

Gedney Marsh greenhouse development - JEPCO, Norfolk House Farm.

Summary

The proposal is to ensure that all roof water from the greenhouse system is captured and held in a buffer reservoir, with capacity 38,000 m³. This is sufficient for a rainfall event in excess of 100 mm.

Drainage will be by a combination of PVC collection headers to the existing 2 dykes, and pumped from these to the buffer reservoir.

Basic site information

Area of greenhouses	37 ha
Average annual rainfall	650 mm
Existing water supply for farm irrigation	80% mains + 20% abstraction (approx)
Existing reservoir network	203,000 m ³

There is an Internal Drainage Board (IDB) dyke running along one side of the site. All works will retain a minimum distance of 12m from this.

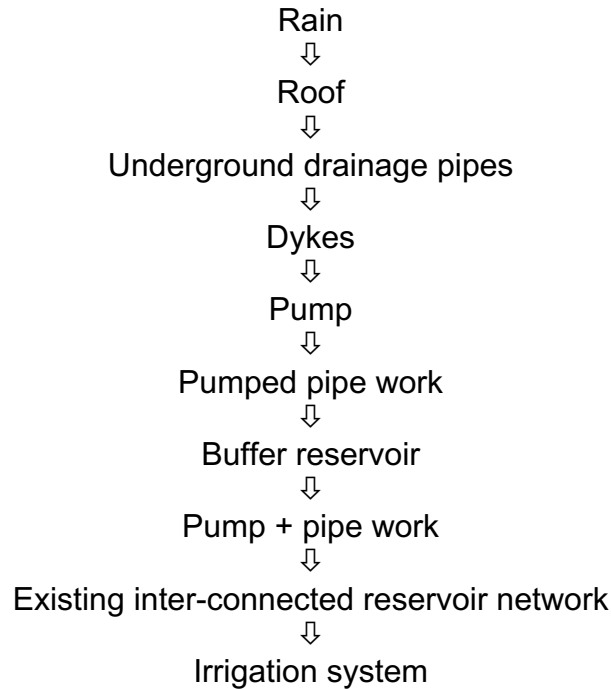
Proposal

The system is designed with rainfall buffering in a reservoir, the contents of which will be transferred to the existing network of 5 reservoirs and will displace bought in mains water.

Greenhouse gutters will deliver the roof water to below ground drainage system (Class 51 PVC) which will then take it the 2 existing farm dykes. These will have new pits excavated to act as sumps for the pumps, and the water will be pumped to the new buffer reservoir. This will have a capacity of 37,000 m³, sufficient for holding a rainfall event in excess of 100 mm. A small area of greenhouses will drain directly to the reservoir due to it's proximity.

The piped drainage system will be gasketed such that if levels in the dykes rise above the outlet invert level there will still be a nominal 5m hydraulic gradient to ensure flow is maintained.

A schematic of process flow of the system is shown below.



Underground drainage.

To comprise suitably laid network of headers and sub headers, ranging from 750 mm to 160 mm dia., class 51 PVC, laid on suitable bed.

Dykes

The existing dykes collect field drainage from the fields that will have the greenhouses, therefore this flow will cease due to interception by greenhouse rooves. The dykes currently drain into the IDB drain, and this will be amended such that they are isolated from the IDB drain. A sump pit will be excavated at the end of each dyke for installation of the pump system to the reservoir.

Pumps

There will be 2 pumps required to transfer to the buffer reservoir, but a further 2 will be available as back up. At this stage it is anticipated that the primary pumps will be electric and the back-up ones diesel, thus offering protection against individual pump failure and energy source failure. Pumps will be controlled automatically according to level.

Buffer reservoir

Buffer reservoir will be earth banked, lined, and with details as per attached drawings. Capacity (allowing for freeboard) = 38,000m³.

Existing reservoir network

There are 5 existing reservoirs, the majority with capacities of 45,000 m³ and 1 with capacity of 22,500m³. These are all linked via a pumped transfer network so that any reservoir can pump to any other. These are used to supply water for irrigation of field crops.

Water utilisation

The annual collected run-off is 240,500 m³ based on average annual rainfall, which is below that currently used for irrigation purposes. This does not allow for the irrigation demands of the new greenhouses. All collected rainwater will be utilised for irrigation purposes, thus reducing the amount of mains water used.