Rainwater harvesting

We would like to provide further information on how we will capture rainwater for use within the proposed development and secondly how this will replace the current mains water usage on the farm. Overall we can achieve the required savings and recycling using the existing infrastructure but adding gutters and completing an amount of ground works and additional automation.

For Water Neutrality we have to harvest rainwater to replace some 70m3 of mains water pa. This water is required for the in-ground and hydroponic growing of fruit and vegetables.

Rainwater will be harvested from the existing poly tunnel roofs. Please see the attached diagram showing the location of the poly tunnels and collection tanks.

The recycling gutters/pipes will drain into two storage tanks. There is a large storage tank of 100 m3 litres capacity (which is sometimes filled by approx. 70m3 of mains water each year). There is a second tank of 36m3 which has not been used to date because the location needs groundwork to be undertaken and to date this has been uneconomic. But to comply with the requirements, we will complete these works.

Harvested rainwater from the new poly tunnel gutters will initially flow into the tank of 36m3. The water from this tank will be pumped into the feed tanks for the hydroponic plants or up to the larger 100m3 tank. The hydroponic feed tanks have their own storage of 21m3. These tanks will be topped up automatically using our computer control system for the farm.

Looking at the calculation below this shows that we need an additional 10304l of RWH tanks in addition to what is already in place (the 96000l tank) to supply what was previously drawn from the water network for irrigation. This can be met comfortably by using poly area 2 or 3.
for this are as follows:

	Value	Unit	Notes
Rainfall in this location	858.7	mm/a	
Rainfall including climate impact (10% rainfall reduction)	858.7	mm	
Collectable rainfall volume	0.8587	m3/m2	
Collection areas			
Poly Area 1 (existing)	175	m2	already in place, to 96,000l tank
Poly Area 2	140	m2	not yet collected, for offset (70m3)
Poly Area 3	148	m2	not yet collected, for crops
Poly Area 4	94	m2	not yet collected, for offset (70m3)
Total **additional** potential collection area	382	m2	
Maximum annual rainfall volume	328	m3	
Hydraulic filter efficiency (whole site)	0.9		
Yield co-efficient - all poly tunnels	0.9		
Actual annual potential collection volume	**266**	**m3**	
Poly Area 2	97.4	m3	
Poly Area 3	102.9	m3	
Poly Area 4	65.4	m3	
WN Offset required	76.542	m3	As calculated in report
Farm daily water demand	206	l/day	As calculated in report from meter readings
Farm annual water demand	75250	litres/a	As calculated in report from meter readings
Total 50 days storage to allow for drought	10,304	litres	This is the min. additional RWH tank size needed to service the crop irrigation
Offset achieved by improving WE in farmhouse	18323	litres/a	
Total combined offset	**93573**	**litres/a**	

Source: Deadalus Environmental

Between the unused storage tank and the feed tanks we have capacity of 57m3 plus the large storage tanks of 100m3.

For the farm, rainwater is ideal since it has the correct PH level for plants and no background EC that in turn helps with the nutrient recipes we give to the crops. So for the farm, the additional rainwater harvesting is both easy and helpful. As we have said earlier we have not done this work before because of cost and the ground works required. Using mains water was far more economic.

Looking at the proposed new house system, the roof has an area of 100m2. This water will be collected and can also go in to the existing 100m3 which will use the existing infrastructure. The water for the house will be pumped back to the proposed development via an existing commercial sand filter.