2402 SUTTON ROAD, SUTTON – GROUNDWATER IMPACT ASSESSMENT

Version 1
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Servicing the agriculture, conservation and development sectors with soil and water management advice, land capability and soil assessment, erosion control and soil conservation planning, catchment and property planning, and natural resource management policy advice.

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John Franklin has over 30 years' experience in natural resource management in the ACT and Upper Murrumbidgee region. This experience includes providing extensive soil and water management advice to State and Local Government and the urban / rural residential development sector across the region. John has detailed knowledge of water resource policy and developed the NSW Farm Dams Policy in 1999 for the Department of Land and Water Conservation and provided strategic support and direction to the NSW water reform process.

Franklin Consulting Australia Pty Ltd holds current Workers Compensation Insurance, Professional Indemnity cover of $10,000,000 and Public Liability cover of $10,000,000.

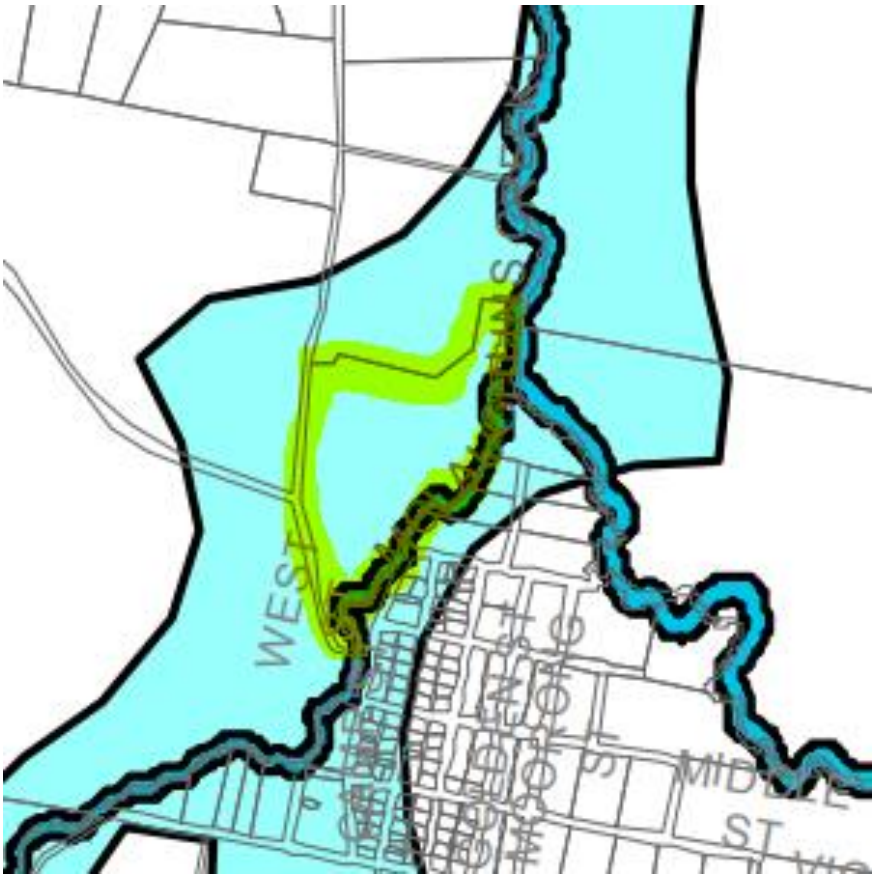
PROJECT DESCRIPTION AND SCOPE

Description	Soil and Water was engaged by Elton Consulting, on behalf of the Grubb family, to undertake an assessment of the impacts of a proposed rural residential development on groundwater. The proposed subdivision is located at 2402 Sutton Road just north of Sutton village on Lot 1 DP 119459. The proposal is to create a range of lot sizes from 5000m^2 to 2.5, see below lot layout.  The capability of the site to support the proposed subdivision including the suitability of the site for the on-site disposal of effluent, has been assessed in *Land capability and related issues for rural residential subdivision – Part lot 128, DP 754882, Parish of Goorooyarroo, Sutton* [Soil and Land Conservation Consulting,

	August, 2003 – Updated January 2019]. This report provides some consideration the impact of on-site effluent disposal on groundwater and recommends some specific mitigation measures (see Appendix 2 in the Land Capability report). Given the location of the proposed subdivision within an area of mapped groundwater vulnerability (Yass Valley Local Environment Plan [2013]), Yass Valley Council and the Department of Planning Industry and Environment (DPIE) have requested additional information regarding potential impacts to the groundwater system. This report provides additional information in response to the requests of Council and DPIE.
Scope	The assessment of development related impacts on the local groundwater system is based on addressing the considerations included in Section 6.4 Groundwater Vulnerability within the Yass Valley Local Environment Plan 2013. The report includes recommendations for specific measures to mitigate potential impacts. This report should be considered as an addendum to the existing Land Capability Assessment (Soil and Land Conservation Consulting, August 2003, revised January 2019).

SITE & DEVELOPMENT INFORMATION

Local Government Area	Yass Valley Council.
Address	Lot 1 DP 119459, 2402 Sutton Road, Sutton, NSW
Site Location (six.nsw.gov.au)	
Developer(s)	Grubb Family C/-Will Pearson Elton Consulting PO Box 41 Dickson ACT 2602
Effluent Management	Effluent for the new building envelopes created by subdivision will be managed on-site via a combination of Advanced Aerated Wastewater Treatment Systems (AWTS + Nutrient Reduction [NR]), combined with effluent dispersal of surface spray or drip, or subsurface irrigation.

	The AWTS + NR combined with subsurface drip irrigation dispersal system, will be used on the 5,000m^2 lots. The larger 2.5 ha lots will use AWTS + NR combined with surface spray or drip, or subsurface drip irrigation dispersal systems. **NB: The Land Capability study also refers to the potential for a centralised packaged effluent treatment system combined with effluent disposal on an area of community land** The specific design and location for effluent management system components will be detailed in site specific On-Site Sewage Management Reports to be prepared for each newly created lot at the time of Development Application for dwelling construction. These reports will be informed by the constraint's analysis and specific recommendations of the Land Capability study, (Soil and Land Conservation Consulting, August 2003, revised January 2019).
Site Constraints	The proposed subdivision is located in an area mapped as having groundwater vulnerability and includes the mapped riparian area along Mc Laughlins Creek and Yass River, refer below.  As a result, the Part 6 Additional local provisions of the Yass Valley Local Environment Plan 2013 relating to Groundwater vulnerability (6.4) are required to be addressed when considering development.

GROUNDWATER IMPACTS

Soil and Water undertook an assessment of the potential impacts to groundwater associated with the proposed development. The assessment focused on the specific considerations in *Additional Local Provisions* in *Part 6 of the Yass Valley Local Environment Plan 2013,* specifically *Part 6.4 Groundwater vulnerability* which include:

1. *Groundwater impacts including:*
    - i. *the likelihood of groundwater contamination from the development*
    - ii. *any adverse impacts the development may have on groundwater dependent ecosystems*
    - iii. *the cumulative impact the development may have on groundwater (including impacts on nearby groundwater extraction for a potable water supply or stock water supply)*
    - iv. *any appropriate measures proposed to avoid, minimise or mitigate of the development.*

The potential impact of the development on groundwater has been assessed in relation to the specific heads of consideration as contained in the Yass Valley Local Environment Plan 2013.

i. the likelihood of groundwater contamination from the development

There is low potential for the contamination of groundwater due to the following mitigating factors:

- intensity of development is low with the creation of a maximum of 28 dwelling lots (including one existing dwelling) over a land parcel of 30.12 hectares (average lot size of 1.075 hectares)
- effluent management systems on new lots will be advanced secondary treatment systems with nutrient reduction (AWTS + NR) which will reduce the level of contaminants (including nitrogen and phosphorous) and therefore potential contamination risk
- treated effluent generated by AWTS + NR systems will be dispersed through subsurface drip irrigation on at least 22 of the new lots, which will minimise the potential for downslope movement of treated effluent offsite. This will minimise the groundwater contamination risk which is highest where treated effluent is mobilised and moves downslope to meet the casing of existing bores and travels down the outside of the casing to water bearing zones
- low rate of effluent application and application to the surface or shallow subsurface, will maximise plant effluent use through evapotranspiration and reduce the risk of vertical and lateral flows of treated effluent
- depth of low permeability light to medium clay subsoils between 0.91- 4.57 m (from GW 047044 bore log) providing a restriction to vertical flows and reduced connectivity between surface and water bearing zones in the groundwater system which range from the shallowest between 6.4-9.4 metres, and the deepest between 76-80 metres
- the two higher yielding irrigation bores on the property (GW047045 & GW047044) should be decommissioned as part of development of the site for rural residential landuse, refer below

- the closest bore downslope of the proposed development (GW047081) is located on the opposite (eastern) side of McLaughlins Creek, which is a barrier between effluent application areas and this existing bore, refer below
- the maximum buffer distance of 50 metres between effluent dispersal and bores (as recommended in the Australian Standard AS 1547:2012), will be maintained on all proposed lots[1].

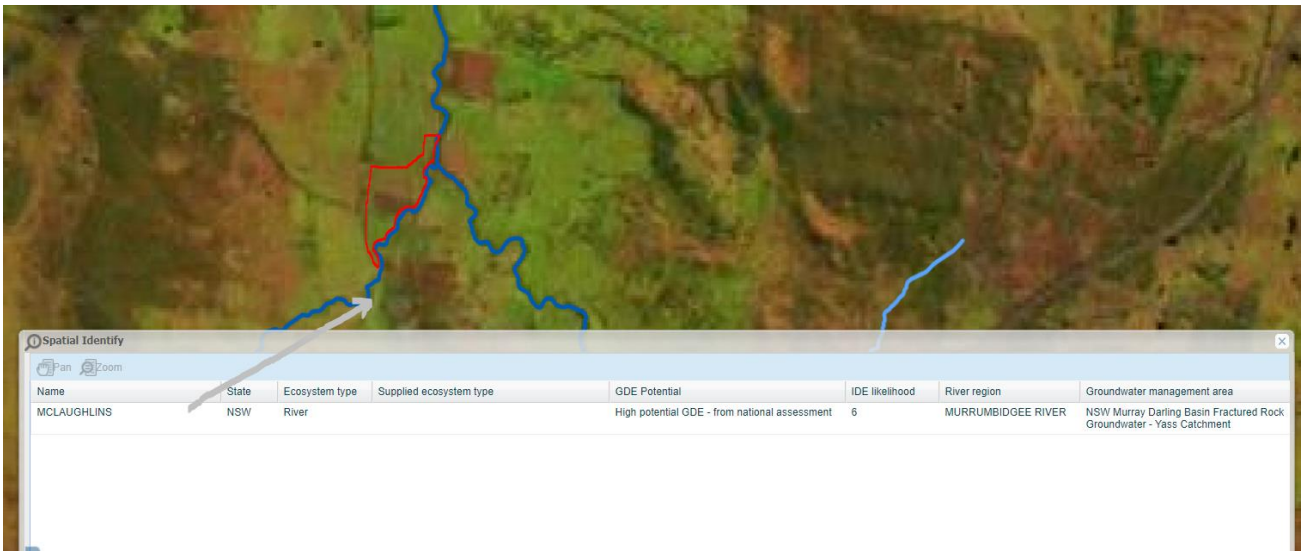
ii. any adverse impacts the development may have on groundwater dependent ecosystems

There is limited potential for the development to adversely impact groundwater dependent ecosystems due to the following mitigating factors:

- there are no groundwater dependent ecosystems known in the vicinity or within the region with potential to be impacted by the development
- there will be minimal risk to groundwater dependent species and ecosystems as the potential impact to the groundwater system through contamination or increased extraction, will be negligible (as detailed in previous and following sections)
- the McLaughlins Creek is mapped as high potential for Groundwater Dependent Ecosystems in Bureau of Meteorology mapping (see below). The potential for the development to adversely

[1] The adoption of a 50 metre buffer between bores and effluent disposal areas is considered suitable on this site due to the use of AWTS + NR secondary treatment systems combined with subsurface drip irrigation or surface spray irrigation on larger lots (>2.5ha); low slope environment; depth of low permeability clay subsoil; depth to water bearing zones.

impact this system is minimal (as detailed in previous and following sections) and is further mitigated by the lot layout which situates the larger lots (>2.5 hectares) along the riparian zone of McLaughlins Creek and provides a 100 metre buffer between effluent disposal areas and the riparian zone.



iii. the cumulative impact the development may have on groundwater (including impacts on nearby groundwater extraction for a potable water supply or stock water supply)

There is limited potential for the development to adversely impact nearby groundwater extraction practices due to the following mitigating factors:

- the development is located downslope of Sutton village which has the highest concentration of groundwater extraction for Domestic and Stock purposes and therefore has limited potential to impact these users
- there is currently one Domestic and Stock bore located on the property (GW404339) and two Irrigation bores (GW047044 & GW047045). The irrigation bores should be decommissioned as part of the change in landuse from rural to rural – residential. This will reduce the potential quantities of groundwater being extracted in the area and therefore lessen the potential impact on the groundwater resource and other users
- newly created lots will be entitled to access groundwater under the Basic Landholder Rights (BLR) provisions in the water legislation. A works approval would still be required prior to bore construction. It is considered that there is low potential for a significant increase in the number of bores associated with the development due to the associated capital and operating costs, and the limited capacity for lots to achieve the necessary buffer distances from effluent disposal practices. The limited number of larger lots (>2.5ha) who may meet the buffer distance requirements and could possibly install a bore, would be limited to the extraction of groundwater for Domestic and Stock watering purposes only, therefore associated extraction volumes would be minimal and unlikely to exceed the volumes relinquished through the decommissioning of the two irrigation bores.

- any bores for irrigation purposes would require approval and licensing, at which stage the sustainability, including the potential cumulative impact on the aquifer and surrounding bores, will be assessed by NSW Water
- the development will include provisions to reduce the need for newly created lots to install a separate bore, including minimum roof catchment areas and tank storage provisions

iv. any appropriate measures proposed to avoid, minimise or mitigate of the development.

There are several specific measures recommended to avoid, minimise or mitigate the potential for the development to impact groundwater. Where appropriate these should be included as conditions of development consent, see below:

- all lots in the X1 zoned area are to install advanced secondary treatment systems (AWTS + NR) linked to subsurface drip irrigation - *to minimise the risk to the groundwater system and surrounding bores*
- all lots in the Z2 zoned area are to install advanced secondary treatment systems (AWTS + NR) linked to either surface spray and/or drip or subsurface drip irrigation - *to minimise the risk to the groundwater system and surrounding bores*
- the two Irrigation bores (GW047044 & GW047045) should be permanently decommissioned – *to minimise the potential for groundwater contamination through treated effluent impacting bore casing and moving vertically to water bearing zones, and potential impacts on groundwater quantity associated with the potential installation of additional BLR stock and domestic bores*

  NB: there may be alternatives to permanent decommissioning of both these irrigation bores provided the groundwater resource management outcome of a net reduction in the quantity of groundwater being extracted can be realised and potential contamination of the groundwater aquifer from vertical leakage down bore casing can be prevented

- a minimum 50 m buffer must be maintained between effluent dispersal areas and any existing or proposed bores – *to minimise the contamination risk to the groundwater system and surrounding bores*
- a minimum 100 m buffer must be maintained between effluent dispersal areas and the riparian zone along McLaughlins Creek and Yass River – *to minimise potential impacts to groundwater dependent ecosystems associated with the creek*
- construction on newly created dwelling lots will include minimum roof catchment areas and minimum tank storage requirements - *to minimise the need for new lots to install separate BLR Domestic and Stock bores for non-potable water supply*

CONCLUSION

The assessment has determined there is a low potential for the development to impact on groundwater provided the recommended mitigating measures are implemented. It is recommended that the mitigating measures be included as conditions of consent and/or attached as covenants on title so that they can be readily identified and incorporated into the On-Site Sewage Management Reports developed for each lot at the time of dwelling construction.