

Comments on West Mundijong Industrial area Local Water Management Strategy

February 2021

Department of Water Comments: 18/01/2021				
No.	Page	Section	Rev 1 - DWER Comments	Rev 1 – Author’s Actions
1	10	Section 7: Groundwater Hydrology	<p>The information presented in this section is done so under the assumption that the land is located in the <i>Serpentine-Groundwater Area – Byford 2 Sub Area</i>.</p> <p>This site is located in the “<i>Byford 3</i>” sub area. Please note in this location the superficial is of a limited thickness with clay sediments in areas, making consistent viable abstraction difficult. Furthermore lower aquifers (Leederville and Cattamarra Coal Measures) are fully allocated with no water available for licensing.</p> <p>It is recommended challenges in obtaining groundwater for future non-potable supply is clearly identified in the LWMS.</p> <p>As such the LWMS should:</p> <ul style="list-style-type: none"> • Identify anticipated non-potable requirements for the sites development. It is acknowledged that private use will be unknown as it will be dependent on industry types that locate in this precinct; • Identify difficulties in securing viable superficial volumes; 	Text modified to reflect the site is in Byford Sub area 3. Notes also updated on the very limited availability and need for trading. This is also expanded upon in Section 12.

Department of Water Comments: 18/01/2021				
No.	Page	Section	Rev 1 - DWER Comments	Rev 1 – Author’s Actions
			<ul style="list-style-type: none"> • Present current licenced allocations in the precinct area that could be secured through a transfer process to be utilised in the lands future development; • Identify that obtaining a licence for groundwater from lower aquifers will require the trade or transfer of an existing entitlement from the same aquifer and groundwater sub-area. 	
2	16	Section 9: Drainage Management Strategy	<p>Conceptual designs for infrastructure to manage stormwater and groundwater should be provided and include, but not be limited to:</p> <ul style="list-style-type: none"> • Critical invert levels; • Areas of water quality treatment, including details of soil amendments (i.e. phosphorous retention index); • Batters and grades; • Area of inundation volumes and top water levels for 15mm, 10% AEP and 1% AEP events; • Integration of subsoil infrastructure; • Depth to groundwater. 	<p>Critical inverts are provided in new Figures 12-14. Sizing and indicative areas (noting they will be spread along roads) for treatments structures shown for each catchment. Batters are generally 1:6. Longitudinal grades are shown in new Figures 15 to 17. Top water levels have been added, noting that all flood flows are held within the wide swales. Inverts for subsoils are shown in Figure 23- Section 12 as well as how it is integrated. The swales are set approximately at the AAMGL. Minor differences of +/- 200mm may be experienced to achieve suitable longitudinal grades across the site.</p>
3	16 & 23	Section 9: Drainage Management Strategy & Section 10	<p><i>Lot Scale Water Management</i></p> <p>The design appears to be reliant upon assumptions of significant on lot infrastructure to manage stormwater drainage, including detention basins and subsoil</p>	<p>Figure 10 provides an indicative lot layout that shows how the various water management aspects are integrated. Text has also been added to Section 9, page 17 to explain how this would work.</p>

Department of Water Comments: 18/01/2021				
No.	Page	Section	Rev 1 - DWER Comments	Rev 1 – Author’s Actions
		Water Quality Management	<p>infrastructure connecting to swales and multiple use corridors. The report should clarify the following:</p> <ul style="list-style-type: none"> • Through what approval mechanism will on lot design requirements be mandated to ensure drainage is managed for the estate scale system to perform as required? • Is the expectation that lot owners shall manage all infrastructure, noting intent within the LWMS that basins may likely have invert levels close to groundwater and be managed as ephemeral wetlands? • Further to the above point, multiple areas of standing water, and associated water quality and mosquito breeding risk an outcome amendable to the Shire? It is for this reason drainage areas are generally designed to be dry functioning systems with adequate clearance to groundwater. • Concepts of how lots are to be configured with regard to drainage, storage, onsite wastewater disposal, groundwater level and connection to Shire infrastructure should be provided. 	Text has also been added that that the Shire will manage this through a range of methods including development of a Local Area Plan and review as part of the development application and Building licences that each lot complies with the specific requirements.
4	21	Section 9.3: Drainage Management Strategy – 1% AEP	Dimensions of proposed north-south ecological corridor to achieve the required floodplain storage in the 1% AEP event should be provided.	The dimension of the north south floodplain storage area varies. It matches the western edge of the powerline easement. Text has been added to Section 9.3 on this area.

Department of Water Comments: 18/01/2021				
No.	Page	Section	Rev 1 - DWER Comments	Rev 1 – Author’s Actions
5	28	Section 12: Groundwater Management	<p>No plan of subsoil drainage function is provided. This information is critical to demonstrate the drainage design can function as intended, and will determine inverts of drainage infrastructure and inundation periods.</p> <p>The subsoil conceptual plan should provide inverts, grades and demonstrate a free flowing outlets with sufficient water quality treatment of outflow.</p> <p>The following commitment from the overarching <i>West Mundijong District Water Management Strategy</i> is also noted “<i>At the LWMS, more detailed modelling of optimum subsoil spacing and fill levels are to be undertaken...</i>”.</p>	<p>Figure 23 shows indicative subsoil discharge inverts to the major swale network. Figure 10 shows indicative lot subsoil layouts. Together these provide levels that future development can be designed to. At the DWMS, it was envisaged that smaller lots would be utilised. As this is no longer the case in the short to medium term, the subsoil inverts and on lot management provide direction that future developments can be assessed against.</p>
6	29	Section 13.2: Wastewater	<p>It is noted that there is an intent to potentially service lots via aerobic treatment units. Should this be the strategy it should be noted that this site is located within a sewerage sensitive area which will require siting of systems irrigation areas over 100m from drains and waterways, as well as a minimum 1.5m above the maximum groundwater level, in accordance with the <i>Government Sewerage Policy 2019</i>.</p> <p>The LWMS, and structure plan, would need to reflect a configuration that complies with this policy.</p>	<p>Figure 10 shows how the disposal units area able to be set back a minimum of 100m from the sites major swale network. Text has also been added in Section 13.2</p> <p>Minor changes to the Structure Plan may be undertaken to facilitate the ease of each lot achieving a minimum of 100m setback.</p>

Department of Water Comments: 18/01/2021				
No.	Page	Section	Rev 1 - DWER Comments	Rev 1 – Author’s Actions
7		General: Governance – Drains and Wetland	The LWMS should identify the future asset manager for drains, Mandejal Brook and the wetland. If the asset manager is to be an alternative agency to the Shire of Serpentine-Jarrahdale such an arrangement is to be confirmed within this structure plan process.	Text has been added to 15.5 on the Shire managing the drainage network and the wetland.
8		General: Landscape Concept	<p>It is acknowledged the structure plan is for an industrial precinct, rather than urban development, hence there is not an intent for usable public open space. However, given the likely future fragmented stages of development by different proponents, expectations for revegetation and landscape works for wetland buffer, Mandejal Brook and drains should be identified in the LWMS, to ensure they are implemented at later stages of planning.</p> <p>This information would not need to be onerous, however it should identify planting areas, target densities and species, to be adhered to by developers at subdivision.</p>	<p>Text has been added in Section 14 on planting of the swales and Wetland (noting that the wetland Report also contains significant details related to its restoration planting).</p> <p>Figures have been added to provide landscaped cross sections of the swale types and an overall plan of the landscaping of the site.</p>

Shire of Serpentine Jarrahdale Comments: February 2021				
No.	Page	Section	Rev 1 - DWER Comments	Rev 1 – Author's Actions
1			<p>Confirmation of planning mechanism (Local Area Plan from memory) to mandate necessary design standards for on lot controls including, but not limited to;</p> <ul style="list-style-type: none"> • Necessary stormwater design practices, inclusive of controlled outflow only in greater than the 10% AEP event; • Onsite basins and wastewater treatment systems; • Rainwater tanks; • Subsoil and stormwater infrastructure to be the responsibility of the proponent to the point of outflow to the Shire road reserve; • Subsoil outlets to be set a minimum 100mm above the receiving roadside swale. 	Text added on a Local Area plan and other mechanisms being used to control on lot water management.
2			<ul style="list-style-type: none"> • Confirm on lot basins will achieve 0.3m clearance to controlled groundwater level. 	Text added to Section 9 on clearance requirement
3			<ul style="list-style-type: none"> • Landscape concept for roadside swale treatment and MUC to ensure design aspiration carried over to developer led urban water management plans. 	Figures added to showcase landscaping requirements
4			<ul style="list-style-type: none"> • Please include structure plan layout within at least one or some of the figures 	Figure with more detailed Structure Plan is included (Jake, I will need the updated Structure Plan to do this)

Shire of Serpentine Jarrahdale Comments: February 2021				
No.	Page	Section	Rev 1 - DWER Comments	Rev 1 – Author's Actions
5			<ul style="list-style-type: none"> Confirm that structure plan layout can achieve necessary setback of 100m from drains to meet with Government Sewerage Policy requirements 	Layout slightly modified to maximise ability for lots to achieve the necessary setback.
6			LWMS to confirm further monitoring to be undertaken to establish a better understanding of groundwater levels to be added an addendum to the document prior to subdivision	Text added on requirements for on site groundwater level monitoring prior to UWMP's.
7			<ul style="list-style-type: none"> Add Cross sections of MUC indicating winter baseflow, 1EY, 10% and 1% flood levels. It should include the landscaping and recommended MUC width 	Cross sections added to show size of swale and minimum MUC as well as water levels and landscaping.
8			<ul style="list-style-type: none"> I believe the CGL was set up considering the MUC winter baseflow level. Please confirm. 	The concept works based on the swales sitting at approximately the AAMGL (+/_200mm, to allow for grading of the swale over the length of the development area). The subsoils feeding into the swales from lots, or adjoining roads, are to be set 100mm above the swale base. The non storm event flows eg base flows, should be below the subsoil inverts, allowing free draining of the subsoil system (except during actual storm flows). Text added to Section 12 to clarify this.
9			<ul style="list-style-type: none"> Since land falls east to west, there is a potential to drain the lot waters through another property. It may require private easement. Please discuss it in the LWMS. 	Text added to explain this may be need in some locations, depending on final levels. This is to be determined at detailed design for lots where this may be an issue. It is also

Shire of Serpentine Jarrahdale Comments: February 2021				
No.	Page	Section	Rev 1 - DWER Comments	Rev 1 – Author’s Actions
				noted in the Section 9 figures, with possible areas where this may be needed
10			<ul style="list-style-type: none"> Graphic is unclear T5 swale same colour as T9. 	Colours modified to make it easier to delineate the 2 swale types.
11			<ul style="list-style-type: none"> I understand that 100m separation of septic systems is required with any water body. What about the separation with lot drainage system? 	<p>Text added to Section 13 that the effluent disposal area must be more than 100m from the swale in the road network.</p> <p>It doesn't technically need to be 100m from on site drainage infrastructure, however I recommend adding in a requirement, that all lot based stormwater systems are above the groundwater level, and so won't intercept the groundwater. I know that the subsoil systems will effectively move the groundwater but consider that an acceptable risk, if well maintained ATU's with high nutrient retention soils beneath the disposal area are used (I will add this requirement to the LWMS to assist with de-risking the site and provide the Shire with direction as part of future design guidelines etc for lot owners).</p>

Shire of Serpentine Jarrahdale Comments: February 2021

No.	Page	Section	Rev 1 - DWER Comments	Rev 1 – Author’s Actions
12			<ul style="list-style-type: none"> We discussed yesterday the 2 years water monitoring in predevelopment scenario shall be set up as an addendum to this LWMS. Leaving it to UWMP stage would impact any future Subdivisions to wait for this data and duplicating the works in each Subdivisions. I believe Andrew agreed to run this water monitoring soon with LWMS. 	<p>Monitoring of groundwater should begin ASAP, so as to capture this years minimum and maximum levels. The LWMS approval will not be held up waiting for this data. The collected data should be made available to landowners/developers and should be included in their UWMP. It would be preferential that monitoring is undertaken over the entire area at the same time.</p> <p>Text added to provide clarification on the need for groundwater level information prior to UWMP’s being developed.</p>

Water Corporation Comments: 9th February 2021

No.	Page	Section	Rev 1 - DWER Comments	Rev 1 – Author’s Actions
1	5	Environment	No Water Corporation rural drains pass through this proposed development.	Noted, no change to report.
2	7	Groundwater Hydrology	Regional ponding of winter groundwater east of Kargotich Road is extensive and should be shown on Figure 5.	Ponding is shown on Figure 5 as areas of inundation (light blue. No change to Figure). There may be some modification of the area after groundwater monitoring is undertaken. Text added that the actual area of ponding to

Shire of Serpentine Jarrahdale Comments: February 2021				
No.	Page	Section	Rev 1 - DWER Comments	Rev 1 – Author’s Actions
				be confirmed as part of groundwater monitoring.
3	8	Surface Water	<ul style="list-style-type: none"> Flows shown in Figures 6 and 7 appear high and may have been over estimated. Refer to DWER for the latest flood modelling and parameters detailed in the Birrega-Oaklands Flood Study 2015. Post development the current regional pre-development floodplain storage needs to be retained on site. Proposed development fill levels need to be higher than the existing top of the western levee bank of the Oaklands MD. 	<p>All flows were determined in consultation with DWER and their 21015 modelling.</p> <p>Predevelopment floodplain storage has been retained through the demarcation of all land to the west of the power easement being set aside for floodplain storage. This land may be modified to increase its ecological benefits, make sure that ne ground levels are raised. Text slightly modified to make this clearer.</p> <p>Text added in relation to the need for lot levels to be set a minimum of 500mm above the corresponding level of the Oaklands MD western levee bank</p>
4	9.1	Drainage Management Strategy 1EY	The effectiveness of infiltration areas and soakwells will be limited by high winter groundwater levels and regional ponding within the floodplain.	It is noted that the insitu soil is often waterlogged. Clean free draining fill is to be used to provide the necessary infiltration. Text updated to provide further clarity.
5	9.3	Drainage Management Strategy 1% AEP	<ul style="list-style-type: none"> The Rational Method is considered out of date now for the design of new drainage systems. 	Text updated to show that Rational method used as part of 2015 DWMS and XP Storm modelling used in LWMS. The LWMS is

Shire of Serpentine Jarrahdale Comments: February 2021				
No.	Page	Section	Rev 1 - DWER Comments	Rev 1 – Author's Actions
			<ul style="list-style-type: none"> • The results of the floodplain modelling done by DWER as part of the Birrega-Oaklands Flood Study 2015 is considered to be more appropriate for development of this greenfield site. • The existing culverts under Kargotich Road should be retained and not upgraded to control discharge to pre-development levels out of the proposed North-South MUC into the Oaklands MD. 	<p>based on DWER modelling. Text has been added to clarify this.</p> <p>Text added to explain culverts not to be modified in size under Kargotich. All detention management happens upstream of these culvert (eg the culverts are not being used as the primary control mechanism for flows under Kargotich.</p>
6	12	Groundwater Management	The setting of Control Groundwater Levels for this site need to be discussed and agreed with DWER.	Groundwater levels have been discussed and agreed with City and DWER. This includes using swales to control levels to at or near the AAMGL. Text slightly modified to reflect this.