Winchelsea Beach

Infiltration Reduction Plan

March 2017
### Document Title: Winchelsea Beach Infiltration Reduction Plan

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GLOSSARY OF TERMS

AMP – Asset Management Programme
BTKNEEC - Best Technical Knowledge Not Entailing Excessive Cost
CCTV - Closed-circuit television
CIPP – Cured In Place Pipe
CIPR – Cured In Place Patch Repair
EA - Environment Agency
ESCC – East Sussex County Council
GW – Ground Water
IPC - Icklesham Parish Council
IRP - Infiltration Reduction Plans
MH – Manhole
RMIDB - Romney Marshes Internal Drainage Board
RPS - Regulatory Position Statement
RTU - Restricted Toilet Use
SW – Southern Water
WaSC - Water and Sewerage Companies
WC – Water Closet
WPS - Wastewater Pumping Station
WRc - Water Research Council
WTW - Wastewater Treatment Works
BACKGROUND

The Environment Agency’s (EA) Regulatory Position Statement (RPS) requires Water and Sewerage Companies (WaSC) which are aware of sewerage systems in their area which are vulnerable to infiltration, to submit Infiltration Reduction Plans (IRP) to the EA for approval. This document is produced in response to the RPS.

The purpose and nature of the IRP is that it will be updated by Southern Water (SW) annually and show the latest information regarding the progress of work in the area to reduce infiltration. Therefore, there will not be a ‘final issue’ of the plan; it is a working document, which will be updated as required.

This IRP covers part of the catchment for Winchelsea Beach Wastewater Treatment Works (WTW) in East Sussex. The extent of the catchment is shown in the map on the following page. Flows are pumped northwards from Victoria Way Wastewater Pumping Station (WPS), where it joins other flows gravitating towards Morlais Ridge WPS. The resultant flows are pumped northwards from Morlais Ridge WPS to Winchelsea Beach WTW. The location particularly affected by sewer flooding is between Victoria Way WPS and Morlais Ridge WPS.

The sewerage system in Winchelsea Beach is designed as a ‘foul only’ system. Over time surface water connections, or misconnections, have been added to the sewerage system which leads to overloading of the system during prolonged wet weather.

In developing this plan Southern Water has been liaising with key stakeholders and particularly in flooding events has been working closely with these bodies to minimise the impact on customers.

In this plan various actions have been identified to improve the integrity of the sewerage system. The success of the IRP will also be dependent on the support of the following agencies and councils:

- Environment Agency
- Icklesham Parish Council
- Rother District Council
- East Sussex County Council
- Romney Marshes Area Internal Drainage Board
- Winchelsea Sands Flood Group
- Rye Bay and Winchelsea Sands Caravan Parks
Representation of the sewerage system for the Winchelsea Beach WTW catchment
1 REPORT STRUCTURE

In response to the Environment Agency’s publication of their Regulatory Position Statement on discharges made from groundwater surcharged sewers, and the consequence of recent sewer flooding, Southern Water has produced this IRP, which sets out the steps being taken to manage the groundwater infiltration (GW infiltration) affecting the catchment of Winchelsea Beach WTW in East Sussex.

As required by the Regulatory Position Statement, the following are included in this Infiltration Reduction Plan.

1. **Situation** with respect to history of flooding, restricted toilet use (RTU) and other customer issues is provided in Section 2.

2. **Outline plans and timescales (milestones) to investigate the source and severity of the infiltration problems** – This is covered in Section 3.

3. **Details of anticipated unavoidable discharges (resulting from groundwater infiltration) indicating their location and the circumstances under which they will need to be made.** This is covered in Section 4. The details of proposed over-pumping are covered in Appendix E and the over-pumping location used in 2014, is given in Appendix D.

4. **Details of the proposed discharges such as screening that will be in place and maximum discharge rates etc.** This is covered in Section 4 and Appendices C and E.

5. **Presentation of potential actions (options) that could be considered to resolve/minimise the infiltration and remove the need for discharges.** This is covered in Sections 5.2 and 6.1. The SW actions are given in Table 1. Multi-agency actions are given in Tables 2 - 4.

6. **A review date.** The IRP will be reviewed on an annual basis. An update will be provided to the EA on a quarterly basis.

7. **Communications** – SW is engaging with other stakeholders, and keeping them informed about planned activities. Signage in the event of over-pumping is included in Appendix F. Communications with Stakeholders and customers are covered in Section 6.

8. **Monitoring** – This is covered in Section 5. SW will set up a programme to monitor and seek to identify significant changes in flow.
Executive Summary

1. Surveys were carried out in 2012/13 at the locations shown in the plan in Appendix A. In summer 2014, further surveys were carried out on 1.2 km of sewer which identified a number of sources of infiltration in manholes and sewers in Dogs Hill Road and Morlais Place. The locations are shown on the 2014 survey plans in Appendix A.

2. SW undertook a flow survey of the catchment in winter 2015 to understand the inflow from different areas of the catchment. The result of the survey has helped to identify areas that are contributing excessive flows into the sewers. A more targeted approach is currently being used to survey assets in these areas to identify potential ingress points.

3. Further flow monitors have been installed this winter (2016/17) which will measure the flow in the sewers and help understand the benefits achieved after the improvement works already completed.

4. SW is engaging with stakeholders, and keeping them informed about planned activities.

5. The IRP has been prepared by SW, but the success of ultimately eliminating the requirement for emergency discharges (other than under exceptional circumstances) is dependent on a multi-agency commitment. [the current set of actions are included in Tables 2 – 5]

6. SW is committed to detecting and repairing sources of infiltration to reduce groundwater infiltration into sewers in accordance with best technical knowledge not entailing excessive cost. (BTKNEEC).

7. Significant investment has been made by SW to reduce infiltration. Multi-agency actions are identified to reduce the impact of high groundwater. However, it is recognized that reducing infiltration is a long term activity and there may be occasions into the future when emergency discharges are required. Due to the extreme heavy rainfall throughout the period December 2013 to February 2014, emergency discharges were necessary to ensure a minimum level of sewerage service is provided to residents. (Details of emergency discharges and tankering in the winter of 2013-14 are provided in Appendix D).

8. Despite the significant investments being made by SW to reduce infiltration into sewers, and multi-agency actions to be taken, there may continue to be occasions when emergency discharges will be required. The circumstances when overpumping and tankering would be expected to be required, locations and expected flow rates are included in Appendix E.

9. It should be noted that manholes in the vicinity of the tankering/pumping may spill during periods of heavy rainfall or high ground water level, despite our actions to maintain sewage disposal services for customers by the use of tankers and (where appropriate) pumps.
2 SITUATION

2.1 Customer issues

The table below provides a list of properties that reported flooding or drainage related issues during period of heavy rain during the last five years. Whilst there are no properties affected by internal sewage flooding during 2012/13, 2013/14, 2014/15 and 2015/16 there are a number of properties affected by external flooding, Restricted Toilet Use (RTUs)/ surcharge during this period.

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*Data shown are up to end of January 2017

During the winters of 2013/14, 2014/15 and 2015/16, tankering and over-pumping were used extensively to reduce levels in sewers and to maintain services for customers. Without these measures, there would have been more extensive flooding, restricted toilet use and spillages from manholes. Some improvements have been observed during winter 2016/17 as the number of customer contacts have reduced and the amount of tankering required following rainfall events has reduced.

2.2 Description of Flooding

External flooding at a property is defined as flooding to external areas within the curtilage of the property, due to sewers becoming surcharged. The flooding will normally be from a surcharged manhole, or gully. External flooding can be contaminated surface water entering the grounds of the property. There are two other categories of external flooding: Highway flooding refers to flooding on roads or footpaths. ‘Other’ external flooding refers to non-residential buildings and public open spaces.

RTU (Restricted Toilet Use) may be experienced by customers as the sewers become surcharged. Toilet facilities still function, but effluent will be slow to drain away and sometimes facilities can only be used for limited periods – for instance after a tanker has removed dilute effluent from the local sewers.

Internal Flooding occurs when sewers either back-up to such an extent that dilute effluent floods inside dwellings from low connections to the drains. (for example through WCs or shower drains), or when contaminated surface water enters the building.
3 OUTLINE PLANS AND TIMESCALES TO INVESTIGATE INFILTRATION PROBLEMS

Southern Water acknowledges that action needs to be taken to reduce non-sewage flows into the sewers.

Acknowledging that action is required, Southern Water took advantage of the high groundwater levels in 2014 to carry out CCTV surveys and has completed rehabilitation work to improve the situation in March 2015. Further rehabilitation works have now been completed for year 1 AMP 6 (April 2015 – March 2016). SW's approach and extent of CCTV undertaken have been described in Section 3.1. Details of all completed and planned rehabilitation work are provided in Section 3.2.

3.1 CCTV Survey

3.1.1 Approach

The approach used when carrying out CCTV is for the flow to be observed at a number of manholes – identified as 'strategic manholes'. The surveys are ideally carried out as the groundwater levels are falling; when the flow in the sewer has reduced, such that the pipe is no longer surcharged, but whilst groundwater levels are still above normal.

3.1.2 CCTV Survey in 2014

In summer 2014, surveys were carried out on 1.2 km of sewer which identified a number of sources of infiltration in manholes and sewers in Dogs Hill Road and Morlais Place. The locations are shown on the 2014 survey plans in Appendix A.

In early March 2015, repairs were carried out at these locations (also shown in Appendix A)

3.2 Rehabilitation and Improvement Works

Sewer systems are designed for normal ‘dry weather’ conditions, but with an allowance for infiltration. However, where SW is aware of significant infiltration which impacts on the ability to provide effective drainage, steps are required to reduce infiltration to an acceptable level. Consequently, SW has proactively identified sewer rehabilitation works following completion of CCTV works in 2014. In addition to the sewer rehabilitation, for critical Wastewater Pumping stations in the catchment, SW will ensure that heath checks are undertaken to make sure their performance level is maintained. Details of these works together with a description of the sewer repair techniques are described in following Sections.

3.2.1 Repair Techniques

Where rehabilitation is required, the appropriate repair technique is selected from the following:

- Sewer lining – fitting a new lining to sewers from one manhole to another or to sections of sewer to repair several leaks, by forming a leak-tight pipe within the existing sewer.
- Excavations to repair leaking joints where no-dig techniques are not possible.
- Quick-Locks – metal ‘sleeves’ which are inserted remotely into damaged pipe sections and, once located correctly, are expanded via compressed air against the inner walls of the pipe to instantly seal leaks.
• Joint Test and Seal – each joint between sewer pipes is air tested and if it does not hold the pressure, the joint is injected with a gel to seal it. Sealed joints are retested.

• Capping of leaking un-used connections.

• Top Hats – fibreglass inserts which form a leak-tight bond at the point where a lateral sewer connects to the main pipe.

• Ground Stabilisation – an alternative technique which involves the injection of gel into the ground around a leak.

• Manhole chamber sealing – a non-excavation method to repair manholes.

3.2.2 Completed Sewer Repairs
SW has completed rehabilitation work at the locations shown on the plans in Appendix A (completed in AMP5) and B (Completed in AMP6) on sewers where infiltration was observed.

3.2.3 Planned Sewer Rehabilitations
SW is planning to undertake further rehabilitation work at the locations shown on the plans in Appendix B on sewers where infiltrations were observed following recent CCTV and Electro-scan Surveys completed in January 2017.

3.2.4 Pumping Station Health Checks and refurbishment
The critical pumping stations in Winchelsea Beach have received a health check prior to the winter season in previous years and these pumping stations will continue to receive similar health checks prior to the winter season. These health checks include inspections and maintenance to maintain optimum performance of the pumps to ensure the WPS achieves its design pass forward flow.

3.2.5 Works undertaken at the Caravan Parks
Historically there has been significant surface water from the two of the largest Caravan Parks entering the public sewers via private sewer networks.

In summer 2015 both these parks have undertaken some remedial works. One of the caravan parks has repaired known pipe defects where infiltration was suspected to get into their private sewers. The other one has capped off known mis-connections to the sewers, and is undertaking ditch clearance works to allow the land drainage system within their site to function more effectively.

SW will continue to work with residents and local caravan parks to help reduce the amount of surface water entering our sewers via private sewer networks to identify pragmatic solutions. Further local engagement and surveying are being undertaken, to help develop a clearer understanding of the volume and location of surface water entering the Southern Water’s network via private sewers.
4 DETAILS OF ANTICIPATED UNAVOIDABLE DISCHARGES

The circumstances under which unavoidable discharges would be required are covered in Section 4.2 below and the over-pumping locations used in 2014 and 2015, are given in Appendix C.

4.1 Requirements

The rehabilitation work being undertaken by SW will improve the integrity of the sewerage system thus reducing groundwater infiltration. However, in this catchment, the contribution of surface water in the sewers is significant. Private drains may also be a source of infiltration and following completion of the current work, SW will work with others to reduce infiltration into these pipes.

SW is committed to detecting and repairing sources of infiltration to reduce groundwater infiltration into sewers in accordance with best technical knowledge not entailing excessive cost. \(\text{BTKNEC}\). Nevertheless, currently in periods of heavy rainfall or high ground water level emergency discharges may continue to be required. Section 2.3 iii) and iv) of the RPS, Version 2, 2014 (reproduced below) anticipates this possibility.

Excerpt from Regulatory Position Statement, Version 2, 2014 - Section 2.3 iii) and iv)

iii) Details of anticipated unavoidable discharges (resulting from groundwater infiltration) indicating their location and the circumstances under which they will need to be made.
iv) Details of the proposed discharges such as screening that will be in place and maximum discharge rates etc.

4.2 Conditions under which discharges are expected to be required

Winchelsea Beach faces Rye Bay, the estuary of the River Rother; at high tide it is composed of shingle, which is normal on this stretch of coastline; whilst at low tide an expanse of mud and sand is revealed.

Rainfall has a major influence on groundwater level in Winchelsea Beach which makes groundwater level unpredictable. However, based on last 2½ years data, it has been observed that there is a good correlation between wet well level at Morlais Ridge WPS and the amount of rainfall. The graphs in Figure 1 show the correlation between rainfall data and Morlais Ridge WPS wetwell level.

Morlais Ridge WPS serves the sub-catchment worse affected in Winchelsea Beach. As it can be observed from the graphs, the wetwell level at this pumping station reacts very quickly to rainfall event, i.e. there is a quick increase in the wetwell level - it reaches 100% during period of heavy rainfall. As noted in the Background section of this report, the system was designed as ‘foul-only’, hence, it is quickly overloaded when it receives increased rainfall related flows such as surface water or rainfall induced infiltration.

It is quite normal for wet wells to fill, but if incoming flows continue to increase, the capacity of the pumps will be exceeded. Once this occurs the upstream sewers start to surcharge. SW has investigated whether the output of the pumps can be increased slightly. However, the pipes into which they pump (rising mains) and treatment works are all part of an integrated system. Consequently it is not always possible to modify any one in isolation. Once the capacity of the pumps is exceeded, customers may start to experience flooding or restricted toilet use issues. Consequently SW has taken steps to reduce infiltration; also with the input of other parties, SW is expecting surface water flows in the sewers to be reduced. Recent monitoring of the
performance of the catchment shows the duration that the wetwell level at Morlais Ridge WPS stays high following rainfall events has considerably reduced.

![Figure 1 Rainfall, Morlais Ridge WPS wetwell level, EAP Trigger Level, Historic Tankering, and Over pumping](image)

**Figure 1 Rainfall, Morlais Ridge WPS wetwell level, EAP Trigger Level, Historic Tankering, and Over pumping**

### 4.2.1 Tankers and Overpumping

Tankering is triggered by the wetwell level at Morlais Ridge WPS and the level at which SW trigger the Emergency Action Plan (EAP) is shown in Figure 1. It has been observed that external flooding in customer properties when the wetwell level reaches about 70% and the EAP is triggered once the level in the wetwell reaches 70%. SW undertook a flow measurement survey at Winchelsea Beach during winter 2015. The survey provided better information about areas of high non-sewage flows. Further repairs and investigation works have been identified. SW has commissioned another flow survey during winter 2016 to monitor the flow in the sewers in Winchelsea Beach and also understand the benefits of improvement works undertaken.

SW has now included Winchelsea Beach in the Winter Planning. As part of this process the wetwell levels and pump run time at Morlais Ridge WPS will be regularly reviewed.

Figure 1 provides tankering and over pumping data compiled for the last 2.5 years. Looking at the chart, it can be observed that deployment of tankers coincide with high wetwell level at Morlais Ridge WPS, which is a result of heavy rainfall. In these situations, customers in Winchelsea Beach start experiencing restricted toilet use or flooding issues.

To provide effective drainage the initial response has traditionally been to provide tankers and to deploy these at strategic locations to manage water levels. However, this is not always an appropriate action, over-pumping is often the more effective response.

Consequently, SW propose to deploy tankers (ideally a maximum of 2 to minimise traffic congestion) to respond to a combination of high wetwell level and customer complaints. The situation shall be monitored and should customer issues persist the need for overpumping will be reviewed in relation to the parameters in Section 4.3 and discussed this with the EA at the time.

In order to minimise its disruptive effect to residents in Winchelsea Beach, to the road infrastructure and carbon emission to the environment, SW do not propose to use more than two tankers at a time. Section 4.2.2 provides a comparison of the carbon footprint of using a tanker as opposed to overpumping.

Overpumping at Winchelsea Beach has been used during winters of 2013/14 and 2015/16 to assist in mitigating flooding issues in Winchelsea Beach which was caused by prolonged wet weather.
4.2.2 Environmental Impact of Tankering and Overpumping

In the winter 2013/14 SW used tankering at two locations (although not concurrently) and overpumping at one location. No over-pumping was carried out in 2014/15. The following year, SW used tankering at the Village Hall in September 2015; and both tankers and over-pumping during winter 2015/16. Tankers and over-pumping are both appropriate solutions, each suiting different scenarios. The key benefits and disadvantages are noted below.

**Tankering**

**Benefits:**

- dilute sewage is discharged at a treatment works for treatment,
- Quicker response time,
- No impact to watercourse,
- Convenience – suitable for response to short duration localised flooding.

**Disadvantages**

- the flow rate is low (approx. 2l/s per tanker over a 24 hour period*)
- there are traffic issues associated with large vehicles using narrow roads
- the roads at Winchelsea Beach will not have been designed to take the load of repeated visits by tankers – resulting in damage to the road,
- tankers are noisy causing disturbance to the local properties, particularly at night time.
- High cost and carbon footprint compared to overpumping.

*Tankers operating at Morlais Ridge discharge at Winchelsea Beach WTW, - a round trip of approximately 2 hours including loading and discharging.

**Overpumping**

**Benefits:**

- typical pump fuel consumption is 85% of the fuel that one tanker would use in a day.
- the discharge rate is significantly greater. A 4” pump will discharge typically 30 l/s; the equivalent of a fleet of 15 tankers.
- pumps are quieter,
- The pumps run on level control so only operate when required.
- Located off the highway

**Disadvantages**

- Environmental impact of over-pumping dilute effluent to the watercourse
- Pumps are less noisy than tankers but may cause disturbance to the local properties, particularly at night time.

The graph in Figure 3 shows the estimated carbon emission per m$^3$ of effluent removed by using a 4000 gallon tanker and 4 inch (100mm) diesel pump assuming that the tanker is discharging at Winchelsea Beach WTW. The data indicates that the use of tankers emit about 20 times more carbon to the environment than a diesel pump. This figure could be larger if effluent is discharged to other sites that are further away, such as the Rye WTW.
4.3 Steps to prevent discharges and prior alternatives to over-pumping

In addition to the steps outlined in Section 3.2, SW also carry out other activities to minimise the requirement for discharges to watercourses. During the Winter 2014/15 SW followed the steps in the following list. These activities supplemented the rehabilitation programme. The approximate timescales for each step are included in brackets.

1. Carry out scheduled maintenance visits to key pumping stations prior to winter weather. [Autumn 2016]

2. Ensure that sewers prone to silt deposition or fat build-up have been jetted as per SW’s Scheduled Maintenance Tasks. [Autumn 2016]

3. As flow in the pumping station increases, monitor WPS performance based on previous flood events. [Late autumn 2016, increase frequency of monitoring to weekly as levels rise]

4. Hold weekly calls with the EA and share forecasts for potential over-pumping [from late autumn 2016, dependent on groundwater levels]

5. Monitor customer calls. Seek to establish whether there is a common cause for the lack of capacity to maintain sewage disposal services. [ad-hoc analysis, as and when required during flood events]

6. Respond to customer calls with targeted sewer jetting, tankering or over-pumping as appropriate. [as required]

7. Keep EA informed about tankering activities and if over-pumping is expected to be required, agree this course of action with the EA. [from late autumn 2016, through weekly reports and calls]

8. Continue to monitor levels. [weekly through the winter/ spring]

9. Keep EA informed about tankering, jetting and over-pumping activities in weekly calls. [from late autumn 2016, through weekly reports and calls]

10. Where over-pumping is required, ensure duration and quantity of discharges are minimised (e.g. by use of level control on pumps). Also ensure the over-pumping components (settlement tanks etc) – as agreed – refer Appendix C of the IRP.
11. Following the flooding event, as levels in the sewers return to normal, lift MH covers in catchments where there has been over-pumping to identify sudden increases in flow. [Spring 2017, but only if there was flooding during the Winter]

12. Instigate survey and repairs if required. [Spring 2017, but only if there was flooding during the Winter]

4.4 Potential Discharges

It is imperative that the sewerage system and wastewater pumping stations in the catchment operate at all times and to their maximum design capacity to ensure that residents and customers do not have to suffer from restricted use of their facilities, or that the sewer system becomes overloaded to the point that uncontrolled discharges occur which causes disruption and pollution incidents to the environment. If the hydraulic capacity of the sewers and wastewater pumping stations is exceeded due to additional flows from groundwater, the first response of Southern Water is to deploy tankers at strategic locations to remove some of the flows. These tankers then transfer excess flows to Rye WTW, Winchelsea Beach WTW, Castle Farm WPS or pumping stations in Hastings.

Tankers are generally deployed to protect a few properties suffering from restricted use of their facilities. In these cases, it is normally sufficient for the tankers to visit these properties once or twice a day to remove excess flows from manholes in the vicinity. However, during exceptional high flows, large numbers of properties may be at risk of restricted use of their facilities. Tankers have limited capacity, can only draw off liquid at a relatively low rate and cause disturbance by their presence and noise associated with the work. Under exceptional high flows, large numbers of tankers would be required to operate continuously for 24 hours a day. This would be impracticable from an operational point of view and would be unacceptable to residents due to the associated high levels of noise and disturbance. Hence the alternative of over-pumping needs to be considered.

There is no clear rule for the exact point to change from tankering to pumping. However, the following factors are taken into account.

1. Use of the appropriate equipment to maintain services to customers (e.g. minimising restricted toilet use).

2. Avoidance of imminent internal or external sewer flooding to protect public health.

3. Forecast of sudden increase in groundwater levels due to severe or prolonged rainfall that would significantly increase risk of sewer flooding.

4. Minimising health and safety risks or disruption to residents due to tanker movements. Particularly where tankers are required at night or where tankers restrict access to properties.

5. Whether there are isolated properties suffering RTU/flooding or whether the disruption is more widespread.

6. Traffic congestion caused by tankers

7. As flood conditions worsen, determining whether tankers remain a practical and economically viable solution.

8. The availability and proximity of a suitable receiving watercourse with sufficient flow.
9. Noise and exhaust fumes pollution of tankers versus the potential impact of over-
pumping on the receiving watercourse.

10. Demand for tankers elsewhere. During the exceptional high rainfall experienced in 2014,
in responding to sewer flooding events, Southern Water exhausted the available supply
of tankers.

When wastewater pumping stations and tankers capacity are exceeded in cases of high flows in
the sewers, it will be necessary to supplement the tankers with temporary discharges from the
sewers to watercourses to protect residents from imminent public health dangers of sewage
flooding in properties or restricted toilet use (RTU). When over-pumps are deployed, tanker
numbers would be reduced, as the pumps discharge significantly more dilute effluent than the
tankers.

Southern Water is investing in sewer improvement works to reduce the ingress of groundwater
into the sewers in order to keep the use of over-pumping to a practicable minimum. SW is also
working with others to seek to reduce the amount of rainwater entering the sewerage systems.
However, during periods of heavy rainfall or high groundwater level emergency discharges to
watercourses at one or more locations might continue to be required.

Prior to the initiation of overpumping, the EA and other stakeholders will be consulted as
detailed in Section 6 on Communications.

4.5 Details of the proposed discharges

A typical over-pumping site consists of a pump located at ground level adjacent to a sewer
manhole near the watercourse. The pump lifts flow (through a barrel filter) from a level which
captures liquid flows rather than solids (which remain in the sewer). The flow is pumped into a
settlement tank where it passes under settlement weirs, before discharging via a hose with a
filtration sack located on the end. In-situ river sampling is undertaken regularly to check
ammonia levels and bacteria content. Further details on a typical overpumping arrangement are
provided in Appendix C.

The overpump used in 2013/14 was a 4” pump. A 4” pump typically has an output of around
30l/s. The WPS pump is designed to accommodate dry weather flows, plus 40% infiltration
allowance, plus a margin for daily variation and some spare capacity. However when the sewers
are surcharged by surface water which is entering the sewers either directly (by connection or
inundation) or indirectly (by infiltration), the flows can be an order of magnitude greater than the
normal flows. So the over-pump may need to discharge considerably more than the WPS pump,
in order to restore sewerage services to customers. The 4” pump was reported to have rapidly
reduced the surcharging of the sewers. If we need to overpump in the future we will endeavour
to utilise smaller pumps that are available in the market.

Typical discharge rates for over pumping are between 10 l/s and 50 l/s depending on the size of
pump and the pipework configuration. Power is supplied either by local access point or Silent
Pack diesel generators on site. Maintenance of the over pumping units is carried out regularly
which includes checking the flow, cleaning/replacement of filtration sacks and cleaning the
tanks.

Details of tankering and over pumping sites during the winter of 2013-14 are provided in
Appendix D. On the basis of future flooding at Winchelsea Beach being similar to that
experienced that winter, SW proposes that the set up used would be as described in Appendix
C. It is recognised that on occasions alternative overpumping and discharge points may be
required either in place or, or in addition to, the sites described in Appendix D.
5 MONITORING

5.1 Water quality monitoring

Southern Water has been carrying out regular monitoring of receiving watercourses at locations where it has been over pumping. Appendix G provides details of proposed sampling points for the identified overpumping location. For any other overpumping site SW will require sampling/measurement at each of the following points:

1. 15m upstream of the effluent discharge
2. The effluent discharge
3. Downstream of the effluent discharge

The upstream/downstream locations provided above are typical positions and may vary depending on the watercourse depth, width or flow.

If SW have to over pump, then a laboratory sample would be taken at each of the above points once a week for:

- E. coli
- Enterococci
- Total coliforms
- COD
- BOD
- Suspended solids

In addition, Southern Water will discuss the requirement for sondes with the Environment Agency. If required, the sondes would be provided at these locations and would record half hourly measurements of:

- Ammonium (NH4+)/ ammonia(NH3)
- Dissolved oxygen
- Turbidity
- Oxidation reduction potential
- Additional standard parameters that come with sondes (pH, temperature, conductivity, total dissolved solids etc)

5.2 Long Term Monitoring

In other locations, SW has commenced work to investigate, monitor and seek correlation between groundwater levels, sewer flows and rainfall. This approach has not yet been applied to the Winchelsea Beach catchment because the low-lying nature of the area means that the ground water levels are relatively low. However SW will analyse available data to identify a suitable approach. The objective of the monitoring is to aid early identification of increases in non-sewage flow. Repairs would then be carried out as appropriate.

6 COMMUNICATIONS

Southern Water has been proactive in communicating with stakeholders and customers about planned and completed work to improve the integrity of the sewerage system. SW keeps
stakeholders informed of progress on survey and sealing work via emails and face-to-face meetings, and customers informed via letters. SW also attends local public meetings with stakeholders. SW has also published an approved copy of the infiltration reduction plan on the Southern Water web-site.

Despite the work being undertaken, if over-pumping is required, SW will liaise with the local EA team in order to agree the requirement and to discuss proposed locations for the emergency discharges to watercourses. Immediately prior to commencing overpumping, SW will notify the EA National Incident Communication Service (Tel. 0800 807 060)

The following stakeholders would also be kept informed of discharges to watercourses (overpumping) before and during the operation.

- Environmental Health Department
- Icklesham Parish Council
- Rother District Council
- East Sussex County Council
- Romney Marshes Area Internal Drainage Board

Immediately prior to over-pumping being operated, Southern Water will put up advisory signs at the over-pumping discharge location(s) and at appropriate locations (shown in Appendix E) downstream along the receiving watercourse, advising the public that over-pumping is in operation. The wording on the signs will be as, or similar to, the example in Appendix E.

Prior to the cessation of overpumping, SW will also liaise with the local EA team and SW will also inform the EA National Incident Communication Service following cessation.

6.1 ACTION PLANS

Rehabilitation work will improve the integrity of sewers at the locations where repairs have been carried out. However, it is expected that during periods of high groundwater, some infiltration will occur at new locations. The monitoring described above will be used to identify significant increases in infiltration.

Activities being carried out by SW that will reduce infiltration into sewers are given in Table 1 below. This table also includes timescales and expected outcomes. In the RPS, the EA notes that it is not seeking the complete elimination of groundwater surcharging, but requires improvements to be made in line with BTKNEEC.

In addition to the steps being taken by SW set out in Table 1, actions to be taken by other agencies that will further reduce the infiltration into sewers are set out in Tables 2 – 5 below. Proposed actions for other parties are dependent on agreement by the respective organisations.

It should be noted that the timing for some of the activities in these tables is dependent on the suitability of flow conditions in the sewer.

Table 1. Southern Water Current Activities to Reduce Groundwater Infiltration

<table>
<thead>
<tr>
<th>Ref.</th>
<th>Item</th>
<th>Actions</th>
<th>Timescale and Status</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>Develop an approach for reduction of infiltration and maintenance of reduced levels of infiltration.</td>
<td>Refer to Section 1 above.</td>
<td>Summer 2013, Complete</td>
<td>The steps are being followed to deliver results.</td>
</tr>
<tr>
<td>1.2</td>
<td>CCTV etc survey of sewers</td>
<td>Identify Strategic Manholes; survey MHs to identify clear flow and infiltration. Carry out CCTV survey where clear flow was identified.</td>
<td>Spring 2014, Complete</td>
<td>Successful survey will identify major sources of infiltration to determine scope of rehabilitation work.</td>
</tr>
<tr>
<td>1.3</td>
<td>Carry out sewer rehabilitation work</td>
<td>Use various techniques to seal infiltration points in manholes and sewers.</td>
<td>2014/15. Complete</td>
<td>Rehabilitation will restore the structural integrity of the sewers.</td>
</tr>
<tr>
<td>1.4</td>
<td>Further surveys (CCTV or alternative techniques), if required,</td>
<td>Further surveys and investigation if required.</td>
<td>Spring 2015. Complete</td>
<td>Determine scope and carry out further surveys if identified as required from the initial survey results.</td>
</tr>
<tr>
<td>1.5</td>
<td>Sewer rehabilitation work, if required, in areas where surveys carried out.</td>
<td>Use various techniques to seal infiltration points in manholes and sewers</td>
<td>Winter 2015. Complete</td>
<td>Rehabilitation will restore the structural integrity of the sewers.</td>
</tr>
<tr>
<td>1.6</td>
<td>Consider alternative solutions to enhance customer service</td>
<td>Investigate following completion of planned rehabilitation works completed as per 1.5 above.</td>
<td>SW, 2016. Complete</td>
<td>Cost-effective. Enhanced customer service.</td>
</tr>
<tr>
<td>Ref.</td>
<td>Item</td>
<td>Actions</td>
<td>Timescale and Status</td>
<td>Outcomes</td>
</tr>
<tr>
<td>------</td>
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</tr>
<tr>
<td>1.7</td>
<td>Maintain IRP as a live document</td>
<td>Update IRP as appropriate to describe work carried out and/or developments</td>
<td>Annual update of the IRP submitted to EA for approval.</td>
<td>The EA requirement is for the IRP to be updated annually.</td>
</tr>
<tr>
<td>1.8</td>
<td>Quarterly progress reports</td>
<td>A progress report on infiltration reduction work related to this catchment will be submitted to the Environment Agency</td>
<td>Quarterly</td>
<td>Keep the Environment Agency informed of progress on a regular basis</td>
</tr>
<tr>
<td>1.9a</td>
<td>Strategy for inflows via private drains</td>
<td>Southern Water to propose a strategy for dealing with infiltration via private drains*</td>
<td>SW, Complete</td>
<td>Southern Water’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.</td>
</tr>
<tr>
<td>1.9b</td>
<td>Flow Survey</td>
<td>Undertake a flow survey of the catchment to understand the inflow from different areas of the catchment.</td>
<td>SW, Winter 2015. Complete</td>
<td>To identify areas that are contributing excessive flows into the sewers.</td>
</tr>
<tr>
<td>1.10</td>
<td>Electroscan Survey</td>
<td>Undertake an Electroscan Survey of the incoming main sewer to the south of Morlais Ridge WPS.</td>
<td>SW, Winter 2016. Completed</td>
<td>Survey identified sources of infiltration in this part of the network.</td>
</tr>
<tr>
<td>1.11</td>
<td>Sewer rehabilitation work in areas where electroscan survey carried out.</td>
<td>Use various techniques to seal infiltration points in manholes and sewers</td>
<td>Year 3 Amp 6</td>
<td>Rehabilitation will restore the structural integrity of the sewers.</td>
</tr>
<tr>
<td>Ref.</td>
<td>Item</td>
<td>Actions</td>
<td>Timescale and Status</td>
<td>Outcomes</td>
</tr>
<tr>
<td>------</td>
<td>---------------</td>
<td>-------------------------------------------------------------------------</td>
<td>----------------------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>1.12</td>
<td>Flow Survey</td>
<td>Undertake another flow survey of the catchment to understand the inflow from different areas of the catchment.</td>
<td>SW, Winter 2016. In progress</td>
<td>To understand the benefits following works undertaken in the catchment and identify areas that are still contributing excessive flows into the sewers.</td>
</tr>
</tbody>
</table>
Table 2. Multi-Agency Activities to Reduce Groundwater Infiltration

<table>
<thead>
<tr>
<th>Ref.</th>
<th>Item</th>
<th>Actions</th>
<th>Owner, Timescale and Status</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>Investigate highway and private road ‘mis-connections’</td>
<td>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</td>
<td>East Sussex County Council, Rother District Council and Winchelsea Sands Holiday Park owner with support from SW, 2015. Complete.</td>
<td>Reduced flow of surface water (if connections are found).</td>
</tr>
<tr>
<td>2.2</td>
<td>Groundwater investigation on customers’ drains</td>
<td>Where non-sewage flow is identified from customers’ properties, investigate to identify source of flow into SW sewers</td>
<td>SW, with assistance from Rother District Council where required, Ongoing.</td>
<td>Reduced flow of surface water (if connections are found).</td>
</tr>
<tr>
<td>2.3</td>
<td>Consider effects of proposed new developments on infiltration.</td>
<td>District Council to continue to consult with SW on development applications.</td>
<td>Rother District Council, Ongoing</td>
<td>Rother Distinct Council consults on most applications including extensions, but this is not obligatory; SW is not a statutory consultee. SW would like to be consulted on everything that will have a discharge to a public sewerage system. Developments in areas which would be detrimental to sewer flooding, to have conditions recommended by SW and applied, as appropriate, by the District Councils.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SW to determine threshold above which they require to be consulted.</td>
<td>SW</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sewerage materials for new developments</td>
<td>SW, Rother District Council</td>
<td></td>
</tr>
</tbody>
</table>
*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 3. Publicity / Communication Activities to Reduce / Mitigate the Effects of Groundwater Infiltration.

<table>
<thead>
<tr>
<th>Ref.</th>
<th>Item</th>
<th>Actions</th>
<th>Owner, Timescale and Status</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1</td>
<td>Public meetings about reducing groundwater infiltration other non-sewage flows into sewerage system</td>
<td>Attend public meetings with other agencies/organisations as appropriate to communicate to customers and stakeholders progress and planned activities.</td>
<td>SW, ESCC, as required</td>
<td>Inform local population of progress and planned activities and receive feedback.</td>
</tr>
<tr>
<td>3.2</td>
<td>Liaise with other agencies as appropriate.</td>
<td>Discuss and agree actions to reduce requirements for tankering and emergency discharges to watercourses.</td>
<td>SW, ESCC, RDC, RMIDB, EA, IPC</td>
<td>Improved understanding of issues and appreciation of issues. Agreement to actions to help reduce the need for tankering and emergency discharges to watercourses</td>
</tr>
</tbody>
</table>

** 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 4. Activities to Mitigate the Effects of Groundwater Infiltration/ Other Flood Protection Mechanisms

<table>
<thead>
<tr>
<th>Ref.</th>
<th>Item</th>
<th>Actions</th>
<th>Owner, Timescale and Status</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1</td>
<td>Early Warning system</td>
<td>Joint continuous monitoring of sewer levels/flows.</td>
<td>SW, EA, 2015, Complete</td>
<td>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.</td>
</tr>
<tr>
<td>4.2</td>
<td>Tankering arrangements</td>
<td>Investigate options for improving location of tankers and over-pump units for future events. E.g. by use of longer hoses/ pumping</td>
<td>SW, 2015, Complete</td>
<td>Potentially less disruption to residents when tankering / pumping is essential.</td>
</tr>
<tr>
<td>4.3</td>
<td>Maintenance of watercourses</td>
<td>Riparian owners to carry out their responsibilities to maintain adequate flow through watercourses by clearing vegetation, desilting, etc</td>
<td>Riparian owners with input from District and Parish Councils – ongoing responsibility</td>
<td>Maximise the flow along watercourses in order to minimise surface flooding, which results in inundation of manholes to the sewerage system.</td>
</tr>
<tr>
<td>4.4</td>
<td>Integrated Approach to reduce sewer flooding</td>
<td>Develop a multi-agency approach to the management of sewer flooding within the catchment</td>
<td>East Sussex County Council/Rother District Council, with inputs from SW, EA and Parish Councils</td>
<td>Actions for participating authorities that in unison, will reduce the extent of flooding and the impact of flooding.</td>
</tr>
</tbody>
</table>
Table 5. Activities required if Groundwater Infiltration cannot be adequately reduced at reasonable cost (BTKNEEC)/ interim arrangements.

<table>
<thead>
<tr>
<th>Ref.</th>
<th>Item</th>
<th>Actions</th>
<th>Owner, Timescale and Status</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.1</td>
<td>Over-pumping Sites: improve effluent quality</td>
<td>Investigate potential for improved screening and basic treatment at points of discharge into watercourse.</td>
<td>SW, 2014, Done</td>
<td>Improved arrangements for discharges when required.</td>
</tr>
<tr>
<td>5.2</td>
<td>Over-pumping Sites: minimise flow</td>
<td>Add level control to pumps to reduce durations for pumping</td>
<td>SW, 2014, Done</td>
<td>Establish whether seasonal discharge(s) will be necessary in order to maintain use of sewerage services for customers during periods of very high groundwater levels.</td>
</tr>
<tr>
<td>5.3</td>
<td>Standards for emergency discharges</td>
<td>SW to discuss with EA about best practice set up for over-pumping arrangements.</td>
<td>SW, 2014, Done</td>
<td>Agree with EA acceptable standards for discharges and acceptable flow rates.</td>
</tr>
<tr>
<td>5.4</td>
<td>Flow, location, screening arrangements for emergency discharges</td>
<td>Determine potential flow rates and screening arrangements and most appropriate locations,</td>
<td>SW, Done</td>
<td>Agree with EA, County Council and local Parish Councils acceptable arrangements for future emergency discharges.</td>
</tr>
<tr>
<td>5.5</td>
<td>Action Plans</td>
<td>Develop SW action plans documenting set up of pumps, tankers, etc. for emergency situations.</td>
<td>SW, 2014, Done</td>
<td>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.</td>
</tr>
<tr>
<td>Ref.</td>
<td>Item</td>
<td>Actions</td>
<td>Owner, Timescale and Status</td>
<td>Outcomes</td>
</tr>
<tr>
<td>------</td>
<td>------</td>
<td>---------</td>
<td>----------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>5.6</td>
<td>Implementation of Action Plan</td>
<td>SW to implement action plan when trigger point is reached, i.e. high wetwell and customer reports flooding during rainfall event.</td>
<td>SW, as required</td>
<td>Tankers to be deployed and situation monitored. Consult EA and other stakeholders if situation doesn’t improve.</td>
</tr>
</tbody>
</table>
APPENDIX A

AMP 5 Surveys and Rehabilitation Works
Winchelsea Beach, East Sussex –
Plan Showing Location of Infiltration Surveyed in 2012/13 - (Plan 1 of 1)

Legend

- Confirmed infiltration points
- Unconfirmed infiltration points
- Surveys affected by surcharge (>20%)
- Catchment boundary

Winchelsea Beach WTW
Castle Farm WPS
Morlais Ridge WPS
Victoria Way WPS
Winchelsea Beach, East Sussex – Plan Showing Extent of CCTV Survey in 2014 - (Plan 1 of 3)
Winchelsea Beach, East Sussex – Plan Showing Extent of CCTV Survey in 2014 - (Plan 2 of 3)
Winchelsea Beach, East Sussex – Plan Showing Extent of CCTV Survey in 2014 - (Plan 3 of 3)
Winchelsea Beach, East Sussex – Location of Rehabilitation Work completed in March 2015 - (Plan 1 of 3)
Winchelsea Beach, East Sussex – Location of Rehabilitation Work completed in March 2015 - (Plan 2 of 3)
Winchelsea Beach - Infiltration Reduction Plan

Winchelsea Beach, East Sussex – Location of Rehabilitation Work completed in March 2015 - (Plan 3 of 3)

Sea Road

Morlais Place

Tophat @ 4.3

CIPR@ 0.57m

Tophat @ 3.9 T

Tophat @ 6.0

Legend:

++ Tophat
++ CIPR
++ MH Sealing

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Winchelsea Beach, East Sussex – Location of Rehabilitation Work completed in March 2015 - (Plan 3 of 3)
APPENDIX B

AMP6 Surveys and Rehabilitation Works

Information shared with The Environment Agency, but removed from published version.
APPENDIX C

Typical Over pumping Arrangements
**Typical overpumping arrangement**

The figure below shows a typical overpumping arrangement and contains links to further details on the equipment used.

![Typical overpumping arrangement](image)

*Figure C1 – Typical overpumping arrangement*
Figure C2 – Pump lifts flow through a barrel filter from a level in the sewer which captures liquid flows rather than solids

Figure C3 – Pump extracts flows from the sewer and discharges to a settlement tank
Figure C4 – Diagram of a large settlement tank showing the direction of flow beneath and above baffle plates which results in suspended fine solids dropping to the bottom of the tank. The dimensions shown (2.44m x 1.83m x 1.52m = 8ft x 6ft x 5ft) are suitable for use with 150mm (6 inch) hoses.

Figure C5 – Photograph of a small settlement tank usually fed by 75mm (3 inch) or 100mm (4 inch) hoses. The dimensions of the tank are 1.0 m wide x 1.5 m long x 1.4 m high.
Figure C6 – Photograph of a typical settlement tank showing the hose at the entry point to the tank and the baffle plates. The blue foam shown can be added to the tank to capture solids at the entry point for flows supplied by 75mm and 100mm pumpsets only.

Figure C7 – Discharge of treated flow to the watercourse through a filtration sack which is replaced regularly.
APPENDIX D

Emergency Discharges in the Winter of 2013-14

See notes in Section 4.2 and 4.3 regarding the potential need to modify / augment over-pumping sites to deal with future flood events. Over-pumping sites will be selected to provide the most effective arrangements to maintain services, whilst minimising environmental effects. Where practical, sites that have been used previously are expected to be re-used (when necessary), but the use of different locations cannot be ruled out, if hydraulic conditions dictate.
Winchelsea Beach, East Sussex - Overpumping and Tankering Sites in the Winter of 2013-14 (Plan 1 of 2)

Overpump (1 No. Pump) GR 59154, 11653, from MH5501 to filtration sacks before discharge to watercourse.

Manholes likely to be particularly vulnerable to spillages.

Sea Road

Morlais Ridge WPS

Tanker Point 3

Willow Lane

Tanker Point 1

Winchelsea Beach Community Hall

Watercourse

Winchelsea Beach, East Sussex - Overpumping and Tankering Sites in the Winter of 2013-14 (Plan 1 of 2)
Winchelsea Beach, East Sussex - Overpumping and Tankering Sites in the Winter of 2014-15 (Plan 2 of 2)

Note: Tanker Point 1 is a hydraulically efficient location for tankering while Tanker Point 2 may be used intermittently for convenience. Tanker point 3 is not convenient as Willow Lane will need to be closed when tankering activities start.
### Timing for Deployment of Tankers and Over pumps in the Winter of 2013-14, 2014-15, 2015-16, and 2016-17 (up to January)

<table>
<thead>
<tr>
<th>Location</th>
<th>Tankering</th>
<th>Overpumping</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Start Date</td>
<td>Stop Date</td>
</tr>
<tr>
<td>Winchelsea Beach, East Sussex</td>
<td>Late October 2013</td>
<td>17/02/14</td>
</tr>
<tr>
<td>(Location 1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Winchelsea Beach, East Sussex</td>
<td>13/10/14</td>
<td>14/10/14</td>
</tr>
<tr>
<td>(Location 1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Winchelsea Beach, East Sussex</td>
<td>03/11/14</td>
<td>07/11/14</td>
</tr>
<tr>
<td>(Location 2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Winchelsea Beach, East Sussex</td>
<td>03/12/14</td>
<td>04/12/14</td>
</tr>
<tr>
<td>(Location 2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Winchelsea Beach, East Sussex</td>
<td>12/12/14</td>
<td>13/12/14</td>
</tr>
<tr>
<td>(Location 2)</td>
<td></td>
<td></td>
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<tr>
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<td>25/09/15</td>
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### Effects of High Groundwater levels in the Winter of 2013-14

There were complaints of external flooding and restricted toilet use in Winchelsea Beach during the winter of 2013-14.

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Days</th>
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<td>05/12/15</td>
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<tr>
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<td>21/12/15</td>
<td>21/01/16</td>
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<td>22/01/16</td>
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<td>22/11/16</td>
<td>1.2</td>
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</table>
APPENDIX E

Emergency Discharge Proposal
Emergency Discharge Proposal

Despite the significant investments being made by SW to reduce infiltration into sewers, and multi-agency actions to be taken there may continue to be occasions when emergency discharges will be required. Further analysis will be conducted after completion of the current rehabilitation programme to access the circumstances when overpumping and tankering would be expected to be required, optimum locations and expected flow rates.

At present, our proposal for emergency discharges will be as follows:

<table>
<thead>
<tr>
<th>Ref</th>
<th>Item</th>
<th>Action</th>
<th>When Required</th>
<th>Locations</th>
<th>Expected Flow Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tankering</td>
<td>Deploy tankers to reduce flows at strategic locations in the sewerage system</td>
<td>When hydraulic capacity of the sewers and pumping stations are exceeded due to additional flows from groundwater. Monitor rising groundwater level in cellars and sewers.</td>
<td>Collect flow from the same manholes used in the winter of 2013-14, as identified in the plans in Appendix D. Discharge flow to Rye WTW, Winchelsea Beach WTW, Castle Farm WPS or pumping stations in Hastings.</td>
<td>Low</td>
</tr>
<tr>
<td>2a</td>
<td>Overpumping: Pumps</td>
<td>Install pumps (preferably 3 inch dia. pump) to reduce flows at strategic locations in the sewerage system.</td>
<td>In cases of exceptional high flows in the sewers, and when tankering is insufficient, in order to protect residents from imminent public health dangers of sewage flooding in properties or restricted toilet use (RTU). Monitor levels in manholes.</td>
<td>Overpump, probably at the same locations used in the winter of 2013-14, as identified in the plans in Appendix D, but as noted in Appendix D, the use of other sites cannot be ruled out.</td>
<td>Flow rate depends on head/pipe material/distance etc. 3 inch dia. pump = 10 - 20 l/s (typical rate) 4 inch dia. pump = 30 l/s (typical rate)</td>
</tr>
<tr>
<td>Ref:</td>
<td>Item</td>
<td>Action</td>
<td>When Required</td>
<td>Locations</td>
<td>Expected Flow Rate</td>
</tr>
<tr>
<td>-----</td>
<td>------</td>
<td>------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>2b</td>
<td>Overpumping: Removal of Suspended Solids</td>
<td>Provide settlement tanks and filtration sacks to remove suspended solids prior to discharge of treated flow into a watercourse</td>
<td>When discharging flow from the sewer into a watercourse</td>
<td>Remove suspended solids at the same locations used in the winter of 2013-14, as identified in the plans in Appendix D, or other sites if necessary</td>
<td>N/A</td>
</tr>
<tr>
<td>2c</td>
<td>Overpumping: Improvement of water quality</td>
<td>Investigate options including basic treatment to improve the quality of treated water discharged to watercourses.</td>
<td>When discharging flow from the sewer into a watercourse</td>
<td>Investigate options for improved treatment where required.</td>
<td>N/A</td>
</tr>
</tbody>
</table>

In addition to the overpumping and tankering, there may on occasions be some spillage from manholes in the vicinity of the operations. By timely set up of equipment and appropriate maintenance, SW will endeavour to minimise, and ideally to completely avoid such spillages. However, SW considers that on occasions, some spillages will be inevitable.

During times of high infiltration, it is possible that there could be a spillage from a few manholes in Winchelsea Beach. Manholes that are known to be particularly vulnerable to spillages are highlighted in Appendix D and include:

Manholes in Willow Lane

Manholes in Sea Road (south of Willow Lane)
APPENDIX F

Signage
Typical Advisory Sign

Winchelsea Beach

EMERGENCY OVERPUMPING

Please note over-pumping of dilute screened sewage to the Dimsdale Sewer is being undertaken to protect customers from flooding and lack of drainage.

It is advised to keep children & pets from the watercourse in the vicinity of this discharge. If you have contact with the water please ensure you wash your hands before eating or drinking.

If you have any concerns please contact:

Southern Water 0845 278 0845 Quoting Ref: TBC
**Location of Advisory Sign**

![Map showing location of advisory sign](image)

**Note**
- ★ Location of advisory sign
APPENDIX G

Sampling Locations
Sampling Locations

- Sampling points