Infiltration Reduction Plan

Longparish

October 2021
Version 3.1

from
Southern
Water

Contents

Document Control

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Glossary

AMP – Asset Management Programme
CCTV - Closed-circuit television
EA - Environment Agency
GW – Ground Water
IRP - Infiltration Reduction Plans
l/s - litres per second
MH – Manhole
RPS - Regulatory Position Statement
SW – Southern Water
WaSC - Water and Sewerage Companies
WC – Water Closet
WPS - Wastewater Pumping Station
WTW - Wastewater Treatment Works

1. Background

This Infiltration Reduction Plan (IRP) for Longparish in the Barton Stacey catchment has been prepared in response to the Environment Agency's (EA) Regulatory Position Statement (RPS). SW has been carrying out work for many years to survey and repair sources of infiltration in the catchment for Barton Stacey Wastewater Treatment Works (WTW) in Hampshire.

Figure 1 shows flows to Barton Stacey WTW. Longparish comprises the hamlets of Forton, Middleton, West Aston and East Aston, which have been combined into a single IRP because they are on the same sewerage network. The map on the following page shows that flows from Longparish are joined by flows from multiple villages upstream, including St Mary Bourne. These flows gravitate to Longparish wastewater pumping station (WPS), where they are joined by pumped flows from Forton WPS. The resultant flows are then pumped to Barton Stacey wastewater treatment works (WTW) south-east of Andover. Groundwater infiltration into the sewerage system in any of these villages contributes to an increase in the potential for flooding in the villages downstream.

The repairs carried out by SW improve the integrity of the sewerage system. SW has been working with the following organisations and is dependent on their support to achieve the objective of reducing non-sewage flows into the sewers.

- Environment Agency (EA)
- Hampshire County Council
- Test Valley Borough Council
- Longparish Parish Council

Southern Water has consulted with representatives of these parties as part of meetings with the local councils.

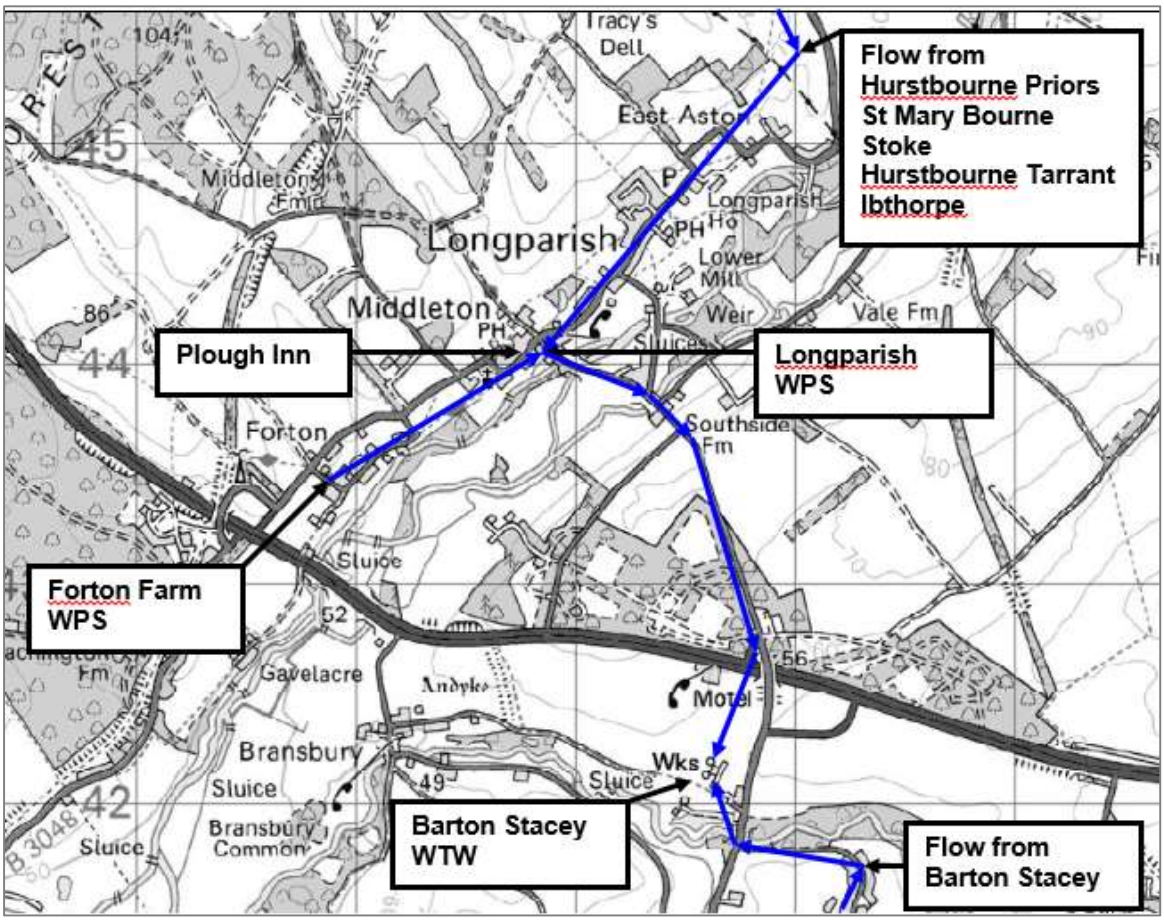

Figure 1.1 - Representation of the sewerage system for the Barton Stacey to Barton Stacey WTW

2. Groundwater Infiltration at Longparish

2.1. The significance of groundwater infiltration.

Longparish are areas in Southern Water's operating area where, during excessively wet winters, customers have been inconvenienced by the effects of groundwater infiltration into sewers. Such effects can include flooding and restricted toilet use (RTU).

Southern Water strives to maintain services for customers by a programme of investigation, repair, maintenance and mitigation. Mitigation measures include the use of tankers and over-pumping. Such mitigation measures are not sustainable, so during the last ten years SW has invested in carrying out major improvements to the integrity of the sewers and manholes in the vicinity Longparish in order to minimise the occasions on which over-pumping is required.

2.2. What would happen if Southern Water did not take action?

Despite the significant groundwater flow through the valley during these conditions, incidents of sewer flooding have been relatively infrequent. Table 2.1 below shows reported incidents of sewer flooding since 2012/13.

A hydraulic model of the Barton Stacey catchment is available, that can be used to understand the performance of the system and determine options to address risks. However, SW is aware from historical reports of which properties are likely to be the first to suffer from the effects of flooding.

It is noted that despite the groundwater levels in 2020 and 2021 being comparable to those experienced in 2013/14, the impact of this on the customers with respect to flooding and restricted toilet use has been much lower. This may demonstrate the effectiveness to date of the sewer sealing work undertaken in the network.

Table 2.1 – Historic Sewer Flooding Incidents in Longparish

Year	External Flooding	Internal Flooding	Restricted Toilet Use	Total
2012_2013	2	0	2	4
2013_2014	2	0	2	4
2014_2015	0	0	0	0
2015_2016	0	0	0	0
2016_2017	0	0	0	0
2017_2018	0	0	0	0
2018_2019	0	0	0	0
2019_2020	0	0	0	0
2020_2021	0	0	0	0
Totals	**4**	**0**	**4**	**8**

3. Investigation & repairs

3.1. Outline Plans to Investigate Sources of Infiltration

The Generic Plan describes Southern Water's Infiltration Reduction process. The specifics of the investigations and repairs at Longparish are captured in Section 3.2 below, and includes the following elements:

- Manhole Inspections and CCTV Surveys
- Flow Monitoring Surveys
- Manhole and Sewer Repairs
- Follow-Up Surveys and Repairs

3.2. Investigation and Repairs in the Longparish

Groundwater infiltration into sewers has been a long-running issue for the Longparish. SW has been making significant investments over many years to minimise infiltration and the need for over-pumping.

Similarly, £1 million worth of survey and seal work has been carried out on the sewer system serving St Mary Bourne which is beneficial for Longparish as St Mary Bourne's flows are also pumped to Longparish.The investigations and repairs followed the process set out in the Generic Plan. The timing and status of each step is in Table 3.1 below.

Table 3.1 – Summary of Survey and Repairs at Longparish

Step.	Description	Approx Date	Status
N/A	Repairs at Longparish 788m of sewers repaired	November 2011 – December 2011	Complete
1.	Manhole lifting followed by CCTV Investigation	May - June 2014	Complete
3.	Determination of required repairs 320m of sewers surveyed.	Autumn 2014	Complete
4.a.	Repairs at Longparish 53m of sewers repaired and 1 manhole sealed [refer plans in Appendix A]	November 2015 - February 2016	Complete

Step.	Description	Approx Date	Status
4.b.	Repairs at Forton 131m of sewers repaired and 2 manholes sealed [refer to plans in Appendix A]	November 2015 – February 2016	Complete
8.	Ongoing monitoring	As required	Instigate when trigger levels at St Mary Bourne are breached.
9.	Repairs at Longparish 788m of sewers repaired	November 2011 – December 2011	Complete
10.	CCTV Investigations	December 2017 - January 2018	Complete
11.	PADLS completed	July 2016 - May 2018	Complete

The long term monitoring analysis reveals that the repairs have provided resilience against an additional 3-4m of groundwater (measured at Vernham Dean borehole). The extent of the repairs is shown in the plans in Appendix A.

SW acknowledged that some infiltration remained, and therefore further targeted repairs were carried out during winter 2015/16 at points along the sewer network. This work has now been completed, which concludes the current phase of sewer rehabilitation. It is too early to measure the effect of the most recent repairs as data is not yet available. Whilst no further work is scheduled, if infiltration remains an issue, the requirement for further investigation and repairs will be considered in relation to other locations which experience sewer flooding.

In addition to physical investigations on site, SW has instigated a long-term monitoring programme in critical catchments, which now includes Longparish, (including Forton).

4. Over-pumping

4.1. Circumstances that lead to over-pumping

Since 2013, SW has made significant investment to reduce infiltration and to protect specific properties at risk of flooding, with the objective of reducing the frequency of discharges to watercourses.

If flows continue to increase, as groundwater levels rise, mitigation measures at certain locations will be required. Using previous experience, areas likely to be the first affected, are identified. The requirement for tankering or pumping will be driven by levels in the manholes locally. Based on experience in 2013 and 2014, over-pumping could be expected to be required when the groundwater level at Vernham Dean BH reaches 121.4m. However, to allow time for investigation and preparation, SW is using a lower groundwater 'trigger level' in the winter planning report. A trigger level of 120m is being used.

Figure 4.1 shows the groundwater level at Vernham Dean BH over the last five years. The levels at which over-pumping was required during this period are also shown. The repair programme in Longparish, including Forton, was completed in February 2016, whilst repairs at St Mary Bourne had been completed earlier.

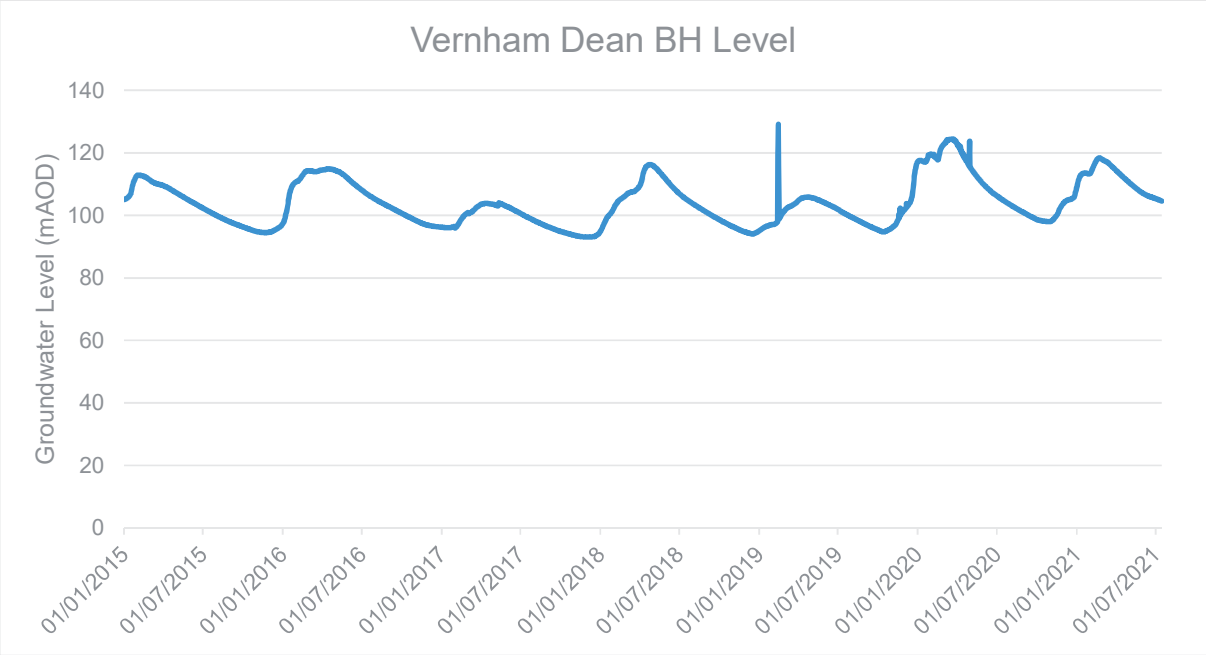

Figure 4.1 - Groundwater levels from 2015 to 2021

The details of where tankering and over-pumping has been necessary in the past are given in Appendix B. The repairs carried out, combined with the winter preparation checks, are expected to minimise the number of locations where over-pumping would be required. However, as a consequence of repairs and potentially other factors outside SW's control (such as the severity of the weather), the hydraulics may dictate that over-pumps are required at other locations either in place of, or in addition to, the sites described in Appendix B.

4.2. Steps to prevent discharges and alternatives to over-pumping

The Generic Plan details the typical activities that Southern Water undertakes to minimise the requirement for discharges to watercourses. Since 2011, SW has undertaken extensive surveys and repaired sewers and manholes where infiltration had been found (the extent of the work is shown in Appendix A). This built on the repairs that had been carried out in previous years (shown in Appendix A).

In addition to the eight steps outlined above, SW also carries out other activities to minimise the requirement for discharges to watercourses. In the Winter of 2014/15, SW instigated a number of steps which are now part of the winter preparation; these activities are detailed in the Generic Plan and supplement the rehabilitation programme.

4.3. Over-pumping arrangements (flow rates and minimisation of effect on watercourse)

A typical arrangement of an over-pumping setup is provided in the Generic Plan.

The locations where tankering and over-pumping has been used in recent years are shown in Appendix B. These locations were effective in restoring service to customers and are the default locations should the situation re-present itself. Dates of historic tankering and over-pumping are also provided in Appendix B.

In addition to the measures described above to remove solid matter, SW invested in ten portable biological treatment units in January 2014 for use at flooded areas throughout its area. Units were not used in Longparish. UV units have been used instead when over-pumping is required.

4.4. Steps to minimise the volume and duration of over-pumping

The Generic Plan outlines a detailed rationale behind the use of tankers and over-pumping, and summarises the benefits and disadvantages. Some specific issues in relation to the Longparish catchment are captured below.

4.4.1. Tankering

Benefits:

- See Generic Plan.

Disadvantages

- The flow rate is low (approx. 2l/s per tanker over a 24 hour period*)
- See also the Generic Plan.

4.4.2. Over-pumping

Benefits:

- Typical pump fuel consumption is 25% of the fuel that one tanker would use in a day.
- The discharge rate is significantly greater. A 150mm pump will discharge typically 50 to 80 l/s; the equivalent of a fleet of 24 tankers.
- See also the Generic Plan.

Disadvantages

- See Generic Plan.

The graph in Figure 4.2 shows the estimated carbon emission per m^3 of dilute effluent removed by tanker and by pump. In this example, data has been used for the 3,000 gallon tankers and a 150mm (6") pump at Longparish in 2014.

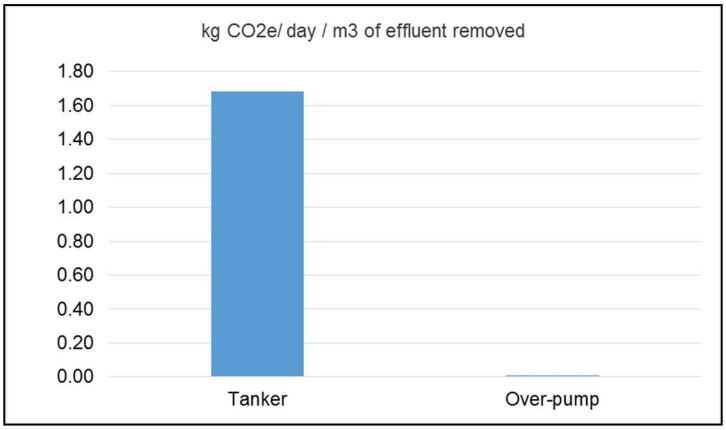

Figure 4.2 – Carbon Footprint figures for Tankers and Over-pumps per m^3 of effluent removed.

4.5. 3rd Party Communications about over-pumping

Since the start of the Infiltration Reduction Programme in 2013, Southern Water has been proactive in communicating with stakeholders and customers about planned and completed work to improve the integrity of the sewerage system. Stakeholders have been kept informed of progress on survey and sealing work via emails and or face-to-face meetings.

SW attends and convenes meetings with a number of local groups. In particularmeetings with the EA and local councils have been influential in helping to shape the IRP. During the flooding of 2013/14 SW had representatives on site who visited affected customers to help them. The latest version of the IRP approved by the EA, will be published on SW's website.

Despite the work being undertaken, if over-pumping is required, the location of advisory signs near the over-pumps is also provided in Appendix B. The Generic Plan provides more detailed arrangements around over-pumping.

During the winters of 2014/15 and 2015/16, SW and the EA held weekly conference calls to discuss locations where total flows in the sewers were reaching the point where SW might need to respond imminently with tankering or over-pumping.

From time to time, SW updates stakeholders about completed and planned work, as part of stakeholder meetings with the local councils.

4.6. Monitoring quality of the downstream watercourse

The Generic Plan provides details of water quality monitoring that will be undertaken, should over-pumping be required.

5. Options To Reduce Infiltration

5.1. Sewer Rehabilitation Programme

SW acknowledges that infiltration reduction is on-going process. In recent years, SW has invested over £300,000 in surveys and repairs in Longparish, including Forton. The work was completed in February 2016, and consequently no further repairs are currently planned in Longparish, including Forton. On a company-wide basis, to ensure that benefit continues to be gained from the work that has been done, SW is continuing the programme of infiltration reduction with proposed investment of a further £10m across its region for AMP6 (2015 – 2020).

5.2. Property Level Protection

A Non-Return Valve (NRV) is a mechanism by which sewerage is allowed to flow in one direction, but not the other; this can be useful for preventing sewage flowing from a main sewer into a lateral sewer. NRVs are particularly relevant where properties are at a low elevation relative to the main sewer. In the event of the main sewer becoming surcharged, the NRV will stop the lateral becoming surcharged, especially for long periods. But in these circumstances the lateral behind the NRV will need to be emptied by a tanker at least once a day to remove the effluent from the property.

NRV's have always been part of SW's armoury for dealing with the effects of infiltration. However, as well as the topography of the area, they are only effective if there is no significant infiltration in the lateral to which they are flitted.

The potential for NRV's to be installed in Longparish has been considered. As a result, work has been carried out, including the installation of an NRV in a lateral drain of a property in February 2015. Additionally, the potential for future use of NRV's will be investigated, if it is deemed appropriate, now that the current repair work has been completed.

5.3. Local Flow Control

Tankering was undertaken in the period January to March 2014, and over-pumping was used intermittently in March 2014. Neither tankering or over-pumping were required in 2019/20 or 2020/21.

5.4. Pumping Stations

In order to minimise the effects of infiltration, SW is continuing to ensure that design discharges are maintained at pumping stations. At Longparish WPS, the pumps were replaced/refurbished in 2014. Pump motors were replaced more recently; one in July 2015 and one in February 2016.

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5.5. Monitoring

SW has set up a monitoring programme using current electronic data (e.g. EA borehole level data via telemetry links). In January 2015, SW commenced a weekly review of the ten locations in its region which are most prone to sewer flooding. St Mary Bourne was added to this programme in 2015, and Longparish, including

Forton, were added in 2016. The monitoring uses 'real time' groundwater levels from local boreholes to predict when it might be necessary to respond to mitigate the effects of flooding. The trigger levels are not the levels at which tankering or over-pumping started historically; when a trigger level is breached SW increases activity to ensure that the sewers are running clearly. Levels in the manholes are also checked, as it is this, not groundwater levels that determine when surplus effluent needs to be removed from the sewers.

The graph below, Figure 5.1, is an example of those used for predicting the earliest, average, and latest dates for when the trigger levels are forecast to be breached. This graph shows groundwater levels (in blue) and an indication of flows (in red).

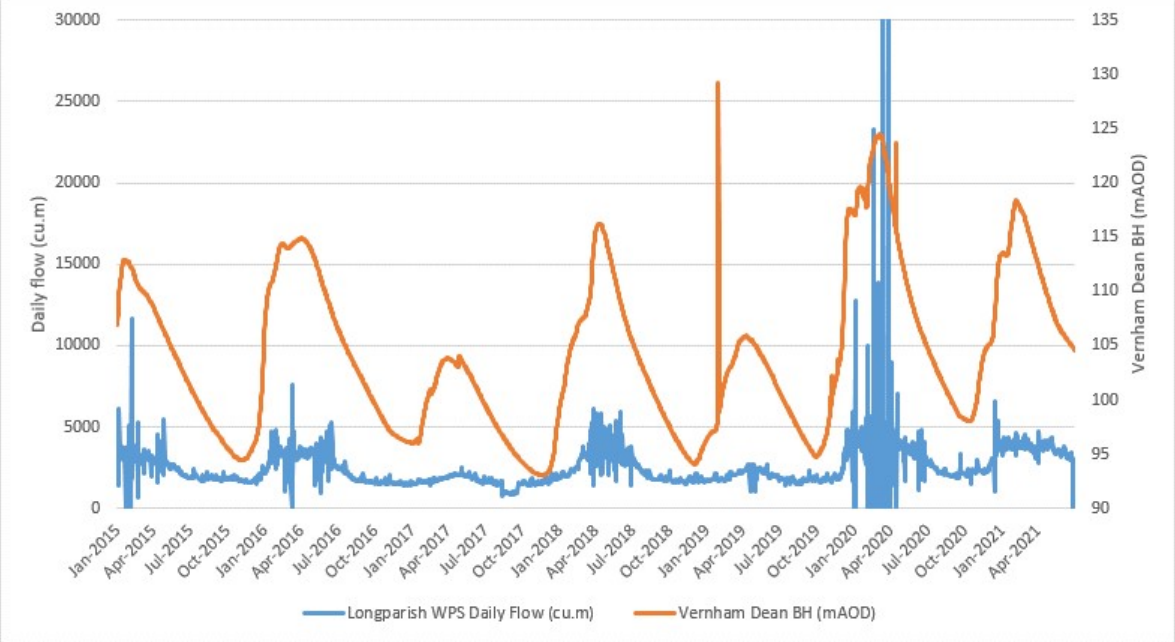

Figure 5.1 – Forecasting of Trigger Dates

SW repeats this monitoring each winter. In 2015, the reporting commenced mid-September, running reports at monthly intervals initially, increasing to fortnightly, then weekly to suit the rise of groundwater levels. Similarly, there were weekly reports during the winter of 2015/16. The forecast dates for reaching trigger levels is shared with the EA when it is produced.

The above approach can only be used during periods of rising groundwater. However it is important for SW to continue to monitor the integrity of the sewers through the drier months of the year.

In addition to the groundwater flooding forecasts explained above, SW is also looking at longer-term trends to monitor the effectiveness of the completed rehabilitation work.

In addition to the groundwater flooding forecasts explained above, SW is also looking at longer-term trends to monitor the effectiveness of the completed rehabilitation work. Figure 5.2 shows the groundwater levels at Vernham Dean borehole plotted against calculated flows at Longparish WPS.

Figure 5.2 – Long Term Monitoring (Jan 2010 to Nov 2015)

Figure 5.2 quantitatively illustrates how flow varies with groundwater levels. It is reasonable that as groundwater levels increase, the rate of infiltration increases. Therefore Figure 5.2 can be used to assess how effective repairs are at reducing infiltration. Two distinct periods are outlined: Jan 2011 – Nov 2011 (before repairs in the Barton Stacey catchment), and Nov 2014 – Jan 2016 (after the repairs). It is important to note that relevant repairs include the following:

- Repairs carried out in Longparish from November 2011 – December 2011.
- Repairs carried out in St Mary Bourne from October 2013 – October 2014 (see St Mary Bourne IRP for more information).

Lines A and B in Figure 5.2 show how values of flow for a given groundwater level vary before and after the repairs. The difference in groundwater level between Lines A and B is approximately 3-4m. In other words, for a given groundwater level, the corresponding flow is lower after the repairs. This suggests that repair work has been effective in reducing infiltration.

6. Action Plans

A significant amount has been achieved in the Longparish catchments in the last ten years. Some actions are ongoing which reflects the continuous improvement process for dealing with infiltration due to groundwater. To make it easy to track progress, the following tables set out the actions to reduce infiltration and also to mitigate the effects of it, if the infiltration cannot be controlled at economic cost. Tables 6.1 and 6.2 cover the actions by SW and by other parties, respectively, to reduce infiltration. Tables 6.3 and 6.4 cover mitigation of the effects of flooding (Communication and other activities).

SW is committed to continuing to pursue infiltration to reduce the frequency of over-pumping. This IRP describes the work that has been done by SW to improve the situation. In addition, it also describes what is being done to monitor flows, the 'winter preparation' work to be carried out to ensure assets are operating correctly, and the work to be developed with other agencies to improve an integrated plan to address flooding.

Colour coding of actions in tables:

- Green – completed
- Orange – imminent action required
- Red – overdue
- White – on-going actions with no specific end dates.

Table 6.1. Southern Water Current Activities to Reduce Groundwater Infiltration

Number	Item	Actions	Timescale and Status	Outcomes
1.1	Develop an approach for reduction of infiltration and maintenance of reduced levels of infiltration.	Refer to Section 3 of this IRP.	Summer 2013. Complete	The steps are being followed to deliver results.
1.2	CCTV etc survey of sewers [Step 1 in Fig. 3.1]	Identify strategic manholes, survey manholes to identify clear flow and infiltration. Carry out CCTV survey where clear flow was identified.	May – June 2014. Complete	Sources of high Infiltration identified by the 2014 CCTV surveys have been repaired.
1.3	Carry out sewer rehabilitation work [Step 4 in Fig. 3.1]	Use various techniques to seal infiltration points in manholes and sewers	Longparish: Identified repairs completed in 2011 and 2015/16. Forton: Some identified repairs completed in 2015. Forton Rehabilitation work completed in winter 2015/16.	Rehabilitation will restore structural integrity of the sewers.
1.4	Further surveys (CCTV or alternative techniques), if required, in areas of high remaining infiltration.	Targeted surveys to address areas suffering sewer flooding.	Spring 2015. Complete.	Determine scope and carry out further rehabilitation if identified as required from the CCTV survey results.

Number	Item	Actions	Timescale and Status	Outcomes
1.5	Further sewer rehabilitation work, if required, in areas where surveys carried out.	Follow-up repairs.	Winter 2015/16. Completed in February 2016.	Rehabilitation will restore structural integrity of the sewers.
1.86A	Maintain IRP as a live document	Update IRP as appropriate to describe work carried out and/or developments	Annually – on anniversary of EA approval	Up-to-date IRP.
1.6B	Quarterly progress reports	A progress report on infiltration reduction work related to this catchment will be submitted to the Environment Agency	Quarterly (December, March, June, September)	Keep the Environment Agency informed of progress on a regular basis
1.7	Strategy for inflows via private drains (see footnote).	SW to propose a strategy for dealing with infiltration via private drains*	SW, Complete. July 2014.	SW's objective is to improve awareness of the significance of infiltration into private drains and the importance for customers to ensure infiltration is repaired when it is discovered.
1.8	Monitor Flows	SW carry out pre-winter checks and monitor sewer flow to identify significant increases in inflows.	Commenced winter 2014/15. Repeated winter 2015/16.	Preparation for winter responses.

Number	Item	Actions	Timescale and Status	Outcomes
1.9	Consider alternative solutions that involve some risk	Investigate unconventional options such as vacuum sewers or consider conventional combined sewer overflows	2020	Ongoing.
1.10	Over-pumping Sites: improve effluent quality	Investigate potential for improved screening and basic treatment at points of discharge into watercourse.	SW, 2014. Complete for previously used sites.	Improved arrangements for discharges when required.
1.11	Over-pumping Sites: minimise flow	Add level control to pumps to reduce durations for pumping	SW, 2014. Complete.	Minimises volumes of discharge if seasonal discharge(s) are necessary in order to maintain use of sewerage services for customers during periods of very high groundwater levels.
1.12	Standards for emergency discharges	SW to discuss with EA about best practice set up for over-pumping arrangements.	SW, 2014. Complete.	Agree with EA acceptable standards for discharges and acceptable flow rates.
1.13	Flow, location, screening arrangements for emergency discharges	Determine potential flow rates and screening arrangements and most appropriate locations,	SW, 2016. Included in this IRP. Complete.	Agree with EA, HCC and local Parish Councils acceptable arrangements for future emergency discharges.

Number	Item	Actions	Timescale and Status	Outcomes
1.14	Action Plans	Develop SW action plans documenting set up of pumps, tankers, etc. for emergency situations.	SW, Summer 2014. Complete.	Action Plan available for planning sessions with other authorities in preparation for repeat flooding events. Engagement with the local community about the potential arrangements for dealing with excess flows into sewers to mitigate disruption to customers.
1.15	Identification of lengths of sewer to survey or resurvey in the period 2021-25	Review sewer records with available ground water profile date	Post 2022	Planned
1.16	Undertake required sewer sealing	Seal sewers and manholes by most appropriate technique	Post 2022	
1.17	Review effectiveness of any sealing work	Analyse monitoring data and groundwater data to determine benefit of investment	Post 2022	

Table 6.2. Multi-Agency Activities to Reduce Groundwater Infiltration

Number	Item	Actions	Timescale and Status	Outcomes
2.1	Strategy for infiltration via private drains	Southern Water to propose a strategy for dealing with infiltration via private drains*	SW supported by EA and local Parish Councils, Summer/ Autumn 2014. Completed 2014.	Southern Water objective is to improve awareness of the significance of infiltration into private drains and the importance for customers to ensure infiltration is repaired when it is discovered.
2.2a	Investigate highway 'mis-connections'	Where non-sewage flow is identified, check highway drainage relative to sewers to ensure road drainage is not a source of flow into the SW sewers	Hampshire County Council with support from SW, as appropriate if connections are identified. To be pursued as and when required.	Reduced flow of surface water (if connections are found).
2.2b	Investigate groundwater infiltration on domestic drains	Where non-sewage flow is identified from domestic properties, investigate to identify source of flow into SW sewers	SW, with assistance from Test Valley Borough Council as appropriate, if connections are identified. To be pursued as and when required.	Reduced flow of surface water (if connections are found).
2.3	Consider effects of proposed new developments on infiltration.	Borough Council to continue to consult with SW on development applications.	Test Valley Borough Council, Ongoing.	Developments in areas which would be detrimental to sewer flooding, to have conditions recommended by SW and applied, as appropriate, by the District Councils.
		SW to determine threshold above which they require to be consulted.	SW, Ongoing.	

Note: Southern Water does not have powers to require residents to repair private drains. Hence the support of the other agencies is required. It is acknowledged that customers may not be aware of infiltration in their private drains, so SW will consider ways of obtaining information to demonstrate the presence of infiltration. District Councils would only be able to instigate action under Section 59 of the Building Act where proof/evidence is provided of the defect.

Table 6.3. Publicity / Communication Activities to Reduce / Mitigate the Effects of Groundwater Infiltration.

Number	Item	Actions	Owner, Timescale and Status	Outcomes
3.1	Public meetings about reducing groundwater infiltration into sewerage system	Attend public meetings with other agencies as appropriate	SW, Regular meetings are not planned, but SW will attend with other agencies as required.	Inform stakeholders of progress and planned activities and receive feedback.
3.2	Communications from SW to stakeholders about reducing groundwater infiltration into the sewerage system.	Send e-mails at regular intervals to communicate progress on sewer rehab activities.	SW, ongoing as required.	Inform stakeholders of progress and planned activities
3.3	Liaise with other agencies as appropriate.	Discuss and agree actions to reduce requirements for tankering and emergency discharges to watercourses.	All parties, as required.	Improved understanding and appreciation of issues. Agreement to actions to help reduce the need for tankering and emergency discharges to watercourses.
3.4	Communicate with stakeholders about optimum arrangements for emergency discharges	Explain potential flow rates and screening arrangements and most appropriate locations.	SW, Complete. SW will communicate further when further emergency discharges are required.	Agree with EA acceptable arrangements for future emergency discharges. Notify HCC and Parish Councils.

** SW can provide base information to councils to include in articles publicising the role that everyone can play in minimising non-sewage flows into sewers, and the importance of doing so to reduce the incidence of restricted toilet use during periods of high groundwater.

Table 6.4. Activities to Mitigate the Effects of Groundwater Infiltration/ Other Flood Protection Mechanisms

Number	Item	Actions	Owner, Timescale and Status	Outcomes
4.1	Early Warning system	Monitoring of winter groundwater levels and sewer levels/flows, using EA borehole data. Discuss with EA in weekly calls (when groundwater levels are high).	SW, 2014. Ongoing. Commenced Jan 2015. Re-commenced Sept 2015.	Develop trigger levels by comparing historic customer complaints and tankering with BH levels (or other reference). Note trigger levels should vary as a consequence of rehabilitation. Also they will need to reflect groundwater reaction times.
4.2	Tankering arrangements	Investigate options for improving location of tankers and over-pump units for future events. e.g. by use of longer hoses/ pumping	SW, Spring 2014. Complete	Potentially less disruption to residents when tankering / pumping is essential.
4.3	Integrated approach to Mitigate effects of groundwater flooding	Attendance at multi-agency meetings and developing multi-agency actions to reduce the effects of groundwater flooding	Hampshire County Council with inputs from SW, EA and Parish/District Councils.	Actions for participating authorities that in unison will reduce flooding and / or the impact of flooding.

Appendix

A Survey Findings and Rehabilitation Scope

B Emergency Discharge Sites