Kent County Council
Flood Risk Management Committee

November 2014

Paul Kent

Wastewater Strategy Manager

Martin Banks

Sewerage Policy Manager

Southern Water

Agenda

- Southern Water's role in flood management
- Impact of winter 2013/14 flooding
- General improvements
- Area specific flooding
- Preparation for winter 2014/15
- Flood protection methods

Southern Water

Flooding – Regional Involvement

- Engage with Lead Local Flood Authorities
- Actively involved in Flood Risk Management Boards and Southern Regional Flood and Coastal Committee
- Member of Steering Group on flood and coastal erosion projects
- Involved with Surface Water Management Plans
- Work closely with Environment Agency, District Councils and local communities

- Aiming for the development and delivery of holistic solutions to flooding problems

Southern Water

Impact of Winter 2013/14

- The autumn/winter weather first impacted with the St Jude storm event (28th October)
- Problems faced, included pluvial, fluvial and tidal flooding, high winds, widespread power outages and access difficulties
- Worst of the protracted issues were associated with high groundwater levels and infiltration into the sewerage system
- Required tankering and over pumping to alleviate sewer surcharging
- Became a 24/7 response with our own staff and contractors, at peak, expenditure of £150k/day, 330 staff involved and almost 120 tankers in use (across Kent, Sussex, Hampshire and Isle of Wight)

Southern Water

Improvements to Date

- Flood Alleviation Schemes (property protection)
  - Dover (Brookfield Place)
  - Maidstone (Buckland Road)
  - Tunbridge Wells (Camden Road)
  - Gillingham (Cherry Tree Road)
  - New Romney (Station Approach)
  - Benchley (Fairmans Lane)

46 properties prevented from flooding - £7.5m

- Infiltration Reduction
  - Inspected 10km of sewers 250 manholes
  - 3.5km sewers repaired last year
  - 4km sewers repaired in previous years

- Total Care Plans
  - Commenced in 2013 to improve reliability of our wastewater pumping stations
  - Stripping and inspecting every pump and valve - repairing/replacing where necessary
  - Full electrical inspection of panels/ MCC - repairing/replacing where necessary

Southern Water

Example of Improvements

Bishopsbourne

Bourne Park

Sealing and lining

Bekesbourne

School Lane

Pumps and control panels replaced

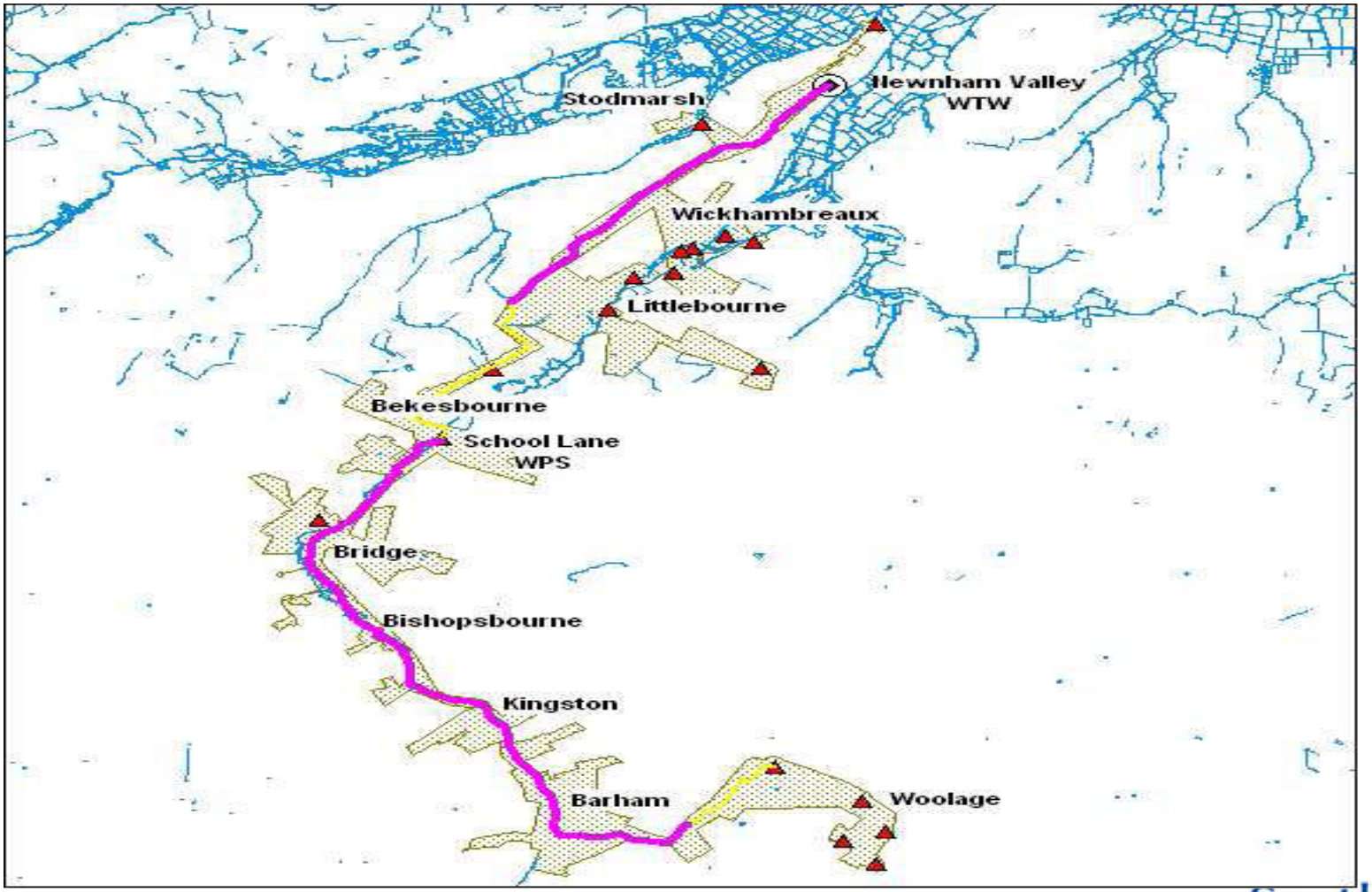
Village	location	Issue	Action/Result	Date
Ottinge	Manholes off Canterbury Road	Surface water ingress through leaking manhole covers	Existing 2x covers replaced with sealed covers	Jun-14
Elham	Hog Green	Root ingress in sewer	Root removal and sewer sealing	2014 (tbc)
	Between Canterbury Road and Hog Green	Root ingress in sewer	Root removal and sewer sealing	2014 (tbc)
	Hog Green	Previous repair failed	Replace sewer liner	2014 (tbc)
		Circumferential cracks	Repair sewer	
	The Orchards	Leaking manholes	Seal manholes	2014 (tbc)
		Circumferential cracks	Repair sewer	
	Between Hog Lane and The Orchards	Circumferential cracks	Repair sewer	
Barham	Valley Road	Infiltration (leaking joints)	Gel sealing of sewer	2005/06
		Infiltration	Sewer sealing	2013
	The Causeway/Denningstone Street	Infiltration	Sewer sealing	2013
Kingston	North west of village	Infiltration (leaking joints)	Gel sealing of sewer	2005/06
		Infiltration	Sewer sealing	2013
Bishopsbourne	Charlton Park and The Street	Infiltration (leaking joints)	Gel sealing of sewer	2005/06
	Bourne Park	Infiltration (leaking joints)	Gel sealing of sewer	2005/06
		Significant infiltration	Gel sealing and lining of sewer	Oct-11
		Significant infiltration	Sealing, lining and Q-lock installation	2013
	Charlton Park (vicinity of cricket pitch)	Significant infiltration	Gel sealing of sewer and spray coating of manholes	Mar-11
	[illegible] of Dower	Significant infiltration	Relay sewer	Sep-12
	Turat sewer through the village	Significant infiltration	Sewer lining	2013
	Park Lane	Significant infiltration	Line sewer at rear of Old Post Office	Jul-14

Repairs Undertaken

Village	location	Issue	Action/Result	Date
Bridge	Bourne Park Road	Infiltration (leaking joints)	Gel sealing of sewer	2005/06
		Infiltration (leaking joints)	Gel sealing of sewer	Aug-11
	Patrixbourne Road	Infiltration (leaking joints)	Gel sealing of sewer	2005/06
		Infiltration	Sewer sealing	2013
		Infiltration	Sewer lining	2013
	Private drain (vicinity of Patrixbourne Road)	Significant infiltration	Gel sealing of drain undertaken by customer	Sep-12
	field to south of Bewery Lane	Sewer manholes in the field floods to Underpass	Replace 3x covers with sealed covers	Jun-14
	Bewery Lane/Bridgefield Way	Infiltration	Sewer sealing	2013
Patrixbourne	Old Palace Road and Patrixbourne Road	Infiltration	Q-lock installation and manhole sealing	2013
	Manholes in the vicinity of Court House and Riverside Cottage	Ingress directly from the Railbourne	Existing 3x covers replaced with sealed covers	Jun-14
	Properties to south east of village	Property protection	Installation of non-return valves	2014 (tbc)
Bekesbourne	Old Palace Road	Infiltration (leaking joints)	Gel sealing of sewer	2013
	School Lane	Infiltration	Sewer sealing, manhole sealing	2013
	School Lane Pumping Station	Refurbish mechanical and electrical equipment	Pumps and control panels replaced	2014 (ongoing)
Pumping Stations	Ottinge	Can the output from the station be increased?	Review capacity of rising main	
	The Orchards Pumping Station	Can the output from the station be increased?	Limited by capacity of Ottinge PS	Mar-14
	School Lane Pumping Station	Can the output from the station be increased?	Refurbishment will increase flows to 12.5 l/s, suggested that downstream sewer capacity is 20.0 l/s. Also need to consider impact on Newsham Valley WTW	
	Nagate Street Pumping Station	Can the output from the station be increased?	Currently 34 l/s, maximum pumping capacity 48 l/s, potential to increase to 48 l/s but need to consider use of capacity of downstream sewer	

Southern Water

Site Specific – Nailbourne – Canterbury Villages



Southern Water

Nailbourne

- Tankering commenced January and over pumping/tankering ceased May
- Typically sequential, commence with tankering, when flows are in excess of tankering capability, then resort to over pumping
- Over pumping at 5 Locations
  - Barham (and tankers)
  - Bishopsbourne (and tankers)
  - Patrixbourne (and tankers)
  - Bekesbourne
  - Littlebourne
- Discharge rates 20-50l/s
- In addition to the above locations, tankers utilised at Bridge

Southern Water

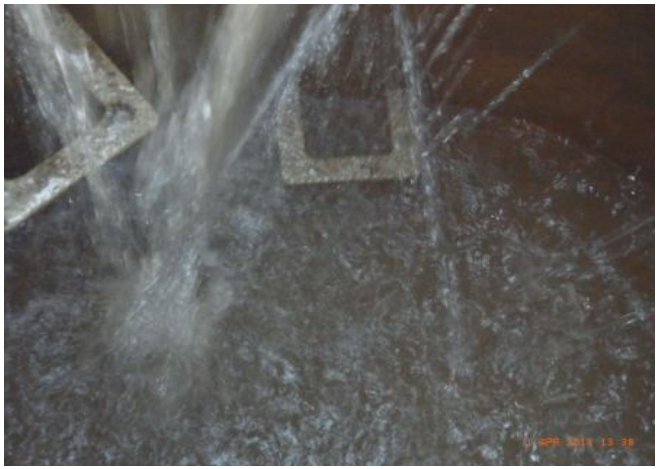
Nailbourne – Elham and Ottinge

- In Elham and Ottinge two events recorded
  - 2000/01 - wettest year on record
  - 2013/14 – wettest winter on record
- Groundwater infiltration leading to restricted toilet use and flooding in Water Farm
- Alleviate flooding and protection of Affinity Water source by over pumping
- Undertaking jetting, sealing manholes, root removal and replacement of previous liner that has failed, possibility of protecting Water Farm with a non-return valve

Southern Water

Elham and Ottinge (cont)

- Ottinge
  - Managed surcharged sewers by tankers
  - Undertaken raising/sealing/replacement covers for 8 manholes



- Plans to replace tankers with temporary pumped discharge directly to Ottinge Pumping Station

Southern Water

Over pumping

Groundwater levels impacted by rainfall events, when levels are very high it causes surcharging of the sewerage system

- prevents free drainage, can lead to flooding and restricted toilet use
- Address by removing excess flows by tankering or over pumping
- Due to volume of groundwater in the sewers, over pumping only means of realistically managing the sewerage system
- Approval sought from the Environment Agency prior to commencing
- Discharge quality similar to that of some of our wastewater treatment works

Southern Water

Bio-treatment units

- Developed in-house
- First of their kind in the Country
- Improves the quality of the discharge

Southern Water

Suction Screening

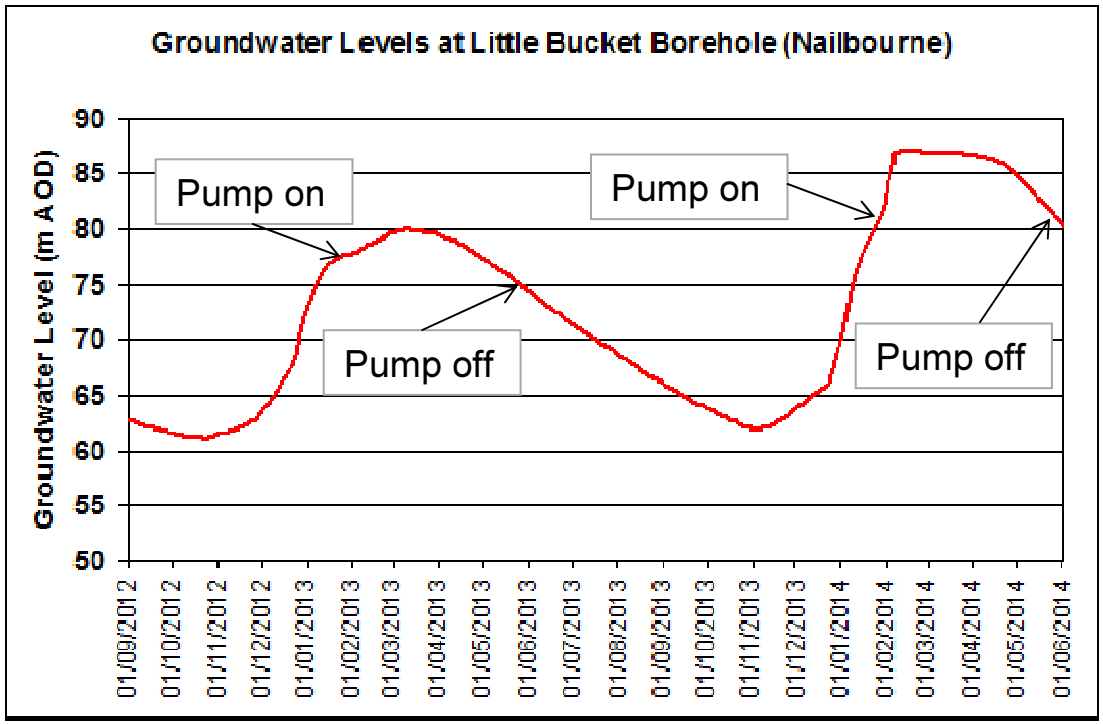
Improves the quality of the discharge and prevents pump blockage

Southern Water

Effluent Screening

Improves the quality of the discharge by fine screening

Nailbourne Improvements



Above suggests that investment has proved successful, over pumping intervention started later and finished earlier than previous year with respect to groundwater levels.

Southern Water

Petham Bourne

- Flooding from manholes in the grounds of the Stiener School
- First occasion since 2000/01
- Water ingress and reliability/capacity of pumping station believed to be the cause

- 8 manholes, repaired, sealed or water tight covers fitted
- Pumping station refurbished, pumps replaced with modern day equivalent, threefold increase in capacity

Southern Water

Five Oak Green and Tonbridge

Five Oak Green

- Historic flooding has been associated with the reliability of Larkfield pumping station. Refurbished several years ago and since proved reliable

- The problems in the winter of 2013/14 were associated with the surface water system. Our investigations highlighted the following issues;
  - downstream water courses restricting flow, causing backing up and flooding from the system
  - partial blockage in the surface water system causing surcharging and flooding
  - heavy deposits in the attenuation tank, causing loss of storage

- Issues now addressed

Danvers Road/Barden Road, Tonbridge

- Flooding in this area dominated by fluvial flooding associated with the River Medway, led to overloading of both the foul and surface water sewerage systems

- We have since undertaken jetting of the surface water sewers to remove any sedimentation

Southern Water

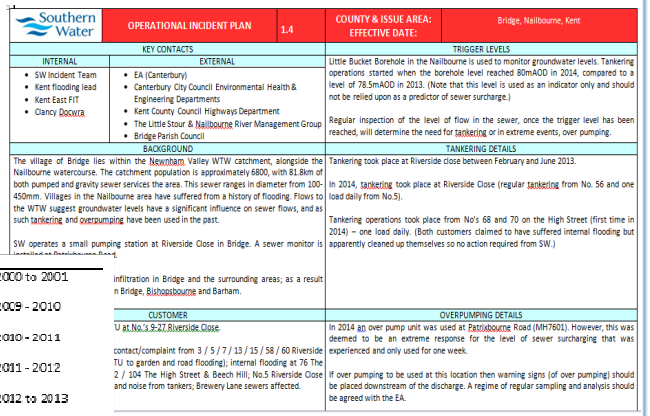
Other Locations

- Alkham Valley
  - Experience of some garden flooding and restricted toilet use, addressed with tankering as and when required. Post event cctv failed to identify any groundwater ingress locations.
- Preston and Elmstone
  - Overloading believed to be from surface water, manhole covers replaced
  - Court Lane pumping station refurbished
  - Court Farm PS refurbished, unfortunately little improvement in reliability, considering replacement
- Ickham and Wickhambreaux
  - Protection of Drill Lane pumping station from fluvial flooding

Southern Water

Preparation for Winter 2014/15

- Proactive preparation, should tankering over pumping need to be deployed, produced Operational Incident Plans per location/village
- Nailbourne specific is the continued interaction with LSNRMG with a view to continuous improvement, through the infiltration reduction plan (IRP)
- Undertaken preventative work to minimise groundwater infiltration volume
- Installed protection measures to prevent flooding to properties (e.g. non-return valves)
- Refurbished and improved vulnerable pumping stations



Southern Water	OPERATIONAL INCIDENT PLAN	1.4	COUNTY & ISSUE AREA: EFFECTIVE DATE:	Bridge, Nailbourne, Kent

KEY CONTACTS

INTERNAL
- SW Incident Team
- Kent flooding lead
- Kent East FIT
- Clancy Docwra

EXTERNAL
- EA (Canterbury)
- Canterbury City Council Environmental Health & Engineering Departments
- Kent County Council Highways Department
- The Little Stour & Nailbourne River Management Group
- Bridge Parish Council

TRIGGER LEVELS

Little Bucket Borehole in the Nailbourne is used to monitor groundwater levels. Tankering operations started when the borehole level reached 80mAOD in 2014, compared to a level of 78.5mAOD in 2013. (Note that this level is used as an indicator only and should not be relied upon as a predictor of sewer surcharge.)

Regular inspection of the level of flow in the sewer, once the trigger level has been reached, will determine the need for tankering or in extreme events, over pumping.

BACKGROUND

The village of Bridge lies within the Newnham Valley WTW catchment, alongside the Nailbourne watercourse. The catchment population is approximately 6800, with 81.8km of both pumped and gravity sewer services the area. This sewer ranges in diameter from 100-450mm. Villages in the Nailbourne area have suffered from a history of flooding. Flows to the WTW suggest groundwater levels have a significant influence on sewer flows, and as such tankering and overpumping have been used in the past.

SW operates a small pumping station at Riverside Close in Bridge. A sewer monitor is

infiltration in Bridge and the surrounding areas; as a result n Bridge, Bishopsbourne and Barham.

TANKERING DETAILS

Tankering took place at Riverside close between February and June 2013.

In 2014, tankering took place at Riverside Close (regular tankering from No. 56 and one load daily from No.5).

Tankering operations took place from No's 68 and 70 on the High Street (first time in 2014) – one load daily. (Both customers claimed to have suffered internal flooding but apparently cleaned up themselves so no action required from SW.)

CUSTOMER

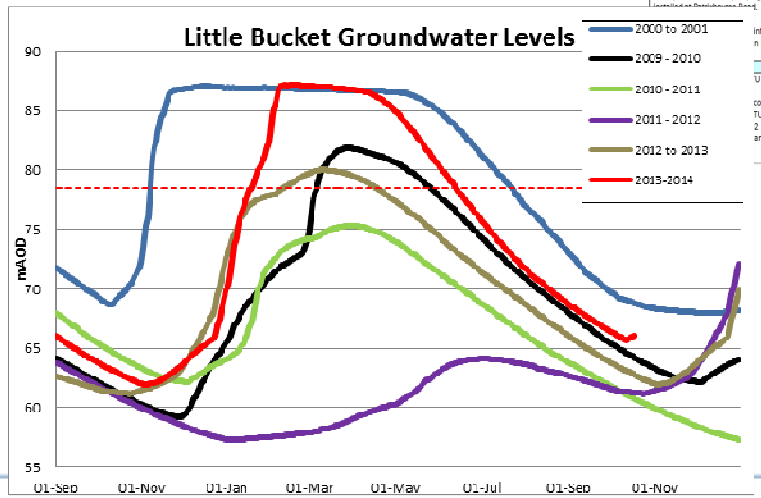
U at No.'s 9-27 Riverside Close.

contact/complaint from 3 / 5 / 7 / 13 / 15 / 58 / 60 Riverside TU to garden and road flooding); internal flooding at 76 The 2 / 104 The High Street & Beech Hill; No.5 Riverside Close and noise from tankers; Brewery Lane sewers affected.

OVERPUMPING DETAILS

In 2014 an over pump unit was used at Patrixbourne Road (MH7601). However, this was deemed to be an extreme response for the level of sewer surcharging that was experienced and only used for one week.

If over pumping to be used at this location then warning signs (of over pumping) should be placed downstream of the discharge. A regime of regular sampling and analysis should be agreed with the EA.



Southern Water

Flood Protection Methods

- We undertake flood mitigation to approximately 100 properties/year, typically where the cost of a permanent solution is excessive or not cost beneficial
- Mixture of methods
  - Garden re-profiling
  - Water tight doors
  - Airbrick covers
  - Flood barriers (in keeping with the property e.g. purpose made wooden gates)
  - Non-return valves
- Non-return valves most common protection
  - Provide protection against backflow from main sewer
  - Fitted on a priority basis and only where they will provide benefit
  - Not normally suitable for protection against long duration flooding events
  - Need to understand the risk of flooding transfer (better external than internal flooding)

Southern Water

Questions?

Southern Water