



Parkhouse Farm, Harbottle, Morpeth, Northumberland, NE65 7BD
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BACKGROUND STATEMENT

**Land at Leadenhall Farm
Holbeach St Marks
Spalding, Lincolnshire**

**Proposed
Irrigation Reservoir**

Ref No. FP/005/BS July 2015

**Ward Farming Ltd
Leadenhall Farm
Holbeach St Marks
Spalding
Lincolnshire
PE12 8HB**

1. BACKGROUND

Ward Farming Ltd crops some 730ha of wheat, sugar beet, vining peas, potatoes and onions at Leadenhall Farm, with a further 50ha of rented land near Conningsby, which is irrigated using summer abstraction rights.

In the light of recent concerns over availability of supply due to changes in weather patterns Ward Farming Ltd have applied for and been granted by the Environment Agency for a 120,000m³ winter abstraction licence for the land at Leadenhall Farm.

The proposal is to construct a winter storage reservoir at Leadenhall Farm so that Ward Farming Ltd can utilise the licence and reduce their reliance on summer abstraction to meet the demand from their customers for drilled onions and salad potatoes.

By changing from Rain Guns to Boom Irrigators and utilising the silt land at Leadenhall Farm, Ward Farming Ltd can reduce its irrigation demand from 62,000m³ to 50,000m³, and thereby its Carbon Footprint.

2. RESERVOIR DESIGN CRITERIA

The reservoir has been designed with reference to the following:-

Small Embankment Reservoirs; Report 161; CIRIA (Construction Industry Research and Information Association)
Floods and Reservoir Safety: an Engineering Guide; The Institution of Civil Engineers. (*F&RS*)

Freeboard Height

Design Freeboard when full is 0.75m

Fetch	0.2 km	
Average Hourly annual max wind speed	18 - 20 m/s	<i>Fig 3 F&RS</i>
Once in Ten Yearly maximum wind speed	24 - 26 m/s	<i>Fig 4 F&RS</i>
Design Wind Speed assumed	25 m /s	

Using *Fig 9. F&FS* Relationship between effective fetch, wind speed and significant wave height by interpolation

Significant Wave Height 0.3 m

Design Wave Height

Using *Table 2 F & FS* Design Wave Heights

Dam Type	Earth Fill
Crest	Road
Downstream slope	Random grass

Design wave height factor 1.2

Design wave height = 0.3 m x 1.2
 = 0.36 m
 = 0.4 m

Wave Run Up

Using *Fig 10 F&FS* Ratio of run-up height to design wave height

Dam Slope	1 : 3
Slope characteristic	Smooth
By interpolation Run-up Ratio	1.7

Minimum Freeboard Allowance = 0.4 m x 1.7
 = 0.68 m
 = 0.7 m

3. ARCHAEOLOGY

The are no known evidence of archaeology on the site which has been intensively cultivated over the years.

Should on stripping the site any evidence be found then Lincolnshire County Councils Historic Environment Team will be advised.

4. PLANNING LEGALISATION

The proposed development can be dealt with under the Prior Notification Procedure for the following reasons:-

The reservoir is reasonable necessary for the purposes of agriculture
The development is being carried out on an area of land of greater than 5 ha
The area of the proposed operations exceeds 0.5 ha
No part of the development is within 25 metres of a metalled part of a trunk or classified road
No excavated material will be removed from the unit. (The spoil from the excavation will be used to construct the walls of the reservoir - see appendix i)

5. CONCLUSION

Prior Approval should be granted for the proposed reservoir so as to enable Ward Farming Ltd to provide consistent yields and quality so that they can remain competitive against other salad and potato growing areas in the country and assist in future proofing the business from the affects of climate change.

Simon Kenny B.Sc., I.Eng., M.I.Agr.E.
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PLANS

FP/005/125 Site Plan

FP/005/01 Plan and typical Section of reservoir

FP/005/FP Farm Plan

Appendix i

Volume Calculations based on Rectangular Reservoir with

Area of Bottom = 18,484 sq m

Area of Bottom of Proposed Reservoir = 18,508 sq m

Site Leadenhall Farm

CALCULATION OF RESERVOIR QUANTITIES

16,578,293 Galls
75,356 cu m

Volume above Ground Level

10,573,697 Galls
48,062 cu m

Description

Qty

Unit

Bottom Width of Reservoir

114.10

m

Bottom Length of Reservoir

162.00

m

Ratio of Side Slopes (Wet)

3.00

Ratio of Side Slopes (Dry)

2.50

Depth of Water

3.50

m

Freeboard

0.75

m

Depth of Excavation below existing G.L.

1.40

m

Depth of Top Soil

0.20

m

Bulk Factor for Top Soil

0.50

Width of Bank Top

4.00

m

Height of Bank above Ground Level

2.85

m

Width at Mid Depth of Water

124.60

m

Length at Mid Depth of Water

172.50

m

Width at Top Water Level

135.10

m

Length at Top Water Level

183.00

m

Width at Top of Bank

139.60

m

Length at Top of Bank

187.50

m

Area of Bottom

18,484.20

sq m

Area at Mid Depth

21,493.50

sq m

Area at Top Water Level

24,723.30

sq m

Width of Liner

144.98

m

Length of Liner

192.88

m

Area of Liner

27,963.53

sq m

Surface Area of Excavation @ Sub-Soil level

20,523.96

sq m

Area at Mid Depth of Excavation of Sub Soil

19,491.12

sq m

Overall Width of Reservoir Top of Bank

147.60

m

Overall Length of Reservoir Top of Bank

195.50

m

Overall Width of Reservoir @ Sub-Soil level

162.85

m

Overall Length of Reservoir @ Sub-Soil level

210.75

m

Overall Area of Reservoir @ Sub-Soil level

34,320.64

VOLUMES

Volume of Water Storage in Gallons

16,578,293

galls

Volume above Ground Level

10,573,697

galls

Volume of Sub Soil Excavated

23,395

cu m

Volume of Top Soil Strip

3,432

cu m

Total Volume of Excavation

26,827

cu m

Volume of Bank

25,180

cu m