Designing and creating the North Wyke Farm Platform

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The North Wyke Farm Platform

A large, farm-scale experiment - established during 2010 as a UK national capability for collaborative research, training and knowledge exchange in agro-environmental sciences.

Addresses agricultural productivity and ecosystem responses to different management practices.
Soils

Halstow soil series
Topsoil: slightly stony, silty clay loam
Subsoil: moderately permeable, mottled stony clay or silty clay; prominently mottled and slowly permeable below 40cm

Hallsworth soil series
Topsoil: slightly stony clay or clay loam
Subsoil: slowly permeable prominently mottled stony clay
Position and elevation were determined on >6000 locations across the potential fields.
Planning permission

- Environment Agency - Flood Defence Consent
- Tree species and condition survey; constraints plan in relation to Root Protection Areas
- Habitat and Protected Species surveys
- Environmental Impact Assessment - including Archaeological Survey and Groundworks Mitigation Plan
Trees

**Constraints Plan**
Survey location, species, dimensions, age class, condition and remaining contribution in years.

**Protection Plan and Arboricultural Method Statement**
Document how the trees are to be protected from inadvertent damage.
<table>
<thead>
<tr>
<th>Trees</th>
<th>% of trees</th>
<th>Root Protection Area (radius in metres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>English Oak</td>
<td>50</td>
<td>7.5</td>
</tr>
<tr>
<td>Common Ash</td>
<td>18</td>
<td>5.4</td>
</tr>
<tr>
<td>Beech</td>
<td>6</td>
<td>7.3</td>
</tr>
<tr>
<td>Silver Birch</td>
<td>6</td>
<td>4.1</td>
</tr>
<tr>
<td>Hawthorn</td>
<td>3</td>
<td>3.0</td>
</tr>
<tr>
<td>Sycamore</td>
<td>3</td>
<td>6.2</td>
</tr>
<tr>
<td>Goat Willow</td>
<td>2</td>
<td>4.4</td>
</tr>
<tr>
<td>Common Sallow</td>
<td>2</td>
<td>4.3</td>
</tr>
<tr>
<td>Holly</td>
<td>2</td>
<td>2.8</td>
</tr>
</tbody>
</table>

Identify RPA of those trees adjoining areas of excavation to establish whether there is a possible conflict with trees of landscape importance.
French drains
Flow measurement - H flumes

15 flumes
8 @ 1’6” (450mm)
6 @ 2’0” (600mm)
1 @ 2’6” (750mm)
Installing H flumes
French Drains - pipe sizes

Pipe diameter = 100, 160, 200, 225, 300, 375, 400 and 450 mm
French drains – bund and dimensions

Trench width = pipe diameter + 100mm each side

<table>
<thead>
<tr>
<th>Pipe diameter (mm)</th>
<th>Trench width (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>300</td>
</tr>
<tr>
<td>160</td>
<td>360</td>
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<td>200</td>
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<td>375</td>
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<td>400</td>
<td>600</td>
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<tr>
<td>450</td>
<td>650</td>
</tr>
</tbody>
</table>
French drains - construction

9203 metres of damp proof membrane

5056 tonnes of 20 – 50 mm clean stone

Back-to-back French Drains on watersheds
Post-construction soil compaction amelioration

- Trafficking
- Sward lifting
- Sward slitting
Water flow and chemistry

Flume area – accessed by service tracks

Bubbler flowmeter

Sequential/composite sampler
Core water data parameters

- Temperature
- Conductivity
- Turbidity
- pH
- Dissolved $O_2$
- Ammonium
- Nitrate
- Dissolved Organic Carbon
- Flow cell
- Total-P
- Ortho-P
Rainfall, soil moisture and soil temperature

Real-time data via RadioTelemetry

Rain gauge

Relay station

Soil temperature and moisture probe
Emissions – CO$_2$ and N$_2$O

Three mobile laboratories – each containing an automated soil CO2 flux system with 12 chambers.

Photoacoustic infrared field gas monitor to measure N$_2$O.

Multiplexer and analyser control unit.
Baseline years – Apr 2011 to Mar 2013

Livestock continuously stocked
- follow sward height guidelines

50 ewes and their twin lambs

25 yearling suckler beef cattle

200 kg N fertiliser per ha

First silage cut – 2/3rds of area

Second silage cut – 1/3rd of area

FYM applied to silage stubble

Farm gate balances:
• Money
• Energy
• C
• N
• P