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Restoration Vision for the Wallan Wallan Wetlands, including Herne Swamp, as the centrepiece of the Wallan Wallan Regional Park: ***Discussion Paper – March 2019***

EXECUTIVE SUMMARY

Herne Swamp is a little known, hidden gem, awaiting the opportunity to be brought 'back to life' as a community asset, within the Wallan Wallan Regional Park concept. It has all the ingredients required for a spectacular restoration project to unfold, if we just give nature a chance. It has:

- a reliable catchment;
- the majority of its former extent as currently undeveloped land;
- a viable dormant seedbank of native wetland plants with proven capacity for spontaneous recovery;
- broad community support;
- consistency with several strategic planning documents; and,
- an area (in the Yarra Valley Water treatment plant irrigation paddocks) that could be decommissioned and made available for Stage 1 of a larger restoration project.

The existing role of Herne Swamp in managing flood waters which is threatened by uncoordinated planning (in flood September 2016, looking towards Mt Fraser).

However, the area is within the Melbourne Northern Growth Corridor and is earmarked for several developments that appear to be moving ahead in an *ad hoc* fashion; without due regard or full consideration of catchment characteristics and the natural flood prone character of the Wallan Wallan Wetlands, nor the environmental, aesthetic and recreational values, or restoration potential of Herne Swamp.

This paper describes a new vision for Herne Swamp that works **with** the natural characteristics of the site, to create a natural centrepiece for the proposed Wallan Wallan Regional Park that will add both value and resilience to adjacent future development. In terms of tough decisions, that means working to gain a consensus **now** on defining a protected future "wetland restoration / flood buffer zone", based on defined natural landforms, that is reserved from all future development.

DETAILED DISCUSSION PAPER

Background

Nature Glenelg Trust (NGT) is an independent, charitable, not-for-profit non-government organisation that primarily works in the regions situated between Melbourne in Victoria and Adelaide in South Australia, and has a particular emphasis on wetland restoration and management, and threatened species research and recovery.

As well as identifying and delivering projects that meet our organisational purpose across all land tenures, we are particularly proud of our success in helping foster, broker and/or implement community-led solutions that work across the boundaries between public and private land, bringing together a wide range of people with an interest in wetlands. Examples of the success of this approach include some major wetland restoration projects now underway, including: Long Swamp in Discovery Bay Coastal Park (Victoria); the Wannon River floodplain straddling public and private land at the boundary of the Grampians National Park (Victoria); and, public and private land along the Tilley Swamp Watercourse (South Australia).

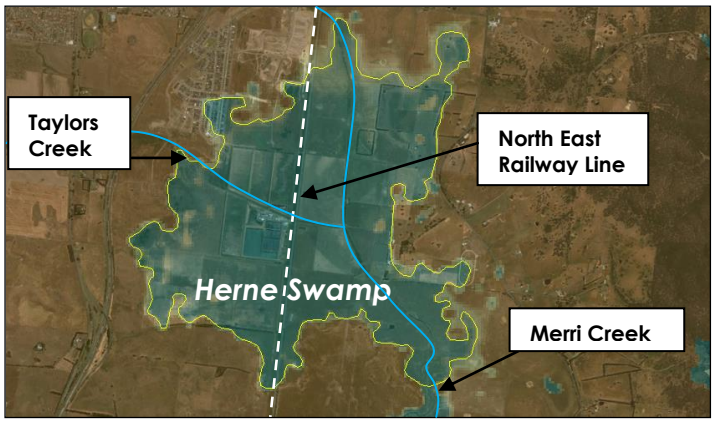
Given our organisational focus on wetland management and restoration, we were invited to inspect Herne Swamp by various members of the local Wallan and Merri Creek community in 2018. It is clear from our initial voluntary investigation (leading to this discussion paper) that the site has significant restoration potential, but fragmented land tenure and a piecemeal approach to planning pose significant risks to the present and future feasibility of the concept of a restored Herne Swamp, and by association the viability of the proposed Wallan Wallan Regional Park and adjacent developments.

In short, we want to harness the enthusiasm that exists, and sharpen community focus on the questions that matter most. Hence this discussion paper is about concisely:

- Exploring the history of Herne Swamp and how it has changed through time;
- Defining its likely past, present and potential future ecological values;
- Defining the true footprint of the wetland and its relationship to the Merri Creek catchment;
- Better integrating landscape features and sustainable water management (through natural wetland restoration) into future urban development and design;
- Sharing the vision of a restored Herne Swamp and how it could become a true community asset, forming a centrepiece for the proposed Wallan Wallan Regional Park; and,
- Highlighting how this proposal is consistent with existing planning strategies of State and local government and government agencies.

Introducing Herne Swamp

Herne Swamp is a significant and large wetland area near the top of the Merri Creek catchment, a short distance to the south-east of the Wallan township, and immediately south of the Wallan Railway Station. Prior to drainage many decades ago, the wetland was well over 600 hectares in size, straddling the North-East Railway line, as shown.



Original extent of Herne Swamp, prior to artificial drainage, based on Digital Terrain Modelling

Historical descriptions

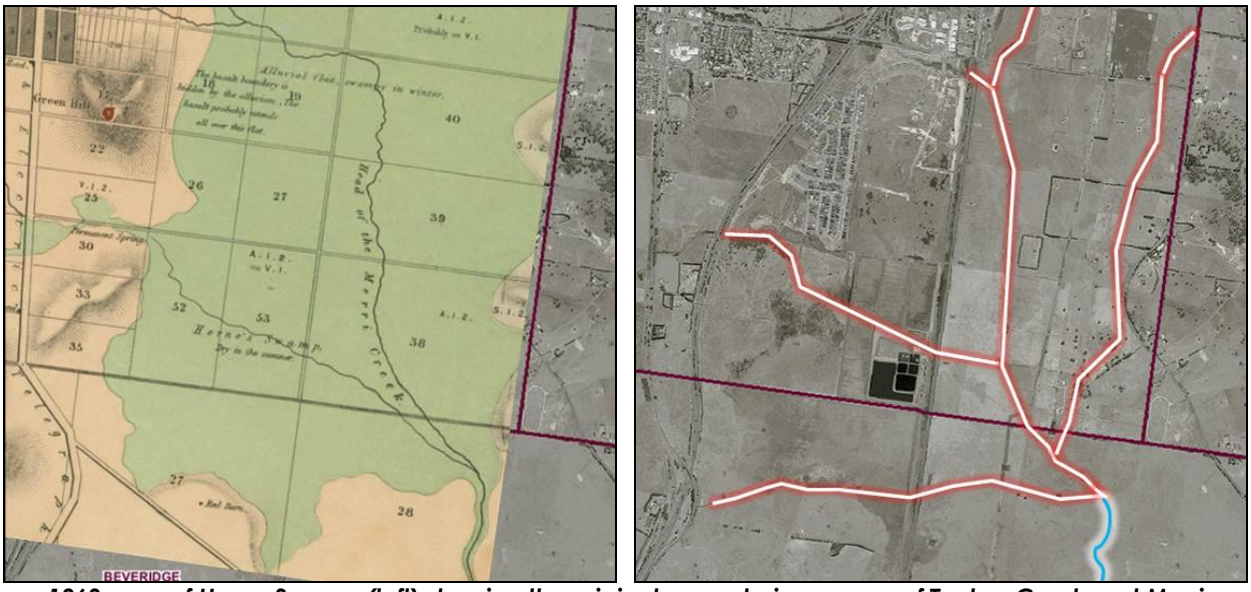
Some early descriptions of Herne Swamp appear in the 1870s Melbourne newspapers, when the new North East Railway Line was being constructed and opened:

Thursday 13th July 1871 (Argus) *"The heavy embankment across that dreary stretch of country known as Herne's Swamp is finished. The bridges in this embankment as originally designed are now considered not sufficiently large to carry off the water, and they are to be enlarged. Very great difficulty is here experienced in getting a good foundation for the bridges, it having been found necessary to pile to a great depth."*

Monday 6th November 1871 (Age) *"From the 22nd to the 26th mile the line crosses a remarkable flat at the head of the Merri Creek, known as Herne's Swamp. This is crossed on an embankment of about four feet in height."*

Sunday 13th April 1872 (Leader) *"… the railway commences to enter Herne's Swamp, a tract of country some three miles across, in the middle, of which the Merri Creek takes its rise. No great difficulty was encountered in laying the permanent way, except in the base of one culvert, where it was necessary to drive piles in order to obtain a foundation. This large marsh which in winter is almost under-water, but in summer is clothed with a rich verdure, seems to be of volcanic origin. Indeed, surrounded as it is with an amphitheatre of hills, which almost deserve to be termed mountains with little islands of bluestone boulders, Herne's Swamp somewhat resembles the crater of a huge volcano. After stopping in the middle of the marsh to give the engine water the train starts again and 29 miles from Melbourne the site of the station at Wallan is reached."*

These early description of Herne Swamp pre-date artificial drainage, which resulted in the loss of wetland values via the straightening, deepening and channelisation of both Taylors and Merri Creek where they previously meandered through the bed of the wetland, as shown below.



1862 map of Herne Swamp (left) showing the original meandering course of Taylors Creek and Merri Creek through the swamp; and present view (right) where comprehensive artificial drainage and channelisation is shown in red and white lines; the natural section of Merri Creek is marked blue.

Wetland drainage was undertaken to enable natural wetland vegetation to be replaced with pasture grasses for grazing, a common scenario throughout south-eastern Australia. On the Plenty and Merri Plains, drainage of wetlands has been comprehensive, with over 90% of the freshwater marshland habitat of the region lost or degraded to a degree that renders it no longer suitable habitat for wetland dependent wildlife.

Existing Ecological values

State significant fauna species recorded at the site include the Black Falcon, Brown Toadlet, Eastern Great Egret, Hardhead, Musk Duck, Royal Spoonbill and Southern Toadlet.

Additionally, over 100 indigenous plant species have also been previously identified.

Herne Swamp also retains nationally significant ecological values (protected under the *EPBC Act 1999*), despite the degree of modification that has taken place, including:

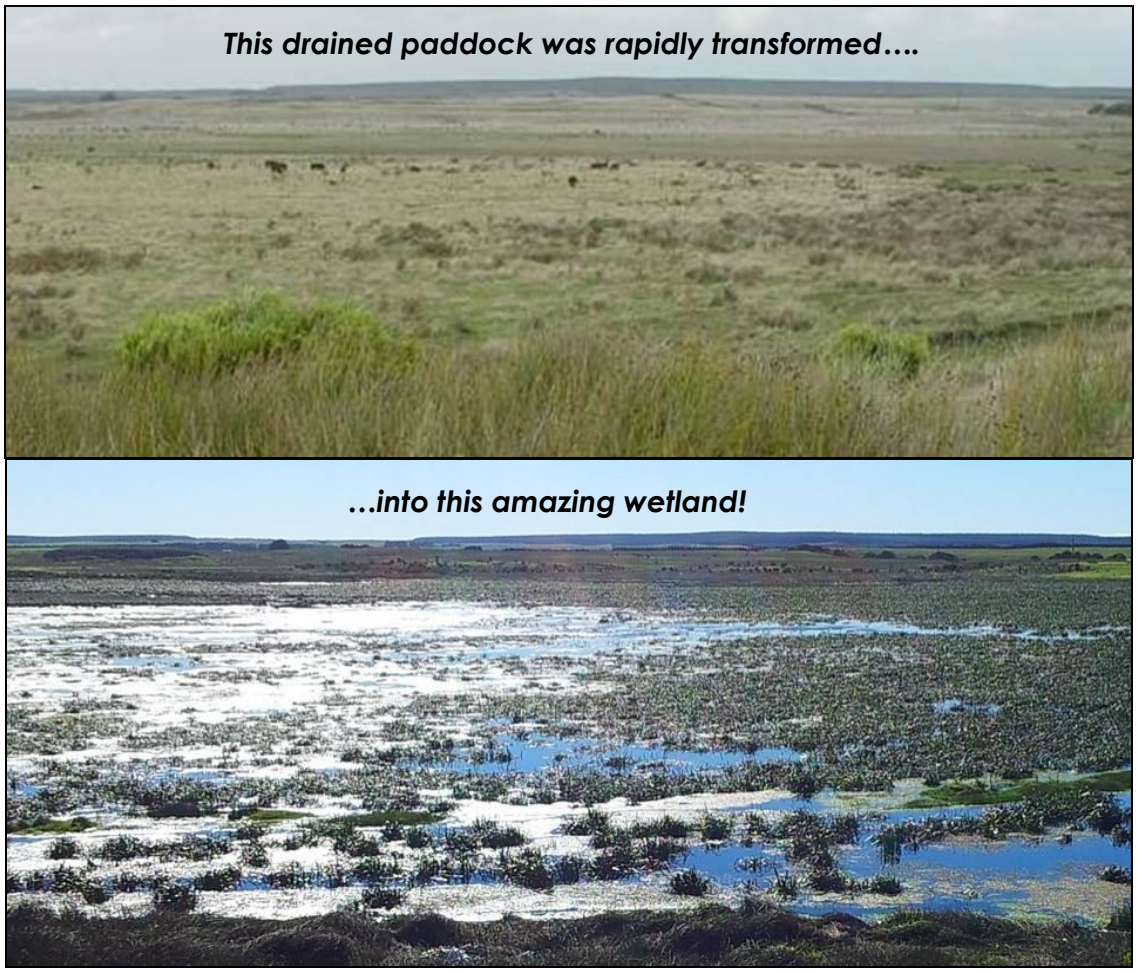
- the seasonal herbaceous wetland ecological community; and,
- habitat for and/or confirmed occurrences of several threatened species (Australasian Bittern, Striped Legless Lizard, Growling Grass Frog, and Golden Sun Moth).

However only a fraction (a small southern portion) of the original footprint of the wetland is currently recognised, mapped and therefore protected under the *EPBC Act 1999*. As the Act only recognises existing values, the rapid restoration potential of wetlands like Herne Swamp is often overlooked by policy makers and planners. Yet all we have to do to reverse this trend is:

"Just Add Water"

The Opportunity

Nature Glenelg Trust has restored dozens of wetlands, large and small, across western Victoria over the past 7 years. When a drained wetland site with the right catchment characteristics (see executive summary) is reinstated, incredible and rapid ecological transformations can take place.



Example of wetland restoration in action – the same site 5 years after restoration works.

Herne Swamp has similar potential, and fortunately this has already been demonstrated during a recent experiment undertaken by Yarra Valley Water. By retaining rain water in a small (1.5 ha), bunded, stormwater holding area adjacent to the treatment plant during the winter and spring of 2018, a remarkable transformation has started to unfold within a fraction of the former wetland.

Part of Herne Swamp in July 2018 – the Yarra Valley Water experimental wetland restoration area.

February 2019 - the same site 6 months later. A wide range of wetland plants have spontaneously regenerated, and the 'verdure' of lush green summer swamp vegetation of Herne Swamp (first noted in April 1872) is bouncing back in this formerly barren yard area.

The experimental wetland area held water for several months, enabled the seedbank of dormant wetland plants to naturally germinate and regenerate, and was quick to attract a wide range of frogs and waterbirds, including triggering the nesting of two Black Swans, with one successfully hatching chicks.

All of this was achieved on area of only 1.5 hectares, after a single season of wetland restoration.

Just imagine what would be possible if this were repeated across the former 600 hectare extent of Herne Swamp, in a staged and measured way, at such a large scale?

Put simply, a wetland of regional significance would be recreated, almost overnight.

The Restoration Project

The practical and technical aspects of the wetland restoration project at Herne Swamp meet a range of the normal criteria that Nature Glenelg Trust consider essential for proceeding with a project of this type. These include factors such as the site being underlain by shallow groundwater that has not been compromised, the upstream catchment still reliably producing flows and evidence of a viable residual seedbank which will trigger rapid recovery of native wetland vegetation.

Despite the fact that there has been some development in the swamp (water treatment plant, railway line, and urban expansion in the north-west corner), in all cases these have involved reclaiming land that has been built up well above the natural surface level. This means that the wetland can still be inundated, as currently occurs temporarily in flood events, without compromising any existing infrastructure. Indeed, as we will explore later, the wetland itself provides an ideal buffer for protecting these and other future developments during such events.

Wetland restoration works usually involve the backfilling, blocking and/or regulating of artificial drains, to mimic the pre-development inundation regime of a wetland. In this case, that means deliberately increasing the capacity of Herne Swamp to receive, store and, most importantly, slow down the movement of flows into Merri Creek downstream.

Example of low cost drain regulation (foreground),
resulting in vast wetland restoration outcomes (background)

This in turn would result in water being deliberately held in the swamp for several months each winter and spring, as well as after any heavy unseasonal rainfall events (rather than immediately draining as currently occurs); noting that the latter type of weather events are predicted to become more common under most modelled climate change projections.

Allowing Herne Swamp to function naturally again will have a wide range of catchment and environmental benefits. A functioning wetland ecosystem not only triggers the natural recovery of biodiversity values, but also literally 'cleans up' the water on its way through, so the quality of water entering Merri Creek downstream will be significantly improved.

Benefits for water authorities, developers, government agencies and the community

The benefits of the project extend far beyond the environmental outcomes described, and include the following:

- **Flood buffering and erosion prevention**: the upper Merri Creek is a constricted waterway that has limited capacity to deal with heavy rainfall events in the catchment, which is why Herne Swamp still temporarily fills after storms and, by default, acts as an equalisation basin even with artificial drainage in place (refer to the image on Page 1 from September 2016). But this significant risk can be turned into a massive strategic opportunity.

  With urban expansion and development set to increase on surrounding land over the years ahead, which results in an additional increase in stormwater runoff, the likelihood of future flooding and erosion is only amplified, and the risk to any development of unwanted inundation (if it continues to extend into the wetland footprint) also increases. Indeed, the North Growth Corridor Plan identifies upper Merri Creek as "highly erosive". Hence by reinstating Herne Swamp and using it as a flood retention basin, it tackles these potential risks head on, by:
  - reducing downstream flooding and erosion risks and pressure; and,
  - allowing for future development around the swamp (as long as it is outside of the flood prone areas in the swamp footprint) to proceed with the awareness that this natural flood buffer (via wetland restoration) was fully integrated into the development design.
  - providing an improved flow regime in the urban sections of the creek with less flood risk and improved water quality.

- **Amenity, recreational and educational values:** if a consensus to restore and protect the wetland is achieved, then it has the prospect of being integrated into all future development, improving visual amenity for surrounding land users, and with it a probable increase in land values. It is not hard to imagine loop walking trails, following the wetland edge, either side of Herne Swamp in the future, creating opportunities for public recreation, exercise and birdwatching, linked by trails and green corridors to other sectors of the Wallan Wallan Wetlands. Local schools will have a major educational asset on their doorstep for environmental science programs. One can see how Herne Swamp could form an incredibly valuable centrepiece of the proposed Wallan Wallan Regional Park.

- **Groundwater protection and recharge:** despite artificial drainage, Herne Swamp is situated in an important area for both groundwater recharge and expression. Restoration would directly protect and replenish the groundwater resource, and also contribute to:
  1. improved downstream flow characteristics, extending the future groundwater base-flows discharge period into the Upper Merri Creek and reducing drought stress; and,
  2. improved health of River Red Gums (right) situated on the drained eastern flank of Herne Swamp, which are dependent upon shallow groundwater.

River Red Gums adjacent to artificial drains on the eastern flank of Herne Swamp

- **Urban design and local climate considerations:** town planners and water authorities are increasingly concerned about built up urban areas functioning as heat traps, with direct impacts on liveability, electricity consumption and human health. Restoring Herne Swamp (and its capacity to hold and retain moisture into the summer months) will provide an effective natural means of moderating the surrounding local climate as adjacent areas become urbanised over the years ahead. In short, a restored Herne Swamp would significantly cool the surrounding suburbs, which are likely to be considerably warmer than much of Melbourne due to its outer northern location and the lack of mature trees.

- **Complementary future management of the Yarra Valley Water site:** the water treatment plant situated within Herne Swamp includes several irrigation paddocks that are currently only intended to be utilised until 2021, when the treatment plant will be connected to the metropolitan sewer system. After that date only sufficient quantities of locally treated sewage will be processed to meet local recycled water demand (to Class A quality).

  The irrigation paddocks, which are currently utilised to minimise the discharge of Class B water directly into Merri Creek, will be decommissioned and potentially made available for other purposes after 2021. Hence, a restored and naturalised wetland surrounding the plant has identical potential to the small experimental area illustrated on Page 5, only on a much larger scale. Given that the former irrigation paddocks are earmarked to be retained by Yarra Valley Water as part of an odour buffer for the core treatment facility that will remain operational on an ongoing basis, this concept provides a proactive and positive future use of the site.

  Important ecological values in Merri Creek downstream of Herne Swamp (e.g. populations of Platypus, Growling Grass Frog) will be better protected with the water quality improvement that a restored Herne Swamp can provide. This will be increasingly important as the future Herne Swamp/Merri Creek catchment becomes more urbanised.

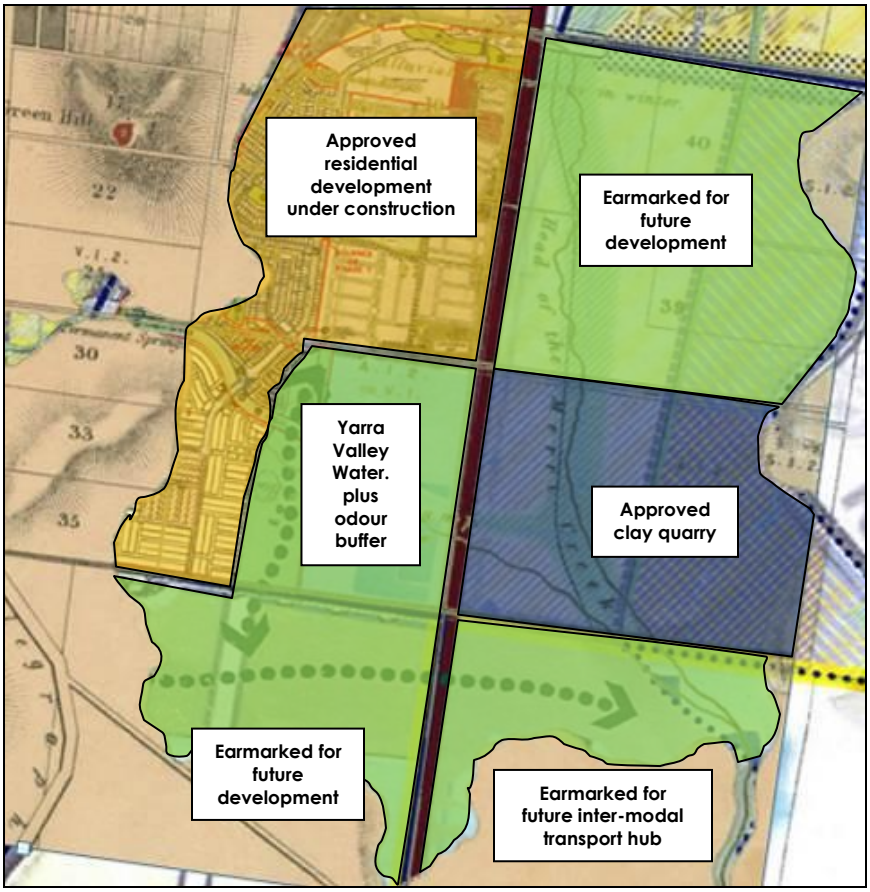
- **Cultural values:** a restored wetland creates the possibility of meaningful reconciliation with the Traditional Owners of this land, the Wurundjeri Land and Compensation Cultural Heritage Council Aboriginal Corporation and local Aboriginal people. Cultural water is a major focus at this time, being aware that healthy waterways and wetlands are a key concern of indigenous Australians. The opportunities for cultural awareness activities at a restored Herne Swamp are vast.

Challenges that need to be overcome

Herne Swamp is situated in Mitchell Shire, within Melbourne's Northern Growth Corridor. Hence while development is inevitable, how most of that development occurs is not yet locked in. As a result, this is a unique time and opportunity to get the future strategic thinking and planning right. Unfortunately, the wetland is situated at the junction of (and bisected by) a variety of planning areas and zones, all progressing at different times. This means that up until now, not only has a single vision for the entire wetland been lacking, but this very concept is under threat from inappropriate development and *ad hoc* planning decisions that have failed to recognise some of the key issues raised in this paper. In short, urban development in wetlands is high risk.

Some of the major challenges include:

- **Urban Residential Development** is already approved for the north-western and far western portions of the former wetland, which are being reclaimed (see over page). This development will increase flooding risk by (1) reducing the storage volume of remaining low-lying areas in the wetland, and (2) increasing rapid stormwater run-off during storms.



Map showing areas of the former wetland committed to development (yellow and blue), with areas that are suitable for wetland restoration and not yet committed to development highlighted (green), noting that at the end of its service life, the clay quarry (blue) will also be suitable for wetland restoration.

- **A clay quarry** in the heart of the wetland has recently been granted development approval by VCAT, despite the strong objections of Mitchell Shire Council. It will provide material to feed the construction of the new nearby urban developments.

- Ensuring that **the remaining areas of the wetland (green)** remain as open space and available for wetland restoration and flood buffering. All parts of the former wetland are currently at risk, as shown above:
    - The north-east and south-west portions are earmarked for future development, albeit an area of nominal 'open space' has been earmarked for the south-western portion. This should be not only retained, but designed to match the landform to facilitate wetland restoration to the natural edge of the former wetland footprint, which is now no longer possible in the north-western corner where the former wetland edge has been reclaimed for suburbs.
    - The south-eastern portion of the site, is within an area that has been earmarked for a future inter-modal transport hub, but is also the zone where nationally significant values (under the EPBC Act) have been identified. The natural wetland edge should be retained and reserved from all development, which will facilitate wetland restoration.
    - The Yarra Valley Water site (incorporating an odour buffer on adjacent land) is the most naturally suited to commencement of wetland restoration activities in the first instance. However, this is contingent on the area remaining as open space.

- Finally the main challenge that needs to be overcome is agreement from all the relevant parties to work towards a unified strategic vision for Herne Swamp, that doesn't pull in different directions, integrated consistently into all future plans and policy decisions.

Consistency with Existing Strategies

Despite the apparent *ad hoc* nature of development presently occurring within and around the wetland, the concept of a future restoration project at Herne Swamp is actually highly consistent with a number of existing, endorsed strategic planning documents, including:

- Yarra - Healthy Waterways Strategy (Melbourne Water) performance objectives:
    1. ***Water regime:*** *Investigate opportunities to restore the natural wetlands in the Herne Swamp area and to improve wetland water regime to meet ecological watering objectives, improve ecosystem services, cultural and social value.*
    2. ***Wetland habitat form:*** *Identify opportunities to improve the wetland habitat at Herne Swamp.*
    3. ***Water for environment:*** *Identify and implement opportunities to maintain or improve the flow regime in the Merri Creek Upper sub-catchment.*
    4. ***Vegetation extent:*** *Establish a continuous riparian vegetation buffer in the Merri Creek sub-catchment.*
    5. ***Stormwater condition:*** *To prevent decline, treat urban development so directly connected imperviousness remains below 2% on the Merri Creek at Summerhill Rd (Wollert)*
    6. ***Access:*** *Increase access to and along waterways by improving connections to path networks and extending paths into new areas (contributes to Merri Creek shared trail).*

- The Victorian Planning Authority's North Growth Corridor Plan, which states:
    - *Ensuring that the North Growth Corridor is an attractive location for a wide range of businesses, and a wide diversity of households are key challenges. The North Growth Corridor Plan seeks to meet these challenges by preserving and enhancing the natural features of the Growth Corridor, including the significant landscape and biodiversity values. New communities will benefit from an integrated open space network that provides a distinctive character and amenity, and existing biodiversity values will be preserved and enhanced.*

- Yarra Strategic Directions Statement (DELWP 2018), Action 17 Wallan Restorative Project, a collaboration between Yarra Valley Water, Melbourne Water and Mitchell Shire Council:
    - *The Wallan Sewage Treatment Plant (STP) will be connected to the metropolitan sewer network by 2021. At this time, the STP will become a sewer mining plant and whilst the entire site will be required to maintain an odour buffer, there is an opportunity to repurpose the existing irrigation land and winter storage lagoons for other benefits. This could include: rehabilitation of the former Herne Swamp, naturalisation of Taylors Creek, stormwater treatment wetlands and creek diversions for treatment and water quality improvement, stormwater detention and flood mitigation for the Upper Merri sub-catchment, biodiversity, community access and eco-tourism, as well as Traditional Owner economic opportunities.*

- Merri Creek and Environs Strategy 2009-2014 (Merri Creek Management Committee), is a reference document for the Mitchell Shire Planning Scheme, and is full of excellent background information in support of the issues outlined in this discussion paper:
    - *Recognition that development within the flood zone of Herne Swamp will affect its hydrology and capacity, and ultimately Merri Creek downstream. Hence development should not occur unless water quality, storm water flows, and flood protection measures are in place. Herne Swamp currently provides valuable reduction in flows to the downstream creek system in flood events, reducing flows to about 25% of inflows.*
    - ***Reach Targets (2.4 Headwaters to Craigieburn Road East) - 4.*** *Restoration of the marshy herbfield character of wetlands (e.g. Herne Swamp) to enhance habitat function, assist in protection of stream water quality and aid stream flow volumes and seasonality.*

- ***Actions: RU2*** *- Undertake a feasibility study of the Herne Swamp area to determine measures able to be implemented to return the site to a more natural marshy herbfield condition, protect significant flora and fauna, and to improve the water quality of Merri Creek.*

- Mitchell Shire Council Plan 2017 – 2021, specifically Action 7.5.4, which proposes to:
  - *Undertake a feasibility study to establish a Southern Regional Park, based on Herne Swamp.*

- The Growling Grass Frog Masterplan for Melbourne's Growth Corridors (DELWP 2017), which identifies the headwaters of Merri Creek, within Herne Swamp, as an important habitat buffer zone. In fact, a restored Herne Swamp is likely to provide extensive Growling Grass Frog habitat, including breeding habitat in deeper pools.

Steps towards creating a unique legacy

A major wetland restoration concept like this isn't realised overnight, but we now have the opportunity to get everyone talking about (and working towards) the same vision, while there is still time to incorporate this thinking into planning decisions and the future urban context of the site within the Northern Growth Corridor. That means developing a shared understanding of exactly what is possible and identifying clear boundaries around the area that is required – which is the intention of this discussion paper. Then it is a matter of how the vision can be turned into reality, in a series of logical, sequential steps – articulated below:

Stage 1: Gain support from Yarra Valley Water and the developers of the adjacent land to integrate wetland restoration into their future plans for this area. This concept would also be subject to additional technical feasibility investigations of flood levels, low flows in the creek and potential vegetation impacts.

Subject to the necessary plans and agreements being in place, this project could be initiated at any time after 2021, and, due to the presence of the railway line and levee banks, can be managed in an entirely independent way from surrounding areas of the drained wetland, which would remain outside the project area.

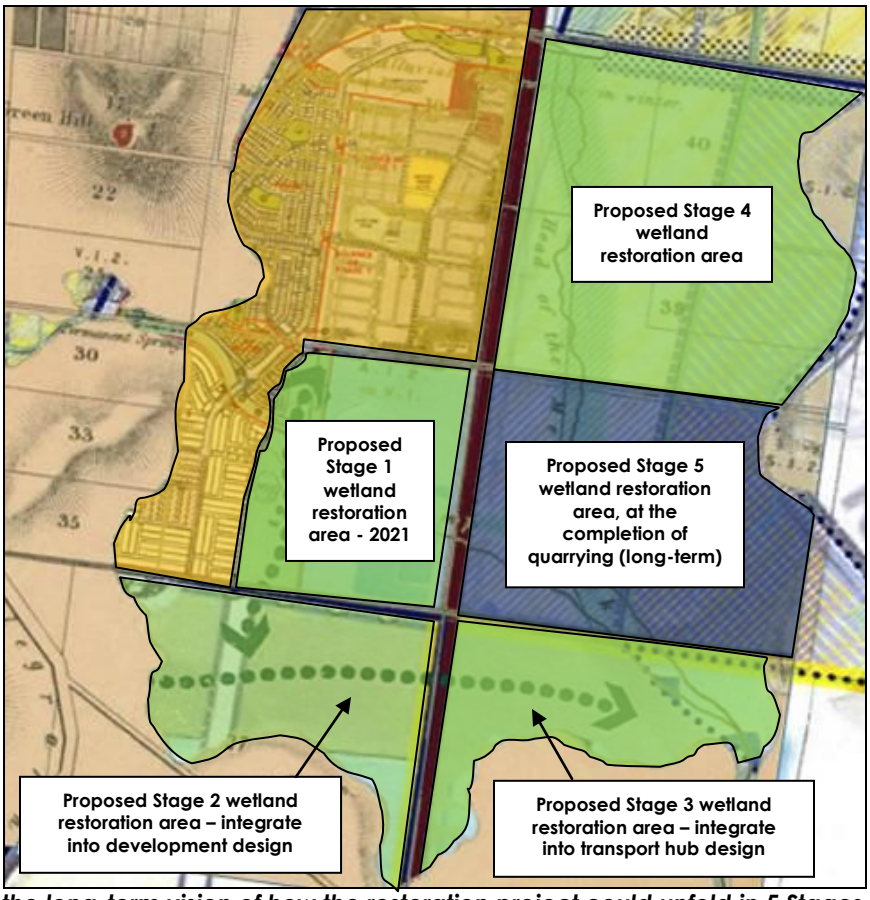
A major beneficiary of restoring Herne Swamp, the nationally threatened Growling Grass Frog

Stage 2: Ensure that development earmarked for this area, builds on the results of Stage 1, by keeping an area of open space that matches the natural edge of the wetland landform once restored. While this won't provide a neat (straight line) boundary, it will provide a destination for stormwater discharge and an area of great natural aesthetic value to build into the development – also enabling the creation of higher value blocks with better views, seasonal waterfront and recreational opportunities. The levee bank between Stage 1 and 2 can be breached at this point to create a single wetland feature bordering the railway line to the east.

Stage 3: Ensure the plans for the mooted intermodal transport hub likewise integrate the restoration of the entire former wetland feature and extent into to the design of this zone, consistent with existing advice that covers this area under the *EPBC Act 1999*.

Stage 4: Ensure the wetland restoration concept is adequately integrated into plans for this north-eastern zone. This area is likely to be crucial for managing flooding risks associated with the Merri Creek, where it flows through the approved neighbouring clay quarry.

Stage 5: In decades to come, when the service life of the quarry is over, it will likely be a perfect candidate for converting to a deeper wetland feature at the heart of the former Herne Swamp, and linking all the previous Stages together.



Map showing the long-term vision of how the restoration project could unfold in 5 Stages. To ensure the future success of the concept, this footprint (green) should be protected from any further development.

This restored major wetland feature, supporting a diverse assemblage of flora and fauna, would form the spectacular ecological, aesthetic, recreational and cultural centrepiece of the future Wallan Wallan Regional Park, and a community and environmental asset for all Victorians.

Nature Glenelg Trust is committed to making complex environmental science more accessible to decision makers and the general public; to improve on-ground environmental outcomes. In this spirit of constructive dialogue, feedback or questions in relation to this discussion paper are most welcome.

You can contact Nature Glenelg Trust by emailing info@natureglenelg.org.au.