

Manor Farm Options summary

Prepared for Stuart Mee

Current system

Stuart Mee currently holds an abstraction licence to take 150,000m³ of water during the winter. His abstraction point is supplied by a 1km² catchment that drains by gravity into his reservoir. The entirety of the supply catchment is to the east of the M25, whereas his reservoir is to the west (see Figure 1). At the moment the water runs through a culvert under the M25. Mr Mee then pumps water out of the reservoir in the summer to irrigate his fields, which are located on both sides of the M25.

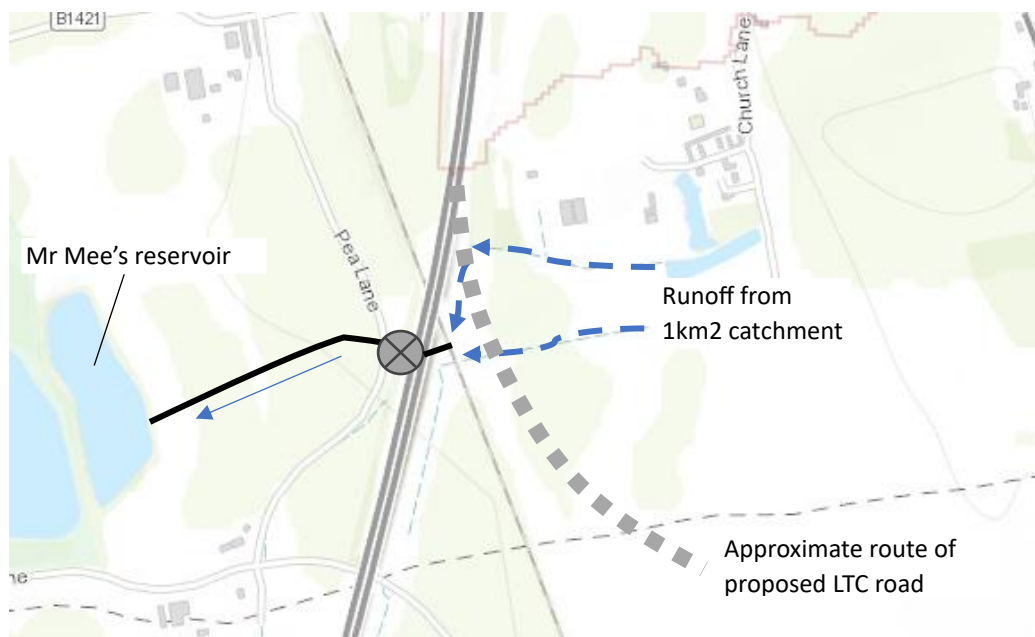


Figure 1: Map of the current abstraction system with proposed LTC road shown as dashed grey line.

The impact of the proposal

As you can see from Figure 1, the proposed new road cuts directly through the current system and has the potential to change the hydrology of the area just upstream of Mr Mee's abstraction point. The cutting for the proposed link road will re-route catchment flows and

cut off the source of supply. It will also sever the irrigation main which carries water back under the M25 to supply the main agricultural area of the farm.

We are also concerned that the cutting will act as a hydraulic sump, intercepting shallow groundwater and routing it away from the existing drain and into new drainage structures which will be constructed to protect the road.

Without appropriate mitigation we believe that the roadworks could cause a 100% loss to Mr Mee's irrigation supply. Furthermore, the irrigation main will be severed separating the current storage facility from the greater part of the farm.

LTC proposal

LTC have proposed to re-route the drain to the south, as shown by the blue dashed line in Figure 2 below. This involves constructing approximately 500m of new drainage ditch along both sides of the new cutting.

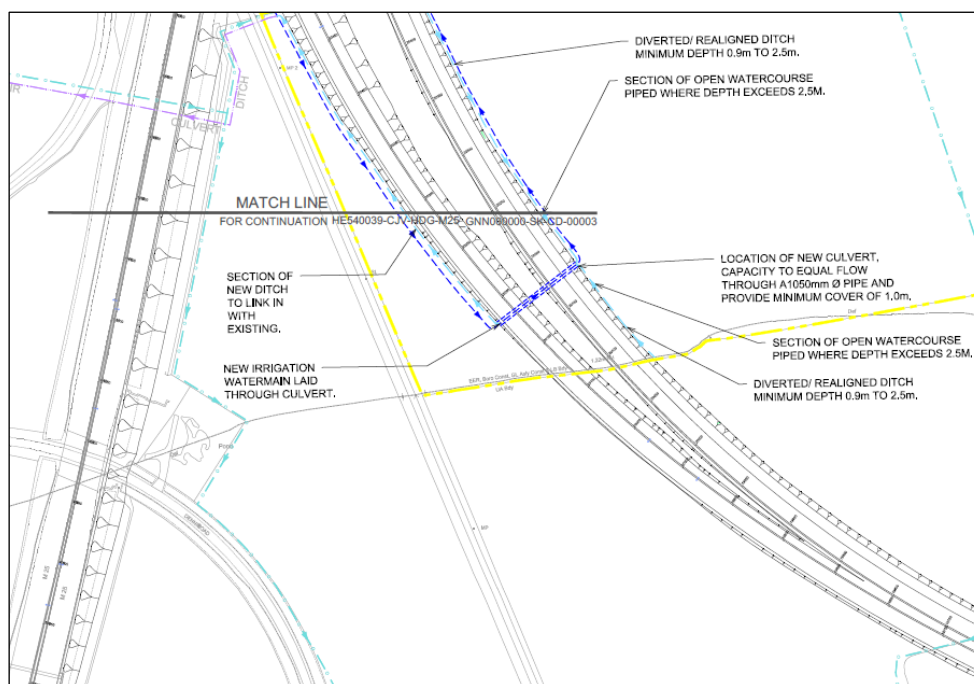


Figure 2: LTC plan showing proposed land drainage and irrigation solution

As part of developing their proposal LTC collected data on the flows into Mr Mee's reservoir and attempted to model the hydrology of the catchment. However, our confidence in the flow data is very low, due to complications with the monitoring equipment. LTC have acknowledged this. This also means that the modelling work, which was based on the same flow data is potentially inaccurate.

The problem with the proposed solution

We are concerned that by re-routing the drain there may be an insufficient hydraulic gradient to ensure that a flow of water can be maintained. We are also concerned that the steep hydraulic groundwater gradient, which would be induced by the new cutting, will increase the risk of the loss of water from the base of the drain and into any new drainage structures constructed as part of the roadworks. This is likely to occur even if the new cutting is partly tanked.

The footprint of the new link road represents a significant proportion of the catchment area supplying Mr Mee's abstraction. We are concerned that the new roads will intercept rainfall and reduce recharge and storage capacity within the catchment and re-route water away from current flow paths reducing the potential yield at Mr Mees abstraction point.

In addition, we have no confidence in the data collected by LTC to support their proposal.

Our proposed solution

We are proposing the following solution to provide Mr Mee with a like-for-like abstraction system that has the same volumes and reliability of supply as his current system (see Figure 3). It included two elements:

1. Re-instatement element

The option that will maintain the highest proportion of Mr Mee's current abstraction supply, is to pump the water from one side of the new road to the other. Water would be captured in an abstraction sump to the east of the road and then pumped under the road and into the existing pipework before entering the reservoir. The same pipe will also be used to re-instate the irrigation main which carries water back under the M25 to supply the fields on the east of the M25.

This element involves moving Mr Mee's abstraction point higher up the catchment, therefore, reducing the area of land supplying his abstraction. Hence, an additional element is needed to make up the difference and create a like-for-like solution.

2. Make-up element to ensure like-for-like solution is delivered.

The re-instatement element will not provide the same volumes of water as the current system. Therefore, we propose to make up the difference by increasing the abstraction rights on a licence at Kemps Farm or developing a new chalk borehole abstraction. Both these options are being discussed with the Environment Agency. Initial discussions suggest that one or both additional sources may be available.

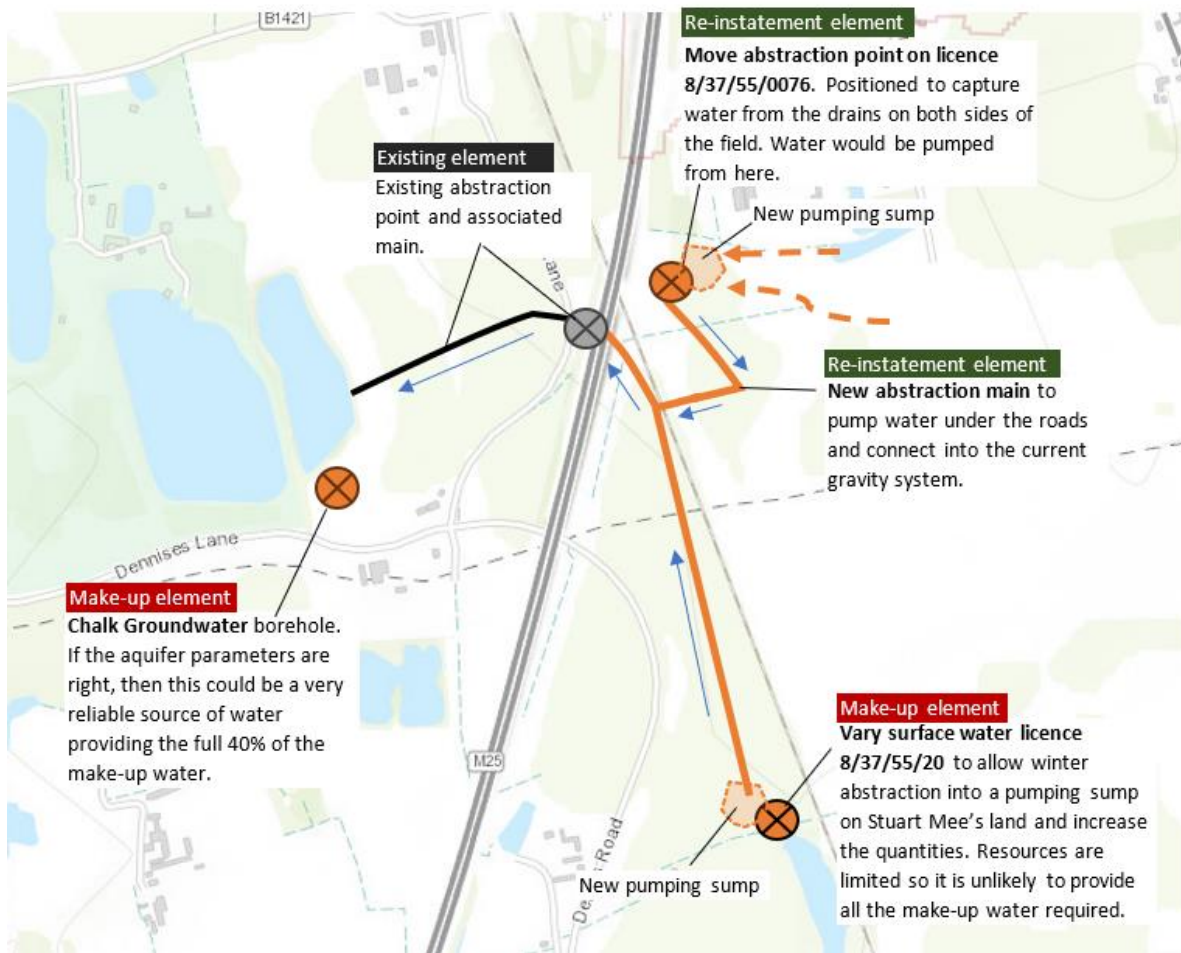
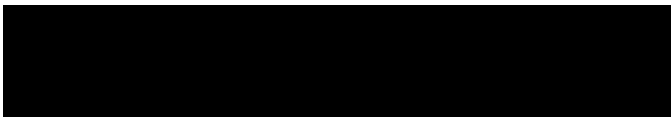


Figure 3: Proposed re-instatement and make-up options. New elements are in orange, existing elements are in grey/black.

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Sustainable Water Solutions