RURAL PARTNERS LIMITED
F I N E · P L A N S

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**BACKGROUND STATEMENT**

**Manor Farm**
**Holbeach Hurn, Holbeach**
**Spalding, Lincolnshire**

# Proposed Extension to Existing Reservoir

**Ref No. FP/011B/BS October 2017**

**Worth Farms Ltd**
**Fleet Estate Office**
**Manor Farm**
**Holbeach Hurn**
**Spalding**
**Lincolnshire**
**PE12 8LR**

# 1. BACKGROUND

Worth Farms Limited is a subsidiary division of A H Worth & Company Limited (AHW), a family business which has farmed on Holbeach Marsh for over 100 years. The farm, situated on the alluvial silts of South Lincolnshire, is currently cropped as follows:-

| | |
|---|---|
| Wheat | 750 ha |
| Potatoes | 270 ha |
| Vining Peas | 270 ha |
| Maize | 250 ha |
| Sugar Beet | 220 ha |
| Salad Crops | 150 ha |

The centre of operations is at Manor Farm, Holbeach Hurn.

A 28 day Prior Approval Application (PP-06443386) has recently been submitted for the amalgamation of the existing reservoirs at the entrance of Manor Farm (top left hand corner of photo) which are used to store surface water from some of the yards and buildings at Manor Farm which extend to nearly 12 ha in total prior to it being disposed of on the surrounding farm land.

Water from the reservoirs at Manor Farm will be pumped to the proposed extension to the existing reservoir where it will be able to store it before using it for irrigation.

Taking the average rainfall for the area to be 575mm (MAFF Techical Bulletin 34 Climate and Drainage) the total annual run off from the farmstead at Manor Farm is in the order

of 69,000 cu m, if only 50% of this could be collected and stored then it would be possible to fill the proposed extension to the reservoir.

## 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 | 0.25 km | |
| Average Hourly annual max wind speed | 18 - 20 m/s | *Fig 3 F&RS* |
| Once in Ten Yearly maximum wind speed | 24 - 26 m/s | *Fig 4 F&RS* |
| 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 0.35 m

**Design Wave Height**
Using *Table 2 F & FS* Design Wave Heights

| | | |
|---|---|---|
| Dam Type | | Earth Fill |
| Crest | | Grass |
| Downstream slope | | Random grass |
| Design wave height factor | | 1.3 |
| Design wave height | = | 0.35 m x 1.3 |
| | = | 0.4725 m |
| | = | 0.5 m |

**Wave Run Up**

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

| | |
|---|---|
| Dam Slope | 1 : 4 |
| Slope characteristic | Smooth |
| By interpolation Run-up Ratio | 1.4 |

Minimum Freeboard Allowance = 0.5 m x 1.4
= 0.7 m

**NOTE:-**

The maximum fetch of 0.25km lies on a South Eastern axis, whilst the fetch on the direction of the prevailing winds (South West) is in fact less than 0.1km.

## 3. ARCHAEOLOGY

No archaeology was discovered when the existing reservoir was constructed and there is 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 ii)

## 5. CONCLUSION

Prior Approval should be granted for the proposed reservoir so as to enable Worth Farms Ltd to utilise the surface water run of from the farmstead for irriigation thereby assisting 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/011B/125 | Site Plan |
| FP/011B/500 | Location Plan |
| FP/011B/01 | Plan and Typical Section |

## Appendix i

Volume Calculations based on Rectangular Reservoir with Area of Bottom = 9,300 sq m

A H Worth Extension
Client F. Parnell
Site Proposed Extension

| | | |
|---|---|---|
| CALCULATION OF RESERVOIR QUANTITIES | 7,957,290 | Galls |
| | 36,169 | cu m |
| Volume above Ground Level | 4,710,997 | Galls |
| | 21,414 | cu m |

| Description | Qty | Unit |
|---|---|---|
| Bottom Width of Reservoir | 61.00 | m |
| Bottom Lenght of Reservoir | 152.50 | m |
| Ratio of Side Slopes (Wet) | 4.00 | |
| Ratio of Side Slopes (Dry) | 2.50 | |
| Depth of Water | 3.00 | m |
| Freeboard | 0.75 | m |
| Depth of Excavation below existing G.L. | 1.40 | m |
| Depth of Top Soil | 0.00 | m |
| Bulk Factor for Top Soil | 0.50 | |
| Width of Bank Top | 4.00 | m |
| Height of Bank above Ground Level | 2.35 | m |
| Width at Mid Depth of Water | 73.00 | m |
| Lenght at Mid Depth of Water | 164.50 | m |
| Width at Top Water Level | 85.00 | m |
| Lenght at Top Water Level | 176.50 | m |
| Width at Top of Bank | 91.00 | m |
| Lenght at Top of Bank | 182.50 | m |
| Area of Bottom | 9,302.50 | sq m |
| Area at Mid Depth | 12,008.50 | sq m |
| Area at Top Water Level | 15,002.50 | sq m |
| Width of Liner | 95.92 | m |
| Lenght of Liner | 187.42 | m |
| Area of Liner | 17,978.26 | sq m |
| Surface Area of Excavation @ Sub-Soil level | 11,819.14 | sq m |
| Area at Mid Depth of Excavation of Sub Soil | 10,529.46 | sq m |
| Overall Width of Reservoir Top of Bank | 99.00 | m |
| Overall Lenght of Reservoir Top of Bank | 190.50 | m |
| Overall Width of Reservoir @ Sub-Soil level | 110.75 | m |
| Overall Lenght of Reservoir @ Sub-Soil level | 202.25 | m |
| Overall Area of Reservoir @ Sub-Soil level | 22,399.19 | |

VOLUMES

| | | |
|---|---|---|
| Volume of Water Storage in Gallons | 7,957,290 | galls |
| Volume above Ground Level | 4,710,997 | galls |
| Volume of Sub Soil Excavated | 14,756 | cu m |
| Volume of Top Soil Strip | 0 | cu m |
| Total Volume of Excavation | 14,756 | cu m |
| Volume of Bank | 15,162 | cu m |