LAND

The Land section describes the characteristics of the proposed development site land, their limitations for the proposal and likely impacts.

LAND

Under Land the SEARs, instructs the EIS must address the following specific matters:

- a full description of the development, including

    - a high quality detailed constraints map identifying the key environmental and other land use constraints that have informed the final design of the development.

    - a detailed justification of the suitability of the site and that the site can accommodate the proposed development having regard to its potential environmental impacts, permissibility, strategic context and existing site constraints, including
    - a soils survey

- using land for its capability and best sustainable land use.

General Conclusion

The EIS provides:

- **limited and inadequate description and detail of the lands' physical characteristics, and inherent constraints for the proposed development**
- **important aspects are not addressed. Numerous problematic constraints for the proposed development and extreme land use change are identified,**
- **no justification the site is suitable to accommodate the proposed development**
- **does not include as soil survey as directed by SEARs.**

The data provided:

- **is not at the scale or detail appropriate for level of development and impact, and**
- **does not identify likely impacts on the environment, landscape or neighbouring land uses adequately.**

Particular constraints are identified and detailed at the end of each land characteristic section.

Detailed land characteristics and environmental constraints of the proposed development site

As an owner/manager of the property for 20 years (2002-2022) I have a good local knowledge of the land and some of the constraints the proposed development needs overcome, and possible down slope offsite effects.

1. Location context

Lake Hume Village (LHV) is located in NSW and the Murray River just upstream from the "twin cities" Albury and Wodonga. It abuts the Hume Dam wall and the Lake Hume Reservoir (see Figure : Lake Hume Village location in context, overleaf)

It is located at the junction of Trout Fam Road and the Riverina Highway. As noted by Council , the "Trout Farm Road is a main thoroughfare to get to Wodonga" from Albury (Table 5-4. Stakeholder and agency feedback, main report). It critical for Victorian residents on the Bethanga Peninsula (Bethanga Bridge) to access Wodonga and locations south of the

Figure : Lake Hume Village location in context

Lake Hume Victorian Arm (the expanding areas of Bonegilla, Kiewa Valley towns and Tallangatta, and vice versa.

It is largely a tourist service centre with "The Resort" complex with a restaurant, The Lake Hume Caravan Park with extensive cabins, two (2) streets of houses (largely short term rentals, and a Café. There is a large boat ramp and the Lake Hume Beach Park with barbeque/toilets.

The "walk across the Dam Wall experience" and "picnic with a Lake view are drawcard visits. The Lake Hume Beach and boat ramp heavily used, and the Lake foreshores areas popular and boating, fishing swimmer, relaxing.

Location Constraints

The proposed Development Site is within 400m of the Resort, two (2) streets of housing, Café and Tourist Centre. It is 500m to the Boat Ramp, Lake Hume Beach Park, DPI Water staff housing and office/buildings, and the Dam Wall picnic area.

2. Easements on the title

The land subject to the development proposal has various easements relating to it. The development proponent has listed the:

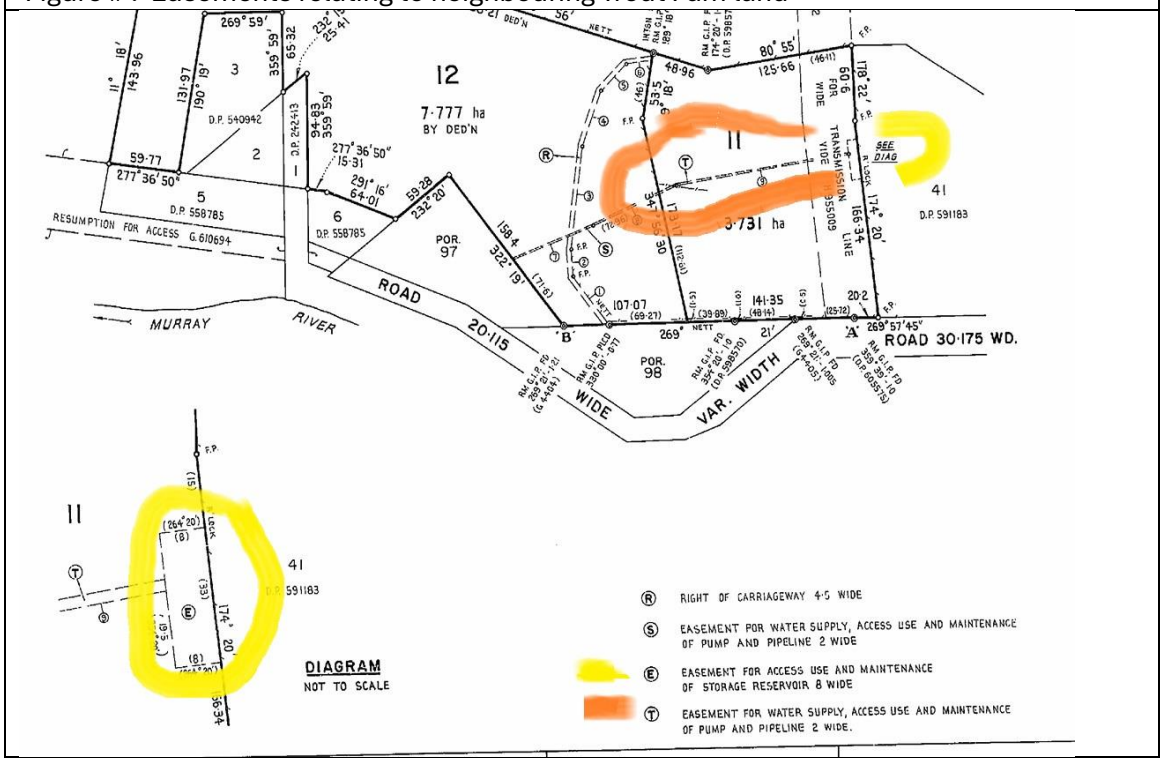
- access approved owners to pass through the Crown Land Lot 98
- the electricity line easement
- carriage Way access rights through the adjacent property – Trout Farm land
- water supply access rights to adjacent land- Trout Fam land.

Not listed in the EIS **are the associated reciprocal entitlements the Trout Farm land has over water supply access easements located on the proposed development site land** (Figure : Easements relating to neighbouring Trout Fam land). The areas marked orange and yellow identity the location of the easements relating to the neighbouring Trout Fam land.

Easement constraints

An adjacent neighbour has the right to the easement, and it must retain access. BESS structures can not be located over it. The water related easements are not mentioned in Section 1.6 Restrictions or covenants, p 5) but critically relevant as it may be "subject of a separate approvals process" (SEARs general Requirements. P 1)".

Figure # : Easements relating to neighbouring Trout Fam land



3, Landform

The site of the proposal development is situation on a gentle ridge immediately west of the Lake Hume Reservoir and north adjacent the Murray River. It is a mix of:

- A gently sloping crest along a flat portion at the top of the ridge
- a ring of steep "drop off" to the south west of the ridge

- concave run on areas below.

The EIS describes the land as:

- "moderately sloping" in the archaeological report, and
- relatively gradual sloping east to west and ranges from about 5% to 20%

A flat site is preferred for large infrastructure buildings due to:

- additional costs (extensive cut, moving and stabilising fill, and retainer walls/ terracing) potential future problems such as settlement, sub terrain drainage problems in the fill, and less concerns about offsite run off.

The site is elevated 60 m above, and 400m to the north east the Murray River.

Land slope on the western side bordering the neighbour's property is some of the steepest on the site. This occurs as a band generally bellow the band of shallow soil (see Figure : Lanark - Shallow Soils and "Rock", p 8 this document)

Landform across the proposed Development site is a mix of terrain units and variable slope. The Scoping study described the land as "moderately sloping"

The EIS says the

"topography within the Project area is undulating, with an elevation between 210 m to 190 m" ie 20 m elevation change. "Slope ranging from about 5% to 20%" (Main report, p 81).

That is described as" moderately inclined", (but towards the nearly steep threshold" according to the AS & LS Handbook (1990).

Landform constraints

It is this sloping land that has caused the design to be adapted to include terracing across the site. At the site entrance it is very high at 6m, at the north less, but there are two (2) retaining walls and benches. The necessity of this engineering is expensive and adds additional drainage and stability risk in the future.

Constructing a high secure retention basin wall s on these slopes will be difficult as the back wall base will be increased significantly by the downhill slope. There is limited space to the neighbour's land.

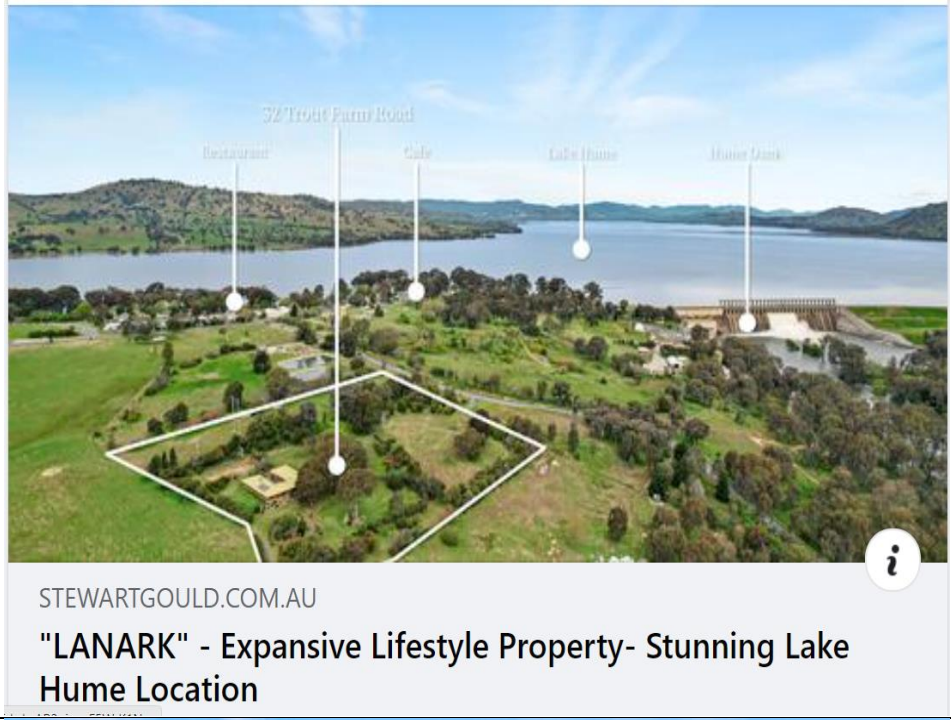
4. Aspect

The land has a general southerly to westerly downhill aspect towards the nearby Murray River and floodplain (see photos below).

The site has extensive 270 degree views of:

- the Hume Dam Wall and Lake Hume and surrounding hills to the south
- the forested Murray River floodplain (foreground) and ranges behind Wodonga (horizon) to the southwest

- the cleared grazing land Murray River floodplain (foreground) the ranges ringing Albury (horizon) to the west and north west (see photo below).
- the cleared undulating to hilly grazing land to the north and north east (see Fig : Aspects lokking to south and southwest, below).

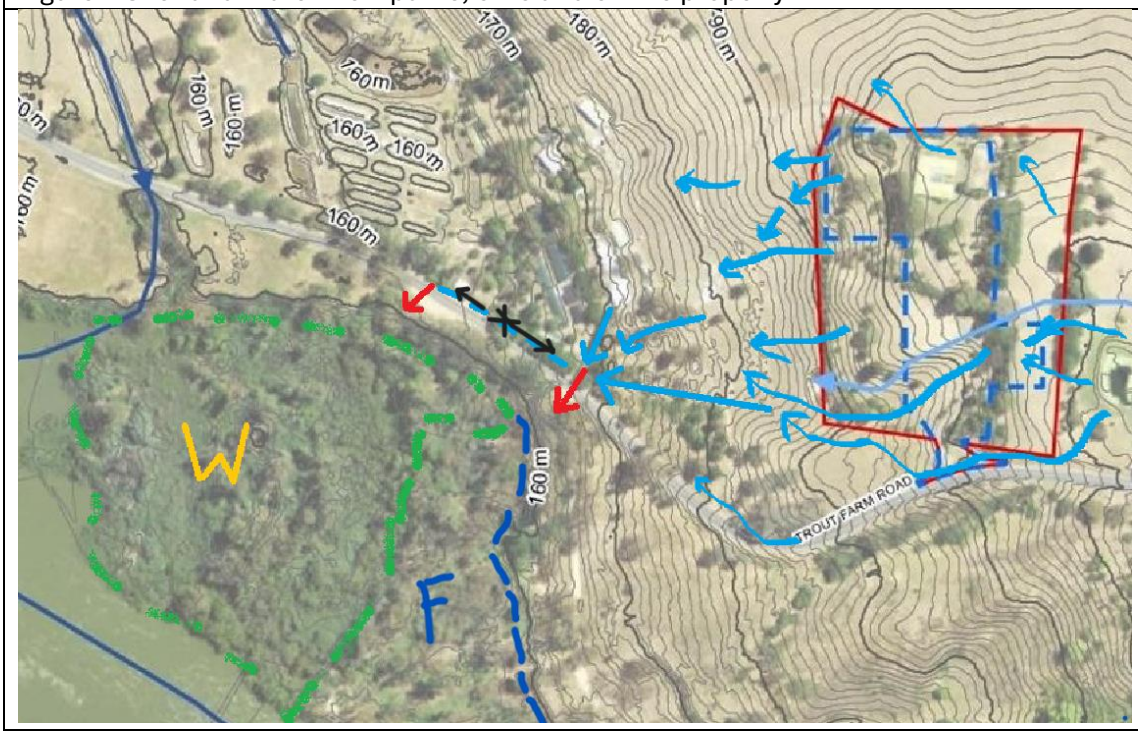
	Looking south to Lake Hume Reservoir and the Victorian Alps (Snowfields)
	Looking southwest to Lake Hume Reservoir and the Murray River and its forested floodplain (Victoria)
Fig : Aspects lokking to south and southwest	

5 Run off flow

The EIS provides a map of “Waterways and overland flow paths” for the property. That map interpretation shows a single flowline and obviously a desktop interpretation as the in the entre flowline of the property is positions approximately north on the map half way up a steep drop off (see Fig 7-17, p 142).

It is far short of the detail assessment required for site runoff, and run-on, for proposed project where almost all of the site is either concreted or hard paved. A more appropriate detailed map is provided in Figure : Overland Water Flow paths, onto and off the property, below.

Figure : Overland Water Flow paths, onto and off the property



Runoff is received from the Water Treatment works above (Figure : Overland Water Flow paths, onto and off the property, above). This is significant during large storms (see Flooding, p 8 below).

Almost all runoff from the property flows to the Trout Farm land adjacent to the west. If substantial, that runoff flows to a culvert under the Trout Farm Road (red arrow) to the Murray River ox-bow wetland (marked “W”).

If the culvert reaches its limit, the water flows along the roadside to the next culvert. This has occurred a couple of times in the 2020’s and cut out a ditch along the pavement edge (marked black * on Figure : Overland Water Flow paths, onto and off the property above).

The area adjacent the Murray River marked “blue F” is Floodplain. It inundates at declared “moderated flood” levels. It was inundated for several weeks during the controlled flood induced as a response to Hume Dame wall crack/movements (2012).

Runoff Constraints

- Flow path determination is too course and does not adequately consider:
  - run-on from land above, or
  - the end point of runoff onto the Trout Farm land; and the wetland/Murray River known to have occurred.
  - site runoff, for proposed project where almost the whole site is either concreted or hard paved

6 Soil, soil depth and rock/stone

Both SEARs guidelines and the Agency Input from DPI Agriculture (Appendix), request a "*soil survey to consider the soil characteristics*".

The EIS does not provide a soil survey**. Information provided is not of suitable detail to identify the existing environment and likely soil related constraints.**

Soil information presented in the EIS is from:

1. State Landscape Soil Landscape mapping (DPIE Website), and
2. preliminary geotechnical investigations (Appendix H), and

State Landscape Soil Landscape mapping in broadscale landscape/soils mapping presented at a scale of 1:250,000 (**1 cm on the map is 2.5 km on the ground**).

Soil, soil depth and rock/stone Constraints

The data source used **is totally inappropriate for a development proposing this level of landscape change,**

No soil survey or soil survey as listed by SEARS requirements and Agency DPI Agriculture Agency Input

Unacceptable and inadequate data is likely to lead to unexpected environmental impacts and off site ramifications.

More appropriate mapping is available in the "Land resources of the Albury Wodonga Growth Centre, AWDC,1977) at a much more appropriate scale of 1:25,000.

7 Preliminary geotechnical investigations

The preliminary geotechnical investigations provide only results of the preliminary drilling to determine depth to hard rock and engineering properties. Samples are taken and tested.

> "*The purpose of the preliminary investigations was to determine the nature of the surface soils and groundwater conditions'* (no page numbering, Section 1, Introduction, last paragraph).

Geo technical boreholes were drilled to 4 m or drill refusal.

"*Extremely weathered, extremely low strength, granite bedrock* encountered" (EWGB) was noted. Drill refusals (shallow soil material) and "*extremely weathered granite bedrock* encountered at:

- BH8 -refusal at 4 m, and EWGB at 1.4 m.
- BH9 – refusal at 1.5m, an EWGB at 0.5 m (rock hammer required).

A map with the borehole location and numbering is presented in the Addendum in the report are identified in Figure # below.

Changes in auger samples were described and laboratory engineering tests undertaken on material. Results of these fining are discussed in relation to proposed construction. Thers are many cautions stated through the report mostly relating to troublesome soil characteristics. For example, "*silt-based material encountered across the subject site"* and *"underlying silty sand and sandy silt material may become "unsuitable" and difficult."* (Section 6.1,p 8).

8 Shallow soil and rock/stone

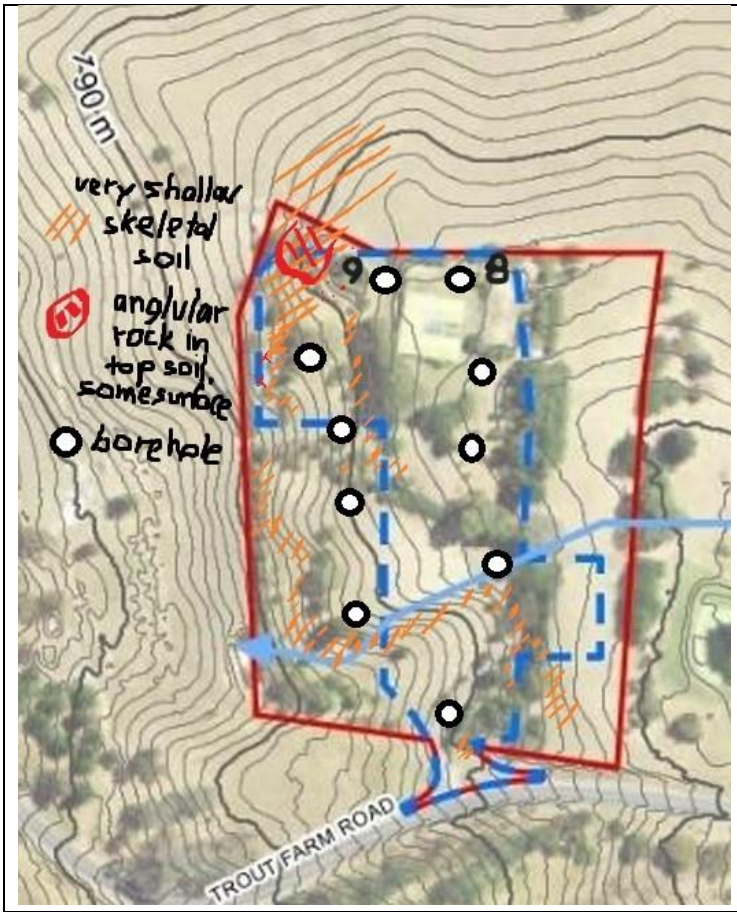
As an owner/manager of the property for 20 years I have a good local knowledge of the land.

I have hit rock with the lawnmower several times behind the wildlife pond.

A map showing the location of shallow soil and with "rock/stone" (large angular pebbles/gobbles, 20 - 200 mm, (ASLS, 1990), close to the surface, some on the surface were produced (see Figure : Lanark - Shallow Soils and "Rock" below).

Sites of the Geo Technical investigations bore holes have been approximately also located on the map to reveal any correlation.

Figure : Lanark - Shallow Soils and "Rock"



The EIS states "no rock is present" :

- "there are no rocks present" (Appendix E, Section 7.2.1, no page numbers) and
- "No rocky habitat on site" (Appendix E Table 2-4 (no page numbers) **relating to "Habitat Suitability: Pink-tailed Legless Lizard: Rocky areas or 50 m of rocky area" listing the candidate species being Pink-tailed Legless Lizard, a threatened species".**

There are rock/stone areas on the property as identified with a red circle in Fig : Shallow soils and rock, above

Furthermore, immediately north on the adjacent property there are more, and larger sized rocks. These are near an old tree stump, **less than 50m from the property**.

The EIS refers to the wildlife pond as artificial. However it ignores mentioning the **large broken pieces of concrete path** assembled around the sides of the wildlife pond's steeper edges; and the "brought in" hill rocks forming path edging adjacent the pond; and flat stone paving stone (earth grout) north of the pond.

Approximately 10 m from the wildlife pond there is also a substantial large high retaining walls on the west side of the house. Stone edging also exists on both the west and south sides of the house.

How well did they look?

Shallow soil and rock/stone Constraints

- angular material of the size described above may have been **a source of material for Aboriginal tool making**
- areas of stony/rocky material (natural to the site or imported) are important identifiers of **habitat and potential habitat for lots od small fauna**. Of particular note, the candidate species being **Pink-tailed Legless Lizard, a threatened species**" (Appendix E Table 2-4 (no page numbers**) fits the description of " a small snake like creature" previous owners have observed several times.**
- the **fauna survey and reporting for the Proposed Project are incomplete and inadequate**.

  It needs to be to an appropriate similar standard as the Vegetation IV plots surveys; therefore the fauna survey needs to be REDONE. This requires returning to the field at the appropriate time of for animal activity, particularly the **Pink-tailed Legless Lizard.**

9. Wetness (Soaks)

A soak is identified on Crown Land Lot 98 in the ACHAR assessment. It was confirmed as a SAL and mapped as an Exclusion Area (SAL) (Appendix, Figure 9-1, p 43).

The risk of waterlogging is alluded to in Section 7.4.4.5 Salinity saying

"*The eSPADE online mapping system (DPIE, 2023)* ***indicates the Project area is*** *situated within the Thurgoona Hydrogeological Landscape (HGL). Salinity conditions for this HGL are summarised as follows: ▪ Land salinity occurrence:* ***'Moderate – some observed salinity sites at break of slope. Mainly waterlogging'***

Apart from that, this land characteristic is addressed only in the Preliminary Geotechnical Investigations report. Relevant points being:

- "*The purpose of the preliminary (geotechnical) investigations was to determine the nature of the surface soils and groundwater conditions'* (Section 1, Introduction, last
- paragraph, no page numbering).
- "*Based on the preliminary geotechnical results****, two borehole logs contained seepage observations between 2 m and 4 m in depth***" (Main report, p 143). However, the sites numbers were not nominated.
- *"It should however be noted that variations to the* ***water table level could fluctuate with changes to the season, temperature and rainfall"*** (Appendix H, p4).

Information presented for wetness/soaks is very limited. It is raised in Appendix H, Preliminary geotechnical investigation raising as issue of sub surface water moving through fill material and that it may warrant drainage.

Using local land knowledge of 20 years on the property the following information a map is presented.

Soaks occur at several locations on Lanark most years and addition areas appear in particularly wet years. These have been identified on Figure # below. The annually wet areas had wet indicator plant species such as rushes, paspalum grass and are untrafficable by foot or 4WD

turf tyred mower in wet years. Rushes and paspalum grass were target introduced plants removed as part of the Lanark Vegetation Management Plan, so gone.

The location of the soaks appears to relate to:

- a change of slope below the steeper shallow soil areas (see Figure : Lanark soaks and wetness ,overleaf), Subsurface seepage is visible in the uphill side of the entrance road cutting after soaking rains and the soak adjacent the Trout Farm Road is to be avoided with vehicles as a fencing contractor learnt the hard way after driving there.
- shallow rock band

The portion of Lanark immediately below the sewerage treatment ponds is quite wet and boggy for a portion of most winters. The extent reflected by an area of Kikuyu Grass (marked “K” on Figure # Soaks and wetness) and stays green well into Summer; and required gumboots to be worn in winter.

A likely explanation is regular seepage during winter or minor off site flows from the Treatment Works site (pond).

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Figure #: Lanark soaks and wetness

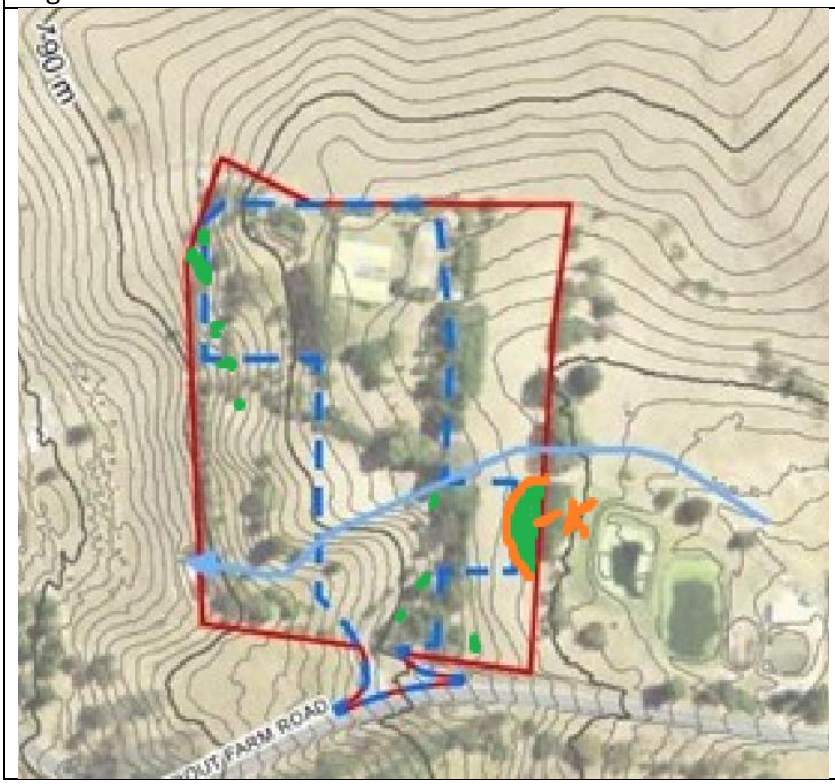
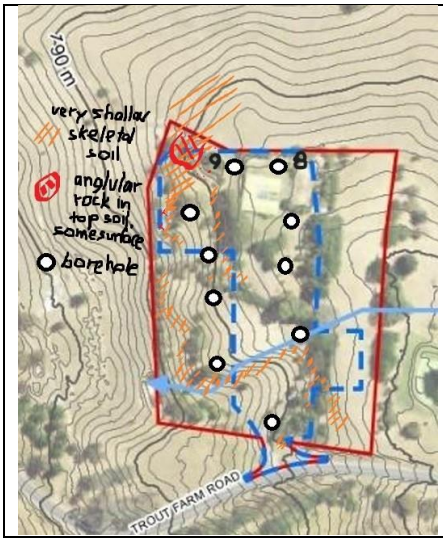
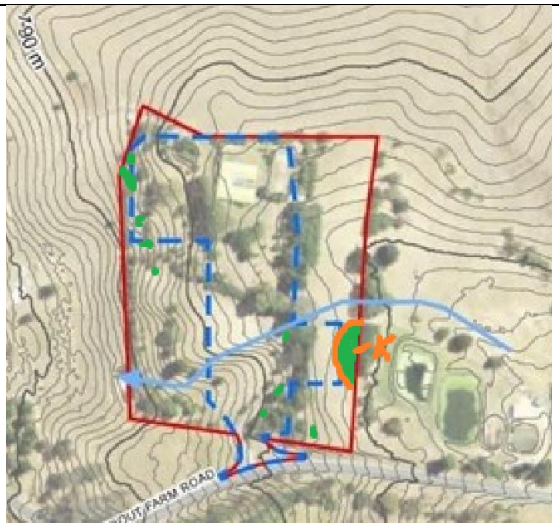


Figure #a: Steeper shallow soil areas	Figure #b: Soaks and wetness





Wetness Constraints

- **ACHAR consultants need to be advised of the presence of these soaks and assessed SAL status if they are significant as the soak identified on Crown Land Lot 98.**
- **Proponent of the development needs to be aware of this land characteristic risk and the effect in will have on the cut/fill presently designed**

10 Flooding

Although located on a ridge crest and its side slopes, parts of Lanark have been flooded.

This occurred twice in the time we were at the property. The second occurrence was documented and brought to the attention of Albury City Council. An Engineer visited the scene, and I explained the problem and consequences it had caused on Lanark.

Following heavy rain, the bottom pond of the adjacent Wastewater Treatment pond overflowed and maybe overtopped (see Photo x.1 below).

Photo x .1: Sewerage Treatment Pond overflowed

Water spilled into Lanark spreading across the “Lemon Tree Paddock” then down through the “Driveway Tree lot” and stock yards toward the property entrance road. Some water crossed the bitumen access road but most flowed down the road towards the front gate.

The water flow was substantial and removed all the gravel from the bitumen surface pushing it into the fence to the west of the road in several points (photos x.2 – x.5 below).

Photo x .2: Stockyard gates

Photo x .3: Road bitumen wash 1

	
Photo x .4: Road bitumen wash 2	Photo x .5: Road bitumen wash 3

Water and its remaining gravel load were channeled across the next paddock (Snow View" Paddock) to the next fence, approximately a further 50 m. At that point a small bank in front of the fence slowed the water and caused more gravel to be dumped.

Water flowed through the entire property then likely to have gone onto the Trout Farm land below.

Photos were taken well after the rainfall event, when the pond overflow had reduced to a trickle and water coming down the road was water coming out of the fringes of the flood affected that had spread across the heavily grassed paddock (see video).

Photo information shows the date of the images to be January 15th, 2022.

It has happened twice that I am aware of, so it is very likely to occur again, maybe more extensive next time.

Constraints

A. **water from the land above has flooded the proposed development site land** has occurred more than once. It has:
B. come onsite from the Council Water Treatment Works land upslope.
C. was substantial enough for:
   - water to **travel through the property and down into neighboring Trout Farm**
   - **Carry gravel** approx. 50m across a paddock with very good groundcover.
D. **It is likely to happen again** and could be a major concern for:
   - for the proposed infrastructure, and
   - the ability of the small detention to contain it. The ramification being **BESS runoff onto Trout Farm land. Bad.**