



KING'S LYNN INTERNAL DRAINAGE BOARD

SUMMER INSPECTION

WEDNESDAY 20 JULY 2011

ITINERARY

09:45 – 10:00	Board Room, Kettlewell House – Coffee
10:00	Depart Kettlewell House Note: via Tennyson Avenue, The Walks flood plain on right; via Nar-Ouse Way, Pierrepointe Pumping Station on left; via Eau Brink Road, Straight Mile Outfall into River Great Ouse
10:25	20 minute stop at Islington Pumping Station and Straight Mile
10:45	Depart Islington PS following the route of the main Smeeth Lode Note: replaced Black Ditch outfall on right; Greenbank Pumping Station and Museum on left
11:10	15 minute stop at Smeeth Road, Emneth Hungate to view completed flood storage pond. Short explanation of purpose – off-line storage during event - and incidental benefits – biodiversity habitat.
11:35 approx	Lady's Drove, Emneth Hungate – short pause to view larger flood storage pond across intervening field (not possible to take coach closer to site)
11:55 approx	A47 Wisbech Bypass (pause in abandoned petrol station entrance) – View potential development land and discuss Developer Contributions
12:10	Arrive lunch venue (Elme Hall Hotel, Wisbech)
14:00	Depart lunch venue On route along A47 and A149, the Engineer will highlight points of interest including: <ul style="list-style-type: none">• Possible need for pond in future to protect north-east Wisbech to east of bypass on DRN145P1001• Protection options for Hardwick Ind. Est. (pause in layby if possible)• King's Reach Attenuation Pond and Pumping Station• Gaywood Flood Plain and River valley• Babingley River
15:00	20 minute stop at Wolferton Pumping Station & River Ingol outfall
15:20	Depart Wolferton Pumping station Note: return via Edward Benefer Way, North Lynn Main Drain on left along frontage of North Lynn Industrial Estate
15:45	St Nicholas Retail Park, King's Lynn – 10 minute stop to view Bawsey Drain
16:00	Arrive Kettlewell House

INTRODUCTION

King's Lynn Internal Drainage Board protects some 36,000 hectares of East Anglia, mainly in King's Lynn and West Norfolk Borough Council district, part of the county of Norfolk, but including parts of the counties of Lincolnshire and Cambridgeshire.

The southern part of Board's area stretches from the River Nene to the River Great Ouse and from Emneth to The Wash. The northern part of the Board's area stretches from the Hardwick Industrial Estate on the southern outskirts of King's Lynn northwards to Hunstanton and from The Wash inland to Grimston and Sedgeford.

Of the 36,000 hectares, some 28,000 hectares is some of Britain's prime grade 1 & 2 arable land, the remainder is residential/industrial and other properties.

Residential areas include the eastern and northern areas of the town of Wisbech, the whole of the town of King's Lynn, and several significant villages; Clenchwarton, Emneth, Heacham, the Terringtons, the Walpoles and the Woottons, et al. Several other significant villages – Castle Rising, Dersingham, Gayton, Grimston, Roydon, Snettisham – just outside the District also rely on the Board's network.

The Board maintains some 560 kilometres of ordinary watercourse, of which some 245 kilometres directly protects residential areas where property density is greater than 25 property equivalents per kilometre of watercourse. The Board endeavours to maintain this network to accommodate a 1:100 event.

The remainder of the network protects mainly agricultural land and the Board endeavours to maintain this network to accommodate a 1:25 event.

Surface water collected within the Board's network is transferred to main river or The Wash via 13 pumping stations and 10 tidal sluices. The pumping stations move some 40 million cubic metres of water per year.

Additional information is available on the web at:

www.wlma.org.uk

THE INSPECTION

This year's inspection is designed to:

give a general overview of the Board's area and work;

highlight recent improvements;

identify deficiencies; and,

outline short and long term proposals.

The tour is concentrated on the A47 and A149 corridors between Wisbech and Wolferton.

The Walks



The Walks parkland in flood condition

A natural flood plain used as amenity parkland managed and maintained by the Borough Council of King's Lynn & West Norfolk. This area currently protects the centre of the town of King's Lynn by storing floodwater from the Gaywood River. It incorporates flood friendly buildings, including a café and office for The Walks Manager, and play equipment.

However, with climate change issues over the next 20-25 years, this area is likely to get flooded more often and to a greater depth as time goes on.

To address this, the Board has purchased a low lying area of land on the outskirts of the town – more later under 'Gaywood Flood Plain and River Valley' – and is intending developing this as a water management facility.

Pierrepoint Pumping Station



Pierrepoint Pumping Station from upstream

The total area protected by the Pierrepoint Pumping Station is **1627.38 hectares** and includes:

- The Hardwick Industrial Estate, King's Lynn (Industrial/Commercial)
- Horsley's Fields Industrial Estate, King's Lynn (Industrial/Commercial)
- Southern side of King's Lynn Town Centre (Residential)
- King's Reach/South Fairstead Estate (Residential)
- The Villages of Middleton, Gayton, East Winch, Ashwicken (Residential/ Commercial/Agricultural/ Environmental).

However, the existing systems feeding to this station are at capacity – in fact, in a 1:100 event the Pierrepoint drain overtops in Hardwick Industrial Estate. This is impacting on future development to the north end of the site – more later under 'Hardwick Industrial Estate'.

Straight Mile Outfall (at side of River great Ouse)



Outfall from the landward side – Straight Mile Storage Area

The outfall gates were refurbished and the canopy replaced during 2010/11 at a cost of £61,000 pounds for which the Environment Agency awarded grant in Aid to cover 45% of this cost.

The gates had been showing signs of wear and had been temporarily repaired in the past. The canopy was rotten and weak and the seal between the canopy and the gates had deteriorated. The seal between the gates at closed position was also less than ideal.

The combination of these factors meant that at high tide, considerable amounts of seepage impacted on the storage area capacity and during events which coincided with a high tide, contributed to the risk that the Islington Pumping Station could become inundated if the pumps were not throttled back.

This is discussed further in the following item; 'Islington Pumping Station and Straight Mile'



Refurbished gates and new canopy back in position alongside River Great Ouse

Islington Pumping Station and Straight Mile



Pumping Station Statistics	
OS Grid Ref:	TF 557546 314462
Pumping Station ID	PMP145P001
Pumped catchment (ha)	5936.03
Pump capacity (cumecs)	3 x 2.8 + 2 x 1.8
Outlet watercourse	River Great Ouse

Islington Pumping Station



Straight Mile Storage Area – taken from outfall gates with pumping station in background

The total area protected by Islington Pumping Station is **5936.03** hectares – the largest single catchment within the Board’s district. The catchment draws from Terrington St Clement to the north, southwards to Emneth, and westwards to Wisbech.

The catchment is largely fenland and, consequently, water is drawn to the station by the action of the pumps rather than any natural gravity fall.

The station has five pumps capable of pumping up to 12 cubic metres per second (cumecs), making it the largest pumping station of the 13 in the Board's assets.

The original station was built in 1959 and has the original three diesel engine powered pumps of 2.80 cumecs each. These are nearing the end of their useful life, though reports indicate that spares should be available for at least the next 10-15 years.

The Pumping Station discharges into the Straight Mile Storage Area which then outfalls into the River Great Ouse. As mentioned previously, the storage area capacity is at risk and with climate change changing the patterns of rainfall and raising the level of tides, there are concerns that this scenario will become more frequent and, to preserve the station over its remaining life, it is intended to excavate an off-line section of the storage area to create an additional storage pond which will assist when the lower channel fills and overflows into the new storage facility.



Area of land to the north of the storage area where excavation and landscaping should provide further storage capability

The Board are currently in discussions with the Environment Agency in an effort to seek Grant in Aid contribution to the scheme.

In any event, it is likely that in around 15 years time the station will have to be majorly overhauled or rebuilt (and possibly relocated) at an estimated cost in excess of £8M. Without the additional storage facility, this time scale may have to be reduced.

The scheme will be planted and managed appropriately to enhance the natural environment and address the Board's Biodiversity Action Plan targets, and with a view to seeking Higher Level Stewardship income in the future.

Smeeth Lode (right hand side as we travel – on the left is the Mill Basin, the main outfall from Greenbank Pumping Station)

As development continues within the catchment, particularly around Wisbech and Emneth, it is likely that further measures will be required to accommodate the extra run-off that will be created by the impermeable areas (roofs, parking, etc) that are constructed.

One option is to widen the existing channel of the Lode at or around normal water level. This will provide on-line storage during storm events and meet elements of the Board's Biodiversity Action Plan by creating saturated shelves to attract flora and fauna.

It is likely that much of this cost will be met through contributions from developers – discussed further later under 'A47 Wisbech Bypass'. However, as environmental habitat will be created as part of the works, it is hoped that the Environment Agency, Natural England, et al, may be prepared to make grants available.

Black Ditch Outfall (right hand side, entering the Lode from the north)

The culvert was replaced during 2010/11. However, as it is purely an agricultural land catchment, Grant in Aid was not available.

The works cost £10.5k and raised the protection level within the Black Ditch catchment from around 1:10 to around 1:18.

Greenbank Pumping Station and Museum (right hand side)



Greenbank Pumping Station and Museum (new station to the left of the picture)

The total area protected by Greenbank Pumping Station is **3762.95** hectares. This includes the eastern fringes of Emneth, the northern fringes of Upwell and the village of Marshland St James.

The new station outfalls into the Mill Basin which runs parallel to Smeeth Lode and outfalls into the River Great Ouse via the Eau Brink Pumping Station, just south of the Straight Mile Outfall.

The old station was occasionally open as a museum but is now up for sale along with the pumping station bungalow.

Emneth Hungate Flood Storage Ponds



Views of Emneth Hungate Flood Storage Ponds shortly after construction

Two flood storage areas have been created at Emneth Hungate.

The smaller of the two (where the coach will stop) is on the main drain from Emneth and was fully funded by the Board to provide further protection to the village and accommodate future development.

The larger pond (not accessible by coach) is on the main drain from the south-eastern fringes of Wisbech and brings the established properties in that area to a 1:100 level protection. Whilst some further development can be accommodated in the catchment, significant development will require further improvements – see previously, 'Smeeth Lode'.

This larger pond benefited from Grant in Aid from the Environment Agency to cover 45% of the costs.

The embankments surrounding the ponds have been seeded with a wildflower mix to encourage birds and small mammals and the beds have been planted with reed which should spread over time. These areas, as well as being functional, have helped the Board address some of its targets within the Biodiversity Action Plan. Both sites are being considered for owl boxes.

It is proposed to seek Higher Level Stewardship income on the sites in due course.

A47 Wisbech Bypass

The site – between the Elme Hall Hotel and the old service station – has been proposed for development in the future.

It measures some 15 hectares in total of which some 40-60% would become impermeable. Even with attenuation, it is likely that this site will generate a six-figure sum in development contributions which will be used to further improve the network either directly downstream or on one of the other tributaries within the catchment nearby – see later 'DRN145P1001'.

***** LUNCH *****

A47 and A149

DRN145P1001

This drain system takes surface water from the north-east corner of Wisbech and it is likely that, to permit significant further development in this area similar ponds to those created at Emneth Hungate will be required to accommodate the run-off. These are likely to be created to the east of the A47.

Again, it is likely that this will be mainly funded from developer contributions as alternatives to on-site attenuation.

Hardwick Industrial Estate

As things currently stand, as previously stated for Pierrepont Pumping Station, the existing networks – Pierrepont and Middleton Stop drains – are at capacity for 1:100 events. Some overtopping currently occurs in the Pierrepont network, largely due to the volume of water in the Middleton Stop network taking precedence at the confluence of the two drains forcing the Pierrepont system to back up.



Middleton Stop Drain from the Pumping Station culvert with the land to be acquired on the left

The Board is currently in negotiation to purchase some 10 hectares of land near Middleton Stop Pumping Station which lies approximately one kilometre east of the A149. This will be landscaped to form a flood alleviation pond with a volume of 58,000 cubic metres. This will operate naturally when the level in the Middleton Stop system reaches the level of concern, water will spill into the pond and after the crisis is over will be pumped back into the drain for its onward journey to Pierrepont Pumping Station and the River Nar.

The scheme is expected to cost around £250,000, a large proportion of which is the cost of the land. This is being funded from Board reserves which will be replenished from developer contributions as the industrial estate develops.

This scheme will give some of control of flows downstream, relieving the current pressure on the Pierrepont drain at the confluence and allowing further development to the north of the industrial estate site.

As further development continues in the area, it is likely that further improvement measures to the network will be required. Again, under the presumption of ‘he who benefits, pays’, these will be fully funded by development contributions.

As previously, the scheme will be planted and managed appropriately to enhance the natural environment and address the Board’s Biodiversity Action Plan targets, and with a view to seeking Higher Level Stewardship income in the future.

Gaywood Flood Plain and River Valley



Gaywood valley flood plain with the Gaywood River on the right and the town in the background

As previously stated under 'The Walks'; the Board has purchased the above area of land to the south of the Gaywood River.

It is proposed to construct a new pumping station near the site of the existing station which the Board has recently adopted. On completion, a section of the bank will be lowered so that when the River levels rise, it spills into this area. After the crisis has passed, the water will be pumped back into the river for its onward journey through the town and to its tidal outfall into the River Great Ouse.

A contribution to the design and construction of the pumping station has been confirmed from the European funded SURF (Sustainable Urban Fringes) Project. This Project aims to improve the educational value and public access to the whole of the River valley and has an element which looks at sustainable water management within the valley. The design is looking at using fish-friendly pump components and will provide some of the power requirements through the installation of photovoltaic (PV) panels at the station and is investigating the potential for energy recovery systems within the outfall pipework. The power generated by these systems will be fed into the national grid and will generate government feed-in tariffs which will provide the Board with a small income for the next 25 years.

Again, it is hoped to manage the area to address the Board's Biodiversity Action Plan targets and seek Higher Level Stewardship income in due course.

Further information on the SURF Project can be found at www.sustainablefringes.eu and a copy of the latest newsletter is appended to this document.



European Union  The European Regional Development Fund

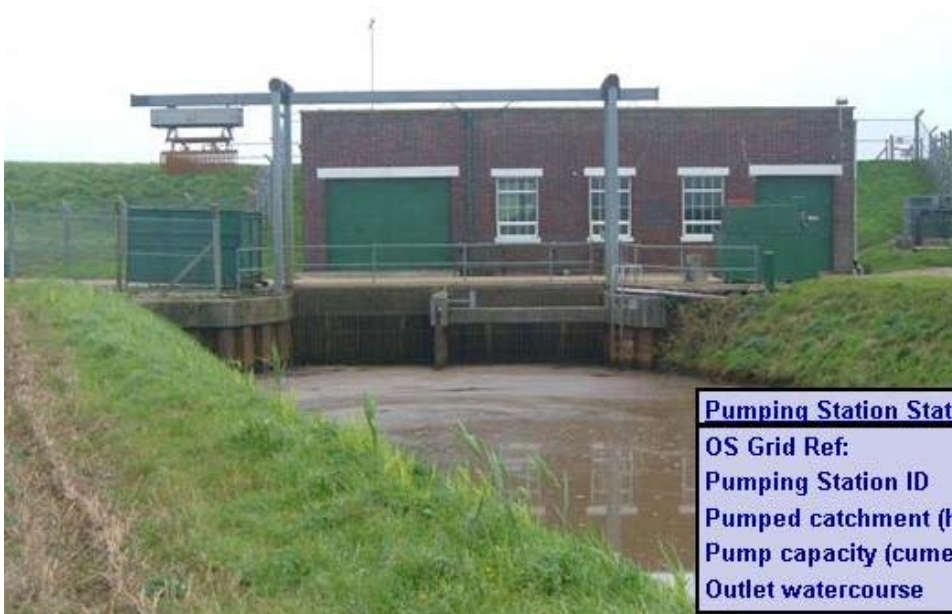


Babingley River

The Board's Engineer is currently in discussions with the Environment Agency on the long-term maintenance strategy for the Babingley, Ingol and Heacham Rivers. These are currently designated as main rivers and the responsibility of the Environment Agency.

However, the Environment Agency are considering options for a number of the smaller main rivers across the country which could mean that the Board takes on some responsibility for these three in the future.

Wolferton Pumping Station (and River Ingol outfall)



Wolferton Pumping Station

The total area protected by Wolferton Pumping Station is **2852.26** hectares. This includes the western fringes of Snettisham and Dersingham and takes high land water from a number of villages and the Sandringham Estate.

When the pumping station is operating at full capacity, the River Ingol outfall is inundated. River water is diverted into the pumping station basin and pumped out to sea.

The duty pump at this facility broke down during 2010/11 and has been repaired and refurbished at a cost of £13,000. The Environment Agency supported this work with Grant in Aid to cover 45% of this cost.

As previously mentioned, the River Ingol is one of the three where some of the responsibility is passed to the Board.

North Lynn Main Drain

This drain forms part of the future strategy for protection of the town.

The **North Lynn Link Scheme** has been under consideration for some time. It links in to the management of the Gaywood River Flood Plain and allows water to be spilled from the Gaywood River into the Bawsey Drain, thence via a pumping station to the north of Lynnsport into the North Lynn Main Drain to North Lynn Pumping Station and into The Wash.

The overall cost of the scheme could be as much as £1.5M, this includes:

Land purchase;
New Pumping Station;
Rising Main to North Lynn Main Drain;
Sluice facility from Gaywood River to Bawsey Drain; and,
Additional pump installation at North Lynn Pumping station.

However, the benefits to the town could be significant including the facility to transfer water between watercourses in the event of one of the two Victorian culverts suffering catastrophic failure, reducing the overall risk of property flooding within the town, and permitting un-attenuated drainage from several potential development sites including the land around Lynnsport.

Bawsey Drain

The section of the Bawsey Drain behind St Nicholas Retail Park is a magnet for fly-tipping and the Board currently spends in excess of £40,000 per annum removing detritus.

The last exercise took place at the start of May and is almost certainly due for a re-visit. However, it seemed appropriate to include this site on the tour as it generates many of the complaints that the Board receives and has been discussed at many of the meetings of the Board over the years.

Part of the issue is that representatives of the riparian owners, the Borough Council of King's Lynn & West Norfolk, avoid meeting officers of the Board to discuss a management strategy.

CONCLUSION

Thank you for your attendance and it is hoped that you have found it informative and interesting.