent increased flows into Hospital Swamp over autumn and summer.

6.0 Review of past reports

I have reviewed the reports listed in Section 4 (above) and the report of EHP in Section 5 above and offer the following views and opinions:

1. The City of Greater Geelong acquired the almost 500 hectares of flood prone farmland in 2019, for the primary purpose of capturing and treating urban stormwater runoff from the adjoining Armstrong Creek development area. Of this area, 200 hectares was to be for natural and constructed wetlands, stormwater channels and management infrastructure, the design of which was completed prior to the release of the Masterplan. The remaining 300 hectares of land (including 4 kilometres of river frontage) is agricultural. The Masterplan intended to guide the transition of this land into public open space incorporating a floodplain conservation reserve along the Barwon River.
2. The hydrological regime that operates within the Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar site is complex and water is provided to Hospital Swamp through local catchment runoff, regulated and unregulated flow from the Barwon River, and possibly through groundwater interaction.
3. Sparrovale Wetland and Hospital Swamp are separated by a constructed levee (designed to prevent the flooding of Sparrovale during Barwon River flood events), which houses a floodgate (in disrepair at the time of the EHP assessment) that historically allowed flows into Hospital Swamp from Sparrovale Wetland. There was a channel directly from Sparrovale Wetland to Lake Connemara that has now been filled with soil but which (in conjunction with a pump that allowed water to be pumped from Sparrovale Wetland directly to the Barwon River) allowed the management of water in Sparrovale Wetland such that the site could be used for agricultural purposes- effectively draining the wetland to increase grazing land (EHP, 2019 referencing Neil Craigie, pers.comm.).
4. The appreciation of contours and aerial image interpretation suggest that Sparrovale Wetland typically flooded to 20cm depth seasonally- with the wetland filling in winter, reaching maximum (seasonally dependant) depth around September, and through evaporation was dry during summer and autumn.

5. HBP SWMS detailed how Sparrovale Wetland could be utilised for stormwater from the Armstrong Creek and Horseshoe Bend growth areas. It was recognised that increased summer and autumn flows into Hospital Swamp would likely be detrimental to the ecological values supported by the swamp. To avoid this, flows would avoid Hospital Swamp by directing water instead into Sparrovale Wetland through a constructed channel, the construction of which was referred to the Commonwealth under the EPBC Act, 1999 and was included in the Armstrong Creek South PSP. This water could then be directed to Hospital Swamp of Lake Connewarre or retained within Sparrovale Wetland where prevailing hydrological conditions required. It was suggested that a channel directly from Sparrovale Wetland into the Barwon River might also be considered.
6. Venant Solutions (2018) modelled the hydrological regime of the Sparrovale Wetlands in a pre and post-development state, and after the development of the model it was determined that the Sparrovale Wetland outlet structure would be manually controlled, and would provide even greater control over water levels than the Venant Solutions model anticipated (EHP 2019).
7. Venant (2018) key findings with regards to the prevailing hydrological regime of the proposed Sparrovale Wetland when both the Horseshoe Bend Precinct and the Armstrong Creek catchments were fully developed were
 - a. that the depth of water within the wetland would be shallow with an average depth of 0.1 to 0.15 metres.
 - b. That the wetland water depths were relatively insensitive to various scenarios modelled which suggests a lot of flexibility in how flows can be managed
 - c. There will be significant flexibility in the system to manage the water balance between flows to Hospital Swamp via Baensch's Wetland, flows along the diversion to the Sparrovale Wetland, outflows from the Sparrovale Wetland (to both Lake Connewarre and Hospital Swamp) and evaporation losses
 - d. In all modelled scenarios, the wetland would dry out each year
8. Venant Solutions (2018) assessed the outflow from Sparrovale Wetland to provide an indication of the changes in flow to the downstream environment. Daily flow analysis showed a significant increase in flow rate in the developed scenario, but when assessed monthly, the percentage increases are smaller. Although there is increased flow into Lake Connewarre, these increases were considered by Venant Solutions (2018) to be insignificant in the context of flow entering Lake Connewarre from the Barwon River and tidal interchange. The increase in flow will not necessarily result in more water to Hospital Swamp as flow to Hospital Swamp is controlled by a regulator structure.
9. EHP (2019) undertook a detailed biodiversity assessment of the impact of the works required to enable the use of the Sparrovale Wetlands to provide '*part of the drainage solution for growth precincts within the Armstrong Creek and Horseshoe Bend catchments*' and list four relevant precincts- the Armstrong Creek East Precinct, Armstrong Creek West Precinct, Western Industrial Precinct, and the Horseshoe Bend Precinct from which Sparrovale would receive stormwater. The report details the offsets required to be achieved for the works necessary to enable the use of the site for stormwater inflow.
10. EHP (2019) state that Seasonally Inundated Sub-saline Herbland is the predominant EVC with the study area to the west of the Barwon Levee and was present across the majority of the Sparrovale Wetland. Beaded Glasswort *Salicornia quinqueflora* was dominant, with Australia Salt-grass *Distichlis distichophylla*, Shrubby Glasswort *Tecticornia arbuscula*, Karkalla *Carpobrotus rossii* (amongst other species) sub-dominant. The monoculture of Beaded Glasswort was considered by EHP (2019) to be the result of seasonal flooding and/or high salinity preventing other species from establishing. This EVC was in poor condition across the wetland, but it was considered a low to moderate likelihood that Orange-Bellied Parrot *Neophema chrysogaster* might utilise this area whilst overwintering in the Bellarine.
11. Whilst Seasonally Inundated Sub-saline Herbland support Beaded Glasswort which is a characteristic species of the nationally significant *Subtropical and Temperate Coastal Saltmarsh*, this vegetation was not considered to represent that community due to its disconnection from tidal regimes, an otherwise key indicative feature.

12. EHP (2019) found none of the significant flora species that had been recorded within the broader local area historically despite systematic, targeted surveys. EHP (2019) further conclude that significant flora species are unlikely to occur.
13. EHP (2019) consider that there is habitat suitable for 13 nationally significant fauna species and 18 state significant fauna species at the site. Given the difficulty of surveying for Orange-Bellied Parrot, their presence is assumed given the proximity of the site to areas with recent records.
14. The EHP (2019) report calculates offsets for direct impacts to native vegetation that result from the construction of the various structures and channels to facilitate the use of the Sparrovale Wetland for drainage outfall. EHP (2019) do address the potential for indirect impacts such as those associated with the changed hydrological regime within Sparrovale Wetland but conclude that the flora and fauna species present within the wetland are unlikely to be negatively impacted by additional stormwater from Horseshoe Bend and Armstrong Creek given that
 - a. The wetland is a monoculture of Beaded Glasswort that tolerates (and favours) seasonal flooding
 - b. That the flooding modelled by Venant (2018) is well within the flooding depth tolerated by the species
 - c. That the flexibility in the management of the hydrological regimes post-development allow greater opportunity to proactively manage the values within the Sparrovale Wetland.
 - d. That the Venant (2018) modelling suggests that Sparrovale will dry out every year under a post development scenario, maintaining Orange-Bellied Parrot habitat and the hydrologic preferences of the vegetation, keeping the vegetative composition consistent with pre-developed conditions
15. Craigie (2024) has determined that the additional inflow into Sparrovale from Marshall and the NEIP would result in a 7.2% increase in stormwater flow from that provided by the Armstrong Creek and Horseshoe Bend Precincts and that the very marginal increase in flows should offer no impediment to adding both Marshall and NEIP Stormwater into Sparrovale.
16. Conveyance of flow from both Marshall and the NEIP is proposed through the construction of channel referred to in the Spiire (2022) as the southern outfall channel (also known as DI_DR 14). Aerial photograph interpretation Shows that the northern half of the proposed DI_DR 14 alignment passes through land that has been subject to heavy disturbance through cropping. Little native vegetation or ecological value is considered likely to be supported by the land. This is supported by the mapping of EHP (2019) The land for the southern half of the DR_DI 14 alignment appears less disturbed through agriculture, however EHP (2019) have not mapped any patches of native vegetation in this area. It therefore appears likely that the construction of D_DR 14 can occur with little risk of significant ecological impacts
17. Deakin University have been monitoring Sparrovale Wetlands for the last three years and the Standard Operating Rules currently governing the management of Sparrovale differ from those that were assumed in the Venant (2018) model. As well as a reduction in the size of the Sparrovale outlet, it appears that the outlet is closed all year. The Venant (2018) model depended on the closure of the gates between December and April, and them being open for the remainder of the year.
18. As a consequence of the gates remaining closed, near-map aerial interpretation suggests that the Sparrovale wetland has been consistently inundated since August 2022. Noting that periods of reduced water volumes are evident around November 2023 This consistent inundation is likely to have had a detrimental effect on the Seasonally Inundated Sub-saline Herbland and therefore, Orange-Bellied Parrot habitat.
19. EHP (2019) suggest that the Seasonally Inundated Sub-saline Herbland could be lost if the hydrological regime within Sparrovale significantly changes. ARI (2016) suggest that other EVC's that have Beaded Glasswort as the dominant species are typically inundated by up to 30cm for periods of between 1 and 6 months. That Sparrovale Wetland has been inundated for the last 24 months suggests that the Seasonally Inundated Sub-saline Herbland mapped by EHP (2019) may be impacted by the changed Standard Operating Rules.

20. Stormwater from Marshall and the NEIP will be treated to best practice standards (Craigie pers. Comm.) and (Watters pers. comm.). As such, the quality of the water from both precincts will not impact water quality within either Sparrovale Wetlands or the Ramsar site.

7.0 Ecological Improvement Opportunities

1. The EHP (2019) report suggests that utilising Sparrovale Wetland for drainage services is likely to provide a number of ecological benefits:
 - a. Increased water quality within Hospital Swamp by reducing the reliance of the swamp being filled from the Barwon River which can be turbid and contain algal blooms. The management plan prepared for the Ramsar site (DELWP 2018) lists catchment and urban stormwater discharge as a critical risk to Lake Connewarre, a risk that can be mitigated through the treatment of stormwater within Sparrovale.
 - b. Provides greater flexibility with water management to ensure the ecological requirements of the Ramsar Complex is met as well as ensuring that the ecological value of Sparrovale is maintained or improved
 - c. Opportunities to create a greater diversity of wetland types within the study area through ecological watering and greater control of hydrological regimes within Sparrovale Wetlands
 - d. Increased connectivity of habitat through the construction of the new channel between Sparrovale Wetland and Lake Connewarre
2. The use of Sparrovale for the stormwater from Marshall PSP and the NEIP will reduce the need for several drainage outfalls to be constructed through the floodplain vegetation of the Barwon River

8.0 Summary

In summary, and based on AECOM's review of available literature, it is considered that the proposed stormwater inputs into Sparrovale Wetland from both the Marshall precinct and the NEIP would not compromise the ecological values that were recorded from Sparrovale by EHP in 2019.

Indeed, provided that the Sparrovale Wetlands can operate in the manner suggested by the Venant Solutions (2018), the inclusion of stormwater into the Sparrovale Wetlands provides an opportunity for the ecological values of both the Sparrovale Wetlands and the downstream Ramsar complex.

If the Standard Operating Rules that influenced the Venant Solutions (2018) model govern the hydrology of the Sparrovale Wetlands post-development, the wetland-dependant species and communities that EHP (2019) recorded from the site will not be detrimentally impacted by the additional water from the Marshall PSP and the NEIP.

The restoration of the existing controls and the addition of further structures and channels as outlined in EHP (2019) will encourage the improvement of the indigenous vegetation within the Sparrovale Wetland and consequently improve the habitat quality for significant wetland-dependant flora and fauna species such as Orange-Bellied Parrot.

9.0 Assumptions and limitations

No field assessments were completed in the preparation of this statement, with conclusions made of existing ecological values based on a review of past reports.

10.0 Declaration

I have made all the inquiries that I believe are desirable and appropriate and no matters of significance which I regard as relevant have to my knowledge been withheld from the panel.