# Drainage and Wastewater Management Plan

**Pennington
Wastewater System Plan**

from
**Southern Water** ®

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# Pennington wastewater system: map and key facts
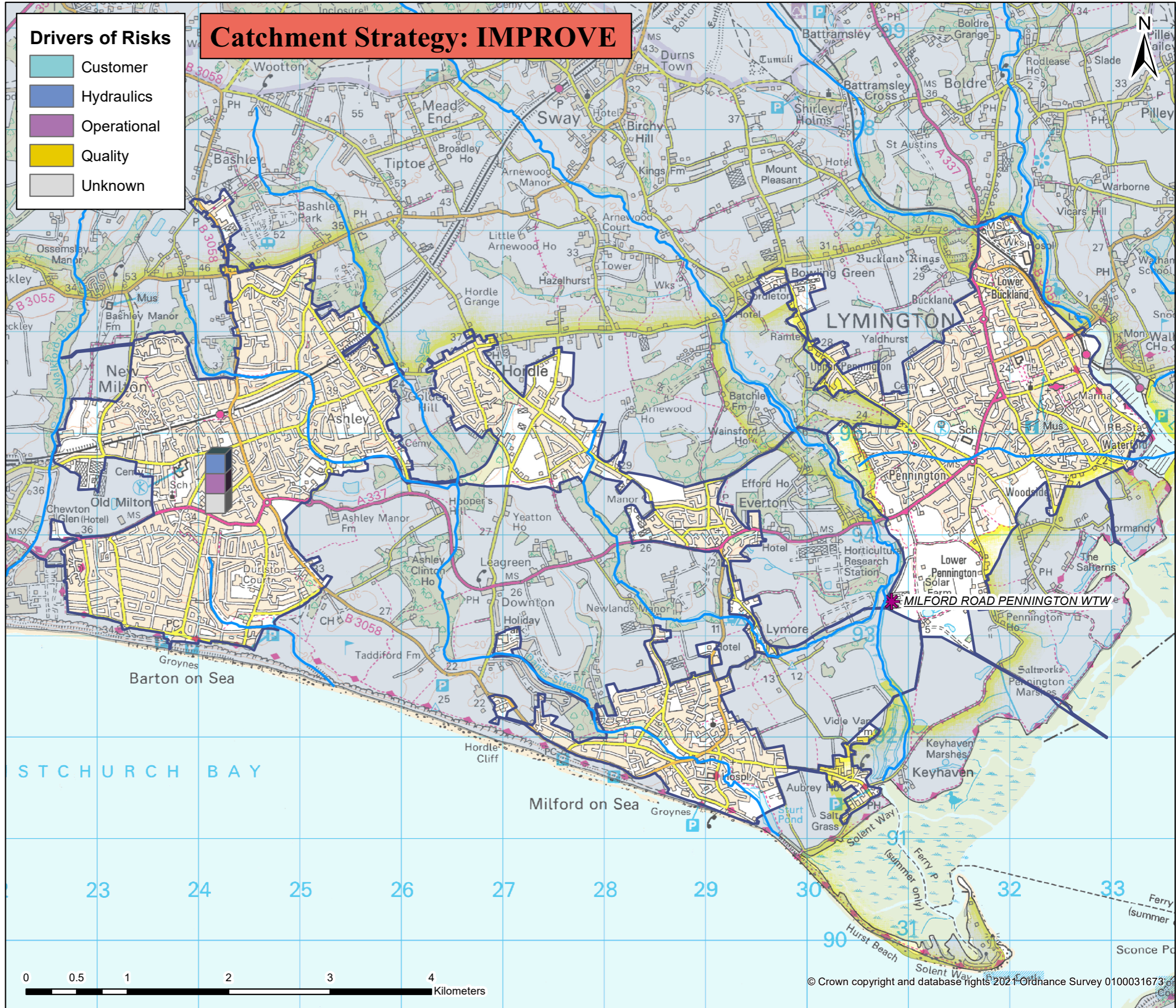


WATER for LIFE from Southern Water

## Drivers of Risks
- Customer
- Hydraulics
- Operational
- Quality
- Unknown

## Catchment Strategy: IMPROVE

| | |
|---|---|
| Population Equivalent (PE) | 50,697 |
| Discharge Waterbody | Long overland outfall into Solent |
| Number of Pumping Stations | 52 |
| Number of Overflows | 12 |
| Length of Sewer (km) | 420.8 |
| Catchment Reference | PENN |

### BRAVA Results Table

| | Planning Objective | 2020 | 2050 |
|---|---|---|---|
| 1 | Internal Sewer Flooding Risk | 0 | |
| 2 | Pollution Risk | 1 | |
| 3 | Sewer Collapse Risk | 0 | |
| 4 | Risk of Sewer Flooding in a 1 in 50 year storm | 0 | 0 |
| 5 | Storm Overflow performance | 2 | 2 |
| 6 | Risk of WTW Compliance Failure | 0 | 0 |
| 7 | Risk of flooding due to Hydraulic Overload | 0 | 1 |
| 8 | Dry Weather Flow Compliance | 1 | 1 |
| 9 | Good Ecological Status / Potential | 0 | |
| 10 | Surface Water Management | 0 | |
| 11 | Nutrient Neutrality | 2 | 2 |
| 12 | Groundwater Pollution | 0 | |
| 13 | Bathing Waters | 0 | |
| 14 | Shellfish Waters | NA | |

MILFORD ROAD PENNINGTON WTW

# Problem Characterisation
## Pennington (PENN)

This document describes the causes of the risks identified by the Baseline Risk and Vulnerability Assessment (BRAVA). The BRAVA results for this wastewater system are summarised in Table 1. The results indicate that flooding, pollution and water quality are the main concerns in this wastewater system. We have completed risk assessments for 2050 where we have the data and tools available to do so. For the other planning objectives, we will explore how we can predict future risks for the next cycle of DWMPs. All the risk assessment methods need to be reviewed after the first DWMPs have been produced with a view to improve the methods and data for future planning cycles.

### Table 1: Results of the BRAVA for Pennington wastewater system

| Planning Objectives | | 2020 | Driver | 2050 |
|---|---|---|---|---|
| 1 | Internal Sewer Flooding Risk | 0 | - | |
| 2 | Pollution Risk | 1 | Operational | |
| 3 | Sewer Collapse Risk | 0 | - | |
| 4 | Sewer Flooding in a 1 in 50-year storm | 0 | - | 0 |
| 5 | Storm Overflow Performance | 2 | Hydraulic | 2 |
| 6 | WTW Water Quality Compliance | 0 | - | 0 |
| 7 | Flooding due to Hydraulic Overload | 0 | - | 1 |
| 8 | WTW Dry Weather Flow Compliance | 1 | Operational | 1 |
| 9 | Good Ecological Status / Good Ecological Potential | 0 | - | |
| 10 | Surface Water Management | 0 | - | |
| 11 | Nutrient Neutrality | 2 | Unknown | 2 |
| 12 | Groundwater Pollution | 0 | - | |
| 13 | Bathing Waters | 0 | - | |
| 14 | Shellfish Waters | NA | - | |

### Key

| BRAVA Risk Band | |
|---|---|
| NA | Not Applicable* |
| 0 | Not Significant |
| 1 | Moderately Significant |
| 2 | Very Significant |

*No issues relevant to planning objective within Wastewater System

### Investment Strategy

The risks identified in this wastewater system mean that we have assigned the following investment strategy:
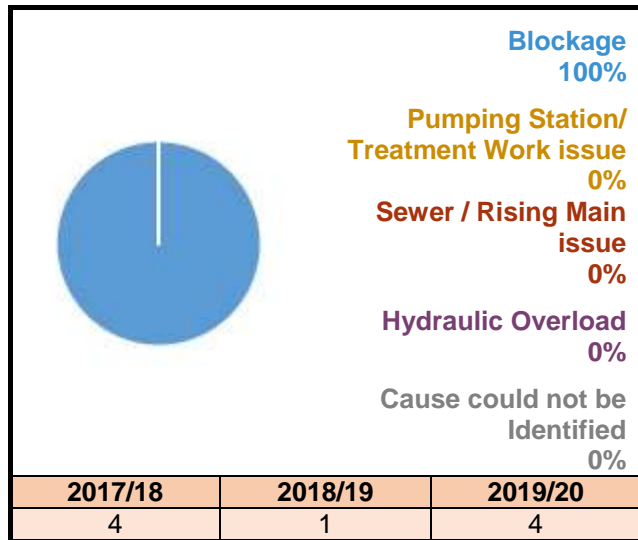
**Improve**

This means that we consider that the current performance of the drainage and wastewater system needs to be improved to reduce the impacts on our customers and/or the environment. We will plan investment to reduce the current risks by actively looking to invest capital funding in the short term to address current performance issues (and consider future risks when implementing improvements).

## Planning Objective 1: Internal Sewer Flooding Risk

The number of internal sewer flooding incidents reported during the three years considered by the risk assessment are shown in Figure 1. The total number of connections in this wastewater system means there have been less than 1.68 incidents per 10,000 connections per year (a threshold set by Ofwat) so the risk is in the 'not significant' band.2

### Figure 1: Number of internal flooding incidents per annum and causes



Blockage
**100%**

Pumping Station/
Treatment Work issue
**0%**

Sewer / Rising Main
issue
**0%**

Hydraulic Overload
**0%**

Cause could not be
Identified
**0%**

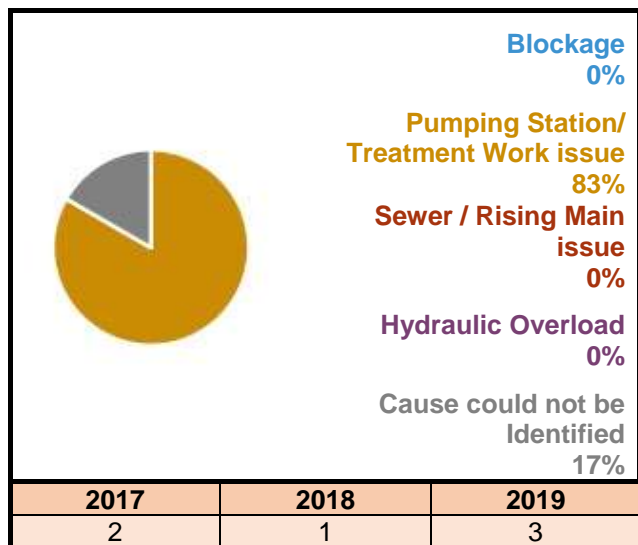| 2017/18 | 2018/19 | 2019/20 |
|---------|---------|---------|
| 4 | 1 | 4 |

## Planning Objective 2: Pollution Risk

The number of pollution incidents reported during the three years considered by the risk assessment are shown in Figure 2. The length of sewer in this wastewater system means there have been between 24.51 and 49.01 incidents per 10,000km per year (a threshold set by Ofwat) so the risk is in the 'moderately significant' band.

The primary driver for pollution is 'Operational' due to asset operational issues. Asset operational issues at our pumping stations and treatments works are the main cause of incidents, contributing to 83% of all incidents recorded in this wastewater system.

### Figure 2: Number of pollution incidents per annum and causes



Blockage
**0%**

Pumping Station/
Treatment Work issue
**83%**

Sewer / Rising Main
issue
**0%**

Hydraulic Overload
**0%**

Cause could not be
Identified
**17%**

| 2017 | 2018 | 2019 |
|------|------|------|
| 2 | 1 | 3 |

## Planning Objective 3: Sewer Collapse Risk

The number of sewer collapses reported during the three years considered by the risk assessment are shown in Table 2. The length of sewer in this wastewater system means there have been less than 5.72 incidents per 1,000km per year (a threshold set by Ofwat) so the risk is in the 'not significant' band.

### Table 2: Sewer collapses and rising main bursts

| | | |
|---|---|---|
| **Sewer Collapse** | **2017/18** | 1 |
| | **2018/19** | 2 |
| | **2019/20** | 1 |
| **Rising Main Bursts** | **2017/18** | 0 |
| | **2018/19** | 0 |
| | **2019/20** | 0 |

### Planning Objective 4: Sewer Flooding in a 1 in 50 Year Storm

The risk of flooding in a 1 in 50 year storm is not significant in 2020 or 2050. This is because our computer model of the sewer network indicate for 2020 that approximately 200 - 300 properties within this wastewater system are in areas that could flood by water escaping from sewers.

Our wastewater networks are generally designed with capacity for up to a 1 in 30 year storm, hence flooding is expected to occur during more severe storms such as a 1 in 50 year event. Flooding will occur due to insufficient capacity of the drainage system either on the surface before it enters the drainage system, and/or from manholes, in people's homes or at a low point elsewhere in the system.

### Planning Objective 5: Storm Overflow Performance

The storm overflow performance risk has been assessed as very significant for both 2020 and 2050. Table 3 shows the overflows that discharge above the low threshold set for storm overflow discharges to Shellfish Water, Bathing Water and inland rivers.

The primary driver for the Storm Overflow Performance is 'Hydraulic.'

#### Table 3: Overflows exceeding discharge frequency threshold per annum

|  | Number of overflows | | Threshold for number of discharges per annum | | |
|---|---|---|---|---|---|
|  | 2020 | 2050 | Low | Medium | High |
| **Shellfish Waters** | 3 High | 3 High | Less than 8 | Between 8-10 | 10 or more |
| **Bathing Waters** | 0 Medium | 1 High | Less than 3 | Between 3-10 | 10 or more |
| **Freshwater** | 1 High | 1 High | Less than 20 | Between 20-40 | 40 or more |

### Planning Objective 6: Wastewater Treatment Works Water Quality Compliance

The risk of non-compliance with our wastewater quality permit has been assessed as not significant for both 2020 and 2050. This is because the wastewater treatment works has no record of compliance failure during the last three years (2018-2020).

### Planning Objective 7: Flooding due to Hydraulic Overload

This is an assessment of the risk of flooding from sewers during a 1 in 30 year storm, and more frequent rainfall, to understand where flooding could occur. The risk of sewer flooding due to hydraulic overload is not significant for 2020. However the ri The annualised number of properties in areas at risk of flooding is shown in Table 4.

#### Table 4: Annualised number of properties at risk per 10,000 connections.

| Rainfall Return Period (yr) | Number of Properties at Risk | | Annualised per 10,000 connections | |
|---|---|---|---|---|
|  | 2020 | 2050 | 2020 | 2050 |
| 1 in 1 | 4 | 19 | 3 | 12 |
| 1 in 2 | 10 | 31 | 4 | 12 |
| 1 in 5 | 44 | 105 | 8 | 19 |
| 1 in 10 | 87 | 199 | 8 | 19 |
| 1 in 20 | 124 | 293 | 6 | 14 |
| 1 in 30 | 218 | 356 | 7 | 12 |
| **Total Annualised** | | | **36** | **88** |

This indicates that the wastewater network currently has capacity for storm events for which the system was designed, but growth, creep and/or climate change will increase the risks in this wastewater system by 2050.

## Planning Objective 8: Wastewater Treatment Works Dry Weather Flow Compliance

The risk of Wastewater Treatment Works Dry Weather Flow Compliance is moderately significant for both 2020 and 2050. This is because the average annual dry weather flow for 2017, 2018 and 2019 has been between 80% and 100% of the current permit, shown in Figure 3. The predicted DWF in 2050 is also expected to remain below 100% of the current permit.

The primary driver is 'Operational' because the contribution of infiltration to the baseline DWF is estimated to be above 50%, based on an equation using the recorded flow (Q90), the resident population reported in 2019 as well the contribution of trade effluent and cesspits from the annual return for 2019.

**Figure 3: Recorded and predicted dry weather flow with existing permit**
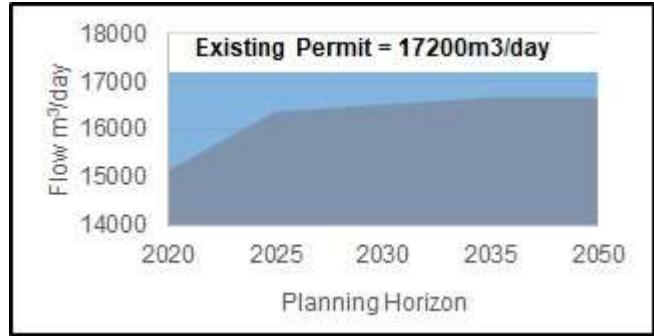


## Planning Objective 9: Good Ecological Status / Good Ecological Potential

This wastewater system is not hydraulically linked to a waterbody where wastewater operations are contributing to not achieving GES/GEP, therefore the risk is not significant.

## Planning Objective 10: Surface Water Management

Figure 4 illustrates the sources of water flowing in the wastewater system during a 1 in 20 year storm. It shows that surface water runoff from roofs, road and permeable surfaces constitutes more than 88.6% of the flow in the sewers. The total contribution of foul water from homes is 6.5% with business contributing 0.4%. The baseflow is infiltration from water in the ground and makes up 4.5% of the flow in the system.

**Figure 4: Sources of water flowing in sewers during a 1 in 20 year storm**



Baseflow 4.5%

Trade 0.4%

Foul 6.5%

Roof Runoff 43.8%

Road Runoff 7.1%

Permeable Runoff 37.7%
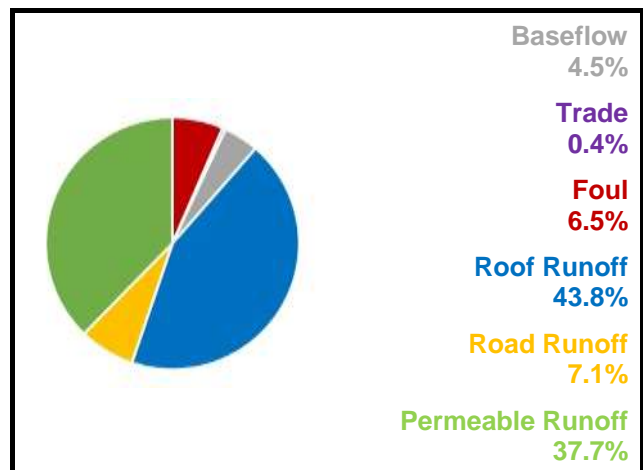
## Planning Objective 11: Nutrient Neutrality

The risk to internationally designated habitat sites from this wastewater system is very significant in 2020 and 2050. This is because Natural England have advised that there is a risk to condition for the habitat sites that are hydraulically linked to our wastewater system, listed in Table 5.

**Table 5: Habitat Sites hydraulically linked to wastewater system**

| Habitat Sites | |
|---|---|
| Solent and Dorset Coast | Phosphate permit review required Overflow Spills |
| Solent & Southampton Water | No Threat/Remedy Identified or Anticipated |

## Planning Objective 12: Groundwater Pollution

The risk of Groundwater Pollution is not significant. This is because the wastewater network in this wastewater system does not overlap with any groundwater Source Protection Zones (SPZ) used for water supply.

## Planning Objective 13: Bathing Waters

The designated bathing waters that could be affected by discharges from this wastewater system are shown in Table 6, along with the current classification from the Environment Agency. The risks from this wastewater system on these bathing waters is not significant. This is because all the designated bathing waters affected by this wastewater system have passed annual inspections..

**Table 6: Bathing Water annual results**

| Bathing Waters | Annual Results | | |
|---|---|---|---|
| | 2017 | 2018 | 2019 |
| Christchurch Bay | Excellent | Excellent | Excellent |
| Milford-on-sea | Excellent | Excellent | Excellent |

## Planning Objective 14: Shellfish Waters

The discharges from this wastewater system do not impact on any designated shellfish waters.

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August 2021
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# Generic Options Assessment for: Pennington (PENN)

| Planning Objectives | | 2020 | Driver | 2050 |
|---|---|---|---|---|
| PO1 | Internal Flooding | 0 | - | - |
| PO2 | Pollution Risk | 1 | Operational | - |
| PO3 | Sewer Collapse | 0 | - | - |
| PO4 | Risk of Sewer Flooding in 1 in 50 yr | 0 | - | 0 |
| PO5 | Storm Overflow Performance | 2 | Hydraulic | 2 |
| PO6 | Risk of WTW Compliance Failure | 0 | - | 0 |
| PO7 | Annualised Flood Risk/Hydraulic Overload | 0 | - | 1 |
| PO8 | DWF Compliance | 1 | Operational | 1 |
| PO9 | Achieve Good Ecological Status | 0 | - | - |
| PO10 | Improve Surface Water Management | 0 | - | - |
| PO11 | Secure Nutrient Neutrality | 2 | Unknown | 2 |
| PO12 | Reduce Groundwater Pollution | 0 | - | - |
| PO13 | Improve Bathing Water Quality | 0 | - | - |
| PO14 | Improve Shellfish Water Quality | NA | - | - |

| Type of Measures | Generic Option Categories | Icon | Take Forward? | Reasons | Examples of Generic Options |
|---|---|---|---|---|---|
| **Source** (Demand) Measures (to reduce likelihood) | Control / Reduce surface water run-off | | Y | - | Natural Flood Management; rural land management and catchment management; SuDS including blue and green infrastructure; storm management |
| | Reduce groundwater levels | | N | Reducing groundwater levels would reduce the risks from infiltration into the network. However, in practice, reducing groundwater levels will be detrimental to the environment, ground conditions and is prohibitively too costly to implement. For these reasons, this generic option has been discounted. | Reduce leakage from water supply pipes; pump away schemes to locally lower groundwater near sewer network |
| | Improve **quality** of wastewater | | N | None of the significant risks are caused by the quality of wastewater entering the wastewater system. | Domestic and business customer education; incentives and behaviour change (reduce Fats, Oils & Grease, wet wipes etc.); monitoring trade waste at source; on-site black water and/or greywater pre-treatment |
| | Reduce the **quantity** / demand | | Y | - | Water efficient appliances; water efficient measures; blackwater and/or greywater re-use; treatment at source |
| **Pathway** (Supply) Measures (to reduce likelihood) | Network Improvements | | Y | - | Asset optimisation; additional network capacity; storage; separate flows; structural repairs; re-line sewer pipe and manholes; smart networks. |
| | Improve Treatment Quality | | Y | - | Increase treatment capacity; rationalisation of treatment works (centralisation / de-centralisation); install tertiary plant; UV plant or disinfection facilities; innovation; improve Technical Achievable Limits; new WTWs |
| | Wastewater Transfer to treatment elsewhere | | N | The causes of risk are not due to where our systems discharge to the environment or our ability to increase the capacity to connect more homes. Transferring wastewater for treatment elsewhere will not reduce any of the significant risks in this catchment. | Transfer flow to other network or treatment sites; transport sewage by tanker to other sites |
| **Receptor** Measures (to reduce consequences) | Mitigate impacts on Air Quality | | N/A | Not included in first round of DWMPs | Carbon offsetting; noise suppression /filtering; odour control and treatments |
| | Improve Land and Soils | | N/A | Not included in first round of DWMPs | Sludge soil enhancement |
| | Mitigate impacts on receiving waters | | Y | - | River enhancement, aeration |
| | Reduce impact on properties | | Y | - | Property flood resilience; non-return valves; flood guards / doors; air brick covers |
| Other | Study / Investigation | | Y | - | Additional data required; hydraulic model development; WQ monitoring and modelling |

August 2021
Version 1

# Pennington Wastewater System - Outline Options Appraisal

| Generic Option | Location of Risk | Planning Objective and Description of Risk | Option Reference | Description | Further Description | Unconstrained Option? | Constrained Option? | Feasible Option? | Net Benefits | Estimated Cost | Preferred Option | Best value / Least cost or Reasons for Rejection |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Control/ Reduce surface water entering the sewers | Catchment Wide/ L4 | PO5, PO7 - Hydraulic Drivers | PENN.SC01.1 | Natural Flood Management | Storing water by planting hedgerows and trees, slowing water through bunds/ditches/ponds, increasing soil infiltration vis improved soil structure, intercepting rainfall via increased vegetation - areas identified using Hydraulic model. | No | | | | | | Cost Effective |
| Control/ Reduce surface water entering the sewers | Catchment Wide/ L4 | PO5, PO7 - Hydraulic Drivers | PENN.SC01.2 | Rural Land Management | Large scale eco-system restoration, farming principles to increase biodiversity and enrich soils, rewilding - areas identified using Hydraulic model. | No | | | | | | Cost Effective |
| Control/ Reduce surface water entering the sewers | Catchment Wide/ L4 | PO5, PO7 - Hydraulic Drivers | PENN.SC01.3 | Changes in Rural Land Drainage | Swales, sediment traps, bunds, ponds, wetland/constructed farm - areas identified using Hydraulic model. | No | | | | | | Cost Effective |
| Control/ Reduce surface water entering the sewers | Catchment Wide/ L4 | PO5, PO7 - Hydraulic Drivers | PENN.SC01.4 | Surace Water Seperation | Removal of connected surface water into the sewer network at source. | No | | | | | | Cost Effective |
| Control/ Reduce surface water entering the sewers | Catchment Wide/ L4 | PO5, PO7 - Hydraulic Drivers | PENN.SC01.5 | SuDS | Installation of SuDS - areas identified using Hydraulic model. | No | | | | | | Cost Effective |
| Control/ Reduce surface water entering the sewers | Catchment Wide/ L4 | PO5, PO7 - Hydraulic Drivers | PENN.SC01.6 | Rain Water harvesting | Collect rainwater from roofs and other paved surfaces for use on site. | No | | | | | | Cost Effective and Risk and uncertainty - future resilience |
| Control / Reduce groundwater infiltration | | | | | | | | | | | | |
| Improve quality of wastewater entering sewers (inc reducing FOG, RAG, pre-treatment, trade waste) | | | | | | | | | | | | |
| Cost Control / Reduce the quantity / flow of wastewater entering sewer system | Catchment Wide | PO8 (2050) - Dry Weather Flow | PENN.SC04.1 | Customer Incentive Programmee | Customers incentivised to reduce their consumption rate through bill reductions or voucher schemes. | No | | | | | | Cost Effective, Environmental risk mitigatable and Risk and uncertainty - future resilience |
| Control / Reduce the quantity / flow of wastewater entering sewer system | Catchment Wide | PO8 (2050) - Dry Weather Flow | PENN.SC04.3 | Water Efficient Measures | Use/promote/providing water efficiency measures to domestic and business customers. | Yes | No | | | | | Environmental - Strategic Environmental Assessment |
| Control / Reduce the quantity / flow of wastewater entering sewer system | Catchment Wide | PO8 (2050) - Dry Weather Flow | PENN.SC04.4 | Blackwater Reuse | Reuse of wastewater from toilets. | Yes | No | | | | | Engineering and Cost |
| Control / Reduce the quantity / flow of wastewater entering sewer system | Catchment Wide | PO8 (2050) - Dry Weather Flow | PENN.SC04.5 | Greywater Reuse | Reuse of wastewater from sinks, baths, washing machines and other kitchen appliances. | Yes | No | | | | | Performance and Sustainability |
| Network Improvements (eg increase capacity, storage, conveyance) | Catchment Wide | PO5, PO7 - Hydraulic Drivers & PO8 - Dry Weather Flow | PENN.PW01.1 | Separate Flows (WfL-H) | Study / Investigation: Identify suitable location/s for surface water separation in the Pennington catchment (update hydraulic model)<br><br>Collaborate to identify suitable location/s to separate foul and surface water systems. | Yes | Yes | Yes | Minor Positive + | £TBC - With Partners | No | Best Value |
| Network Improvements (eg increase capacity, storage, conveyance) | Lymington Area | PO5, PO7 - Hydraulic Drivers & PO8 - Dry Weather Flow | PENN.PW01.2 | Separate Flows/Relining sewers | Study / Investigation: Identify suitable location/s in Lymington for sewer relining to prevent saline intrusion (update hydraulic model)<br><br>Collaborate to identify suitable location/s to for sewer relining to prevent saline intrusion. | Yes | Yes | Yes | Minor Positive + | £TBC - With Partners | No | Best Value |
| Network Improvements (eg increase capacity, storage, conveyance) | Catchment Wide | PO5, PO7 - Hydraulic Drivers | PENN.PW01.3 | Additional Storage Capacity | Construction of online/offline storage as stipulated point across the catchment, as outlines in the hydraulic model - using DAP results. | No | | | | | | Risk and uncertainty - future resilience |
| Network Improvements (eg increase capacity, storage, conveyance) | Catchment Wide | PO5, PO7 - Hydraulic Drivers | PENN.PW01.4 | Additional Conveyance Capacity | Based on results of hydraulic model (option PENN. | No | | | | | | Risk and uncertainty - future resilience |
| Network Improvements (eg increase capacity, storage, conveyance) | Northern Lymington | PO4 and PO7 - Growth | PENN.PW01.5 | Diversion sewer | DAP Option. | Yes | No | | | | | Feasibility and Risk |
| Network Improvements (eg increase capacity, storage, conveyance) | Waterloo Road, Lymington | PO4 and PO7 - Growth | PENN.PW01.6 | Online tank and sewer regrade | DAP Option. | Yes | No | | | | | Feasibility and Risk |
| Network Improvements (eg increase capacity, storage, conveyance) | Saltgrass Lane | PO4 and PO7 - Growth | PENN.PW01.7 | Increase manhole size | DAP Option. | Yes | No | | | | | Feasibility and Risk |
| Network Improvements (eg increase capacity, storage, conveyance) | School Lane and Lymore Valley | PO4 and PO7 - Growth | PENN.PW01.8 | Regrading and upsizing | DAP Option. | Yes | Yes | Yes | Major Positive +++ | £80K | Yes | Best Value |
| Network Improvements (eg increase capacity, storage, conveyance) | Ashely Common Road | PO4 and PO7 - Growth | PENN.PW01.9 | Upsizing | DAP Option. | Yes | Yes | Yes | Major Positive +++ | £380K | Yes | Best Value |
| Network Improvements (eg increase capacity, storage, conveyance) | Beechwood Avenue and Marley Avenue | PO4 and PO7 - Growth | PENN.PW01.10 | Upsizing | DAP Option. | Yes | Yes | Yes | Major Positive +++ | £605K | Yes | Best Value |
| Network Improvements (eg increase capacity, storage, conveyance) | Milford Road Pennington WTW | PO4 and PO7 - Growth | PENN.PW01.11 | Storage | DAP Option. | Yes | Yes | Yes | Major Positive +++ | £660K | Yes | Best Value |
| Network Improvements (eg increase capacity, storage, conveyance) | Peters Lane New Milton WPS | PO2- Pollution Risk | PENN.PW01.12 | Maintenance Programme WPS | Improve resilience: Review operation and maintenance of Peters Lane New Milton pumping station to improve resilience. | Yes | Yes | Yes | Minor Positive + | £235K | Yes | Best Value |
| Network Improvements (eg increase capacity, storage, conveyance) | Holly Lane Ashely WPS | PO2 Pollution Risk | PENN.PW01.13 | Maintenance Programme WPS | Improve resilience: Review operation and maintenance of Holly Lane Ashely pumping station to improve resilience. | Yes | Yes | Yes | Minor Positive + | £235K | Yes | Best Value |
| Network Improvements (eg increase capacity, storage, conveyance) | BECTON LANE BARTON ON SEA CEO | Flooding and spill assessments - PO5 | PENN.PW01.14 | Storage | The model has a Medium risk DAP confidence score of 3 and was last verified in 2013. | No | | | | | | Risk and uncertainty - future resilience |
| Network Improvements (eg increase capacity, storage, conveyance) | HIGH STREET LYMINGTON CSO | Flooding and spill assessments - PO5 | PENN.PW01.15 | Storage | Use Hydraulic Model to identify storage volume needed to prevent the high spilling CSO from discharging. | Yes | Yes | Yes | Major Positive +++ | £1,000K | Yes | Best Value |
| Network Improvements (eg increase capacity, storage, conveyance) | LYMORE CSO | Flooding and spill assessments - PO5 | PENN.PW01.16 | Storage | Use Hydraulic Model to identify storage volume needed to prevent the high spilling CSO from discharging. | Yes | Yes | Yes | Major Positive +++ | £1,000K | Yes | Best Value |
| Network Improvements (eg increase capacity, storage, conveyance) | MILFORD ROAD PENNINGTON WTW | Flooding and spill assessments - PO5 | PENN.PW01.17 | Storage | Use Hydraulic Model to identify storage volume needed to prevent the high spilling CSO from discharging. | Yes | Yes | Yes | Major Positive +++ | £1,000K | No | Best Value |
| Network Improvements (eg increase capacity, storage, conveyance) | Catchment Wide | PO8 (2050)- Dry Weather Flow | PENN.PW01.18 | Pipe Rehabilitation Programme | Relining/improving structural grades of sewers across the catchment. | Yes | No | | | | | Environmental - Strategic Environmental Assessment |

# Pennington Wastewater System - Outline Options Appraisal

| Generic Option | Location of Risk | Planning Objective and Description of Risk | Option Reference | Description | Further Description | Unconstrained Option? | Constrained Option? | Feasible Option? | Net Benefits | Estimated Cost | Preferred Option | Best value / Least cost or Reasons for Rejection |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Improve treatment (capacity and quality at existing works or develop new WTWs) | Pennington WTW | PO8 (2050) - Dry Weather Flow | PENN.PW02.1 | Increase Treatment Capacity | Increasing the treatment capacity at the treatment works, to ensure permit is below 80% and reduced risk of exceeding. | Yes | No | | | | | Operational |
| Improve treatment (capacity and quality at existing works or develop new WTWs) | Effected Designated Sites/Pennington WTW | PO11 - Nutrient Neutrality | PENN.PW02.2 | Install P removal tertiary plant | Currently no Phospahte permit. | No | | | | | | Risk and uncertainty - future resilience |
| Improve treatment (capacity and quality at existing works or develop new WTWs) | Effected Designated Sites/Pennington WTW | PO11 - Nutrient Neutrality | PENN.PW02.3 | Install N removal tertiary plant | Remove more N from final effluent, past the currently allowed 9. | No | | | | | | Risk and uncertainty - future resilience |
| Improve treatment (capacity and quality at existing works or develop new WTWs) | Pennington WTW | PO5 - Storm Overflow Performance PO11 - Nutrient Neutrality | PENN.PW02.4 | Optimisation of Treatment Process | Optimising treatment process by increasing full flow to treatment of works. | Yes | No | | | | | Operational |
| Improve treatment (capacity and quality at existing works or develop new WTWs) | Pennington WTW | PO2, PO8 - Operational PO5, PO7 - Hydraulic | PENN.PW02.5 | De-centralisation of Treatment | Breaking up of sewer system into smaller catchments that only cover the small towns, rather than Pennington which covers seevral of these developments. | No | | | | | | Risk and uncertainty - future resilience |
| Improve treatment (capacity and quality at existing works or develop new WTWs) | MILFORD ROAD PENNINGTON WTW | PO8 (2050)- Dry Weather Flow | PENN.PW02.6 | Permit Review | Increase capacity of the Wastewater Treatment Works (WTW). | Yes | Yes | Yes | Minor Positive + | £2,385K | Yes | Best Value |
| Wastewater Transfer | | | | | | | | | | | | |
| Mitigate impacts on Air Quality (e.g. Carbon neutrality, noise, odour) | | | | | | | | | | | | Not included in the first round of DWMPs |
| Improve Land and Soils | | | | | | | | | | | | Not included in the first round of DWMPs |
| Mitigate impacts on Water Quality | Effected Designated Sites/Pennington WTW | PO11 - Nutrient Neutrality | PENN.RC03.1 | Catchment permits | Reduce consented permit levels for nutrients and solids in the final effluent from treatment works. | No | | | | | | Do customer support it and Risk and uncertainty - future resilience |
| Mitigate impacts on Water Quality | Effected Designated Sites | PO11 - Nutrient Neutrality | PENN.RC03.2 | River enhancement and mitigation | Enhance river upstream of catchment to provide attenuation of flows, limiting unconsented spills from CSOs, and providing opportunity for natural nutrient removal. | No | | | | | | Cost Effective |
| Mitigate impacts on Water Quality | Effected Designated Sites/Pennington WTW | PO11 - Nutrient Neutrality | PENN.RC03.3 | Efflent re-use | Re-use of effluent from site - pumping of this effluent to potable process treatment works. | No | | | | | | Cost Effective and Deliver the required outcome |
| Reduce consequences Properties (e.g. Property Flood Resilience) | Catchment Wide | PO7 - Hydraulic Drivers | PENN.RC04.1 | Flood Mitigation for Flooding | Flooding mitigation to consider options (but not limited to); Non-return Values, Smart Airbricks, Flood Doors. | Yes | No | | | | | Operational |
| Study/ investigation to gather more data | Catchment Wide | PO5, PO7 - Hydraulic Drivers & PO8 - Dry Weather Flow | PENN.OT01.1 | Further Study/Investigation | Futher Study/Investigation - Identifying ideal locations to separate foul and surface water systems. | Yes | No | | | | | Environmental - Strategic Environmental Assessment |
| Study/ investigation to gather more data | Catchment Wide | PO8 (2050)- Dry Weather Flow | PENN.OT01.2 | Further Study/Investigation CCTV Survey - Condition Assessment | Investigation work to determine the structural condition of the sewer network within the catchment. | Yes | No | | | | | Operational |
| Study/ investigation to gather more data | CSOs - Becton Lane Barton on Sea; High Street Lymington; Lydmore; Milford Road Pennington. | PO5 - High Spilling CSOs | PENN.OT01.3 | Further Study/Investigation | Failing CSOs - EDM data shows spills are greater than threshold - however, predicted model spills on Hydraulic Model has a spill frequency less than the threshold. | Yes | No | | | | | Operational |
| Study/ investigation to gather more data | Solent and Dorset Coast Solent & Southampton Water | PO11 - Nutrient Neutrality | PENN.OT01.4 | Further Study/Investigation | In order to take forward any unconstrained option - PENN. | Yes | No | | | | | Operational |
| Study/ investigation to gather more data | PENN FC08 - BECTON LANE BARTON ON SEA CEO | Flooding and spill assessments - PO5, PO13 | PENN.OT01.5 | Storage ( FC08 - BECTON LANE BARTON ON SEA CEO) | Use Hydraulic Model to identify storage volume needed to prevent the high spilling CSO from discharging. | Yes | Yes | Yes | Major Positive +++ | £1,000K | Yes | Best Value |
| Study/ investigation to gather more data | PENN FC09- LYMINGTON SLIPWAY PENNINGTON CSO | Flooding and spill assessments - PO5, PO13 | PENN.OT01.6 | Storage ( FC09- LYMINGTON SLIPWAY PENNINGTON CSO) | Use Hydraulic Model to identify storage volume needed to prevent the high spilling CSO from discharging. | Yes | Yes | Yes | Major Positive +++ | £1,000K | Yes | Best Value |
| Study/ investigation to gather more data | PENN FC010 - HIGH STREET LYMINGTON CSO | Flooding and spill assessments - PO5, PO13 | PENN.OT01.7 | Storage ( FC010 - HIGH STREET LYMINGTON CSO) | The model has a Medium risk DAP confidence score of 3 and was last verified in 2013. | Yes | No | | | | | Feasibility and Risk |
| Study/ investigation to gather more data | PENN FC11 - LYMORE CSO | Flooding and spill assessments - PO5, PO13 | PENN.OT01.8 | Storage ( FC11 - LYMORE CSO) | The model has a Medium risk DAP confidence score of 3 and was last verified in 2013. | Yes | No | | | | | Feasibility and Risk |
| Study/ investigation to gather more data | Catchment Wide | PO5- Storm Overflow PO7- Hydraulic Overload | PENN.OT01.9 | Improve Hydraulic Model | Study / Investigation: Update and re-verify the Pennington Hydraulic Model to improve model confidence. | Yes | Yes | Yes | Minor Positive + | £225K | Yes | Best Value |
| Study/ investigation to gather more data | Solent and Dorset Coast Solent & Southampton Water | PO11 - Nutrient Neutrality | PENN.OT01.10 | Nutrient Budget | Study / Investigation: Develop a nutrient budget and investigate the risks and sources impacting these named Habitat sites. | Yes | Yes | Yes | Minor Positive + | £75K | Yes | Best Value |

**Drainage and Wastewater Management Plan (DWMP)**

# DWMP Investment Needs

1. The options listed in the DWMP Investment Needs below are the preferred options in our DWMP. They will need further refinement as we implement the DWMP to confirm the exact location and scope of action needed, and the cost.

2. The costs are indicative costs for planning purposes only. The basis for the cost estimates, including assumptions and uncertainties, are explained in our DWMP Investment Plans.

3. The table of Investment Need provides an indicative cost so we know what level of funding is needed to reduce the risks. It is not a commitment to fund or deliver any option.

4. The Indicative Timescale is when the investment is needed. Some options may take several investment periods to achieve the desired outcomes.

5. Potential Partners have been identified in the table of Investment Needs. This is to indicate where there may be opportunities for us to work with these partners when developing and delivering these options. It is not a commitment by any of the partners to work with us.

6. These options will inform our future business plans as part of the Ofwat periodic review process to secure the finance to implement these options.

7. The options listed are prioritised by the method stated in the Programme Appraisal Technical Summary.

Date : May 2023
Version : 1.0

1

| Reference | River Basin (L2) | Wastewater System (L3) | Location | Option | Indicative Cost | Indicative Timescales | Potential Partners | Applicable Planning Objectives |
|---|---|---|---|---|---|---|---|---|
| **New Forest** | | | | | | | | |
| **Pennington** | | | | | | | | |
| PENN.PW01.8 | New Forest | Pennington | School Lane and Lymore Valley | Growth scheme from our Drainage Area Plan (DAP): Upsize 67m of existing sewer to 675mm diameter sewer | £80K | AMP9 | - | PO4 PO7 |
| PENN.PW01.9 | New Forest | Pennington | Ashely Common Road | Growth scheme from our Drainage Area Plan (DAP): Upsize 455m of existing sewer to 375mm diameter | £380K | AMP9 | - | PO4 PO7 |
| PENN.PW01.10 | New Forest | Pennington | Beechwood Avenue and Marley Avenue | Growth scheme from our Drainage Area Plan (DAP): Upsize 728m of existing sewer to 525mm diameter | £605K | AMP9 | - | PO4 PO7 |
| PENN.PW01.11 | New Forest | Pennington | Milford Road Pennington WTW | Flood Alleviation: Separate or attenuate excess rainwater in sewer network using Sustainable Drainage Systems (SuDS) to reduce risk of flooding (Costs based on storage solution but surface water separation is our preferred approach) | £660K | AMP9 | - | PO4 PO7 |
| PENN.PW01.12 | New Forest | Pennington | Peters Lane New Milton WPS | Improve the operational resilience of wastewater pumping station (WPS) to reduce pollution incidents | £235K | AMP8 onwards | - | PO2 |
| PENN.PW01.13 | New Forest | Pennington | Holly Lane Ashely WPS | Improve the operational resilience of wastewater pumping station (WPS) to reduce pollution incidents | £235K | AMP8 onwards | - | PO2 |
| PENN.PW02.6 | New Forest | Pennington | Pennington WTW | Increase capacity to allow for planned new development | £4,000K | AMP8 | Environment Agency | PO8 |
| PENN.OT01.9 | New Forest | Pennington | System Wide | Improve the Hydraulic Model: Surveys and reverification of model to improve confidence and accuracy | £225K | AMP8 | New Forest District Council New Forest National Park Authority | PO5 PO7 |
| PENN.WINEP01.1 | New Forest | Pennington | MILFORD ROAD PENNINGTON SSO | Reduce impact from storm spills from MILFORD ROAD PENNINGTON SSO through wetland creation and/or sewer lining to reduce infiltration of groundwater | £24,275K | AMP8 | - | PO5 PO14 |
| PENN.WINEP01.2 | New Forest | Pennington | STATION STREET LYMINGTON NO 1 CSO | Reduce the number of storm discharges from STATION STREET LYMINGTON NO 1 CSO by creating below-ground storage | £1,135K | AMP11 | - | PO5 |
| PENN.WINEP01.3 | New Forest | Pennington | HIGH STREET LYMINGTON CSO | Reduce the number of storm discharges from HIGH STREET LYMINGTON CSO by creating below-ground storage | £1,515K | AMP11 | - | PO5 |
| PENN.WINEP01.4 | New Forest | Pennington | LYMORE CSO | Reduce impact from storm spills from LYMORE CSO through wetland creation and/or sewer lining to reduce infiltration of groundwater | £6,435K | AMP10 | - | PO5 |
| PENN.WINEP01.5 | New Forest | Pennington | SUNNYFIELD ROAD BARTON ON SEA CSO | New or improved screen to reduce aesthetics impacts from storm discharges at SUNNYFIELD ROAD BARTON ON SEA CSO | £130K | AMP12 | - | PO5 |
| PENN.WINEP01.6 | New Forest | Pennington | FRIARS WALK BARTON ON SEA CSO | Reduce impact from storm spills from FRIARS WALK BARTON ON SEA CSO through wetland creation and/or sewer lining to reduce infiltration of groundwater | £3,165K | AMP12 | - | PO5 |

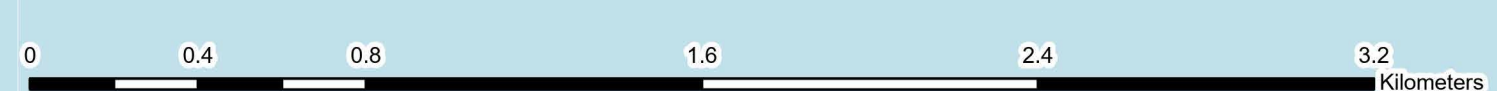| Reference | River Basin (L2) | Wastewater System (L3) | Location | Option | Indicative Cost | Indicative Timescales | Potential Partners | Applicable Planning Objectives |
|---|---|---|---|---|---|---|---|---|
| PENN.WINEP01.7 | New Forest | Pennington | SKY END LANE HORDLE CSO | Reduce impact from storm spills from SKY END LANE HORDLE CSO through wetland creation and/or sewer lining to reduce infiltration of groundwater | £2,815K | AMP11 | - | PO5 |
| PENN.WINEP01.8 | New Forest | Pennington | SOUTHERN ROAD PENNINGTON CSO | Reduce impact from storm spills from SOUTHERN ROAD PENNINGTON CSO through wetland creation and/or sewer lining to reduce infiltration of groundwater | £2,865K | AMP12 | - | PO5 |

# Drainage and Wastewater Management Plan: Location of Potential Options PENNINGTON Wastewater system in New Forest River Basin Catchment

WATER for LIFE from Southern Water

(i) This map should be read in conjunction with the list of Investment Needs for this wastewater system
(ii) The areas shown on this map are the potential locations for the options. The location of the risk may be elsewhere in the system.
(iii) Labels for each location are the option references in the list of Investment Needs
(iv) Drainage Area Plan (DAP) options on flooding and growth are not shown.

New Forest
New Forest National Park
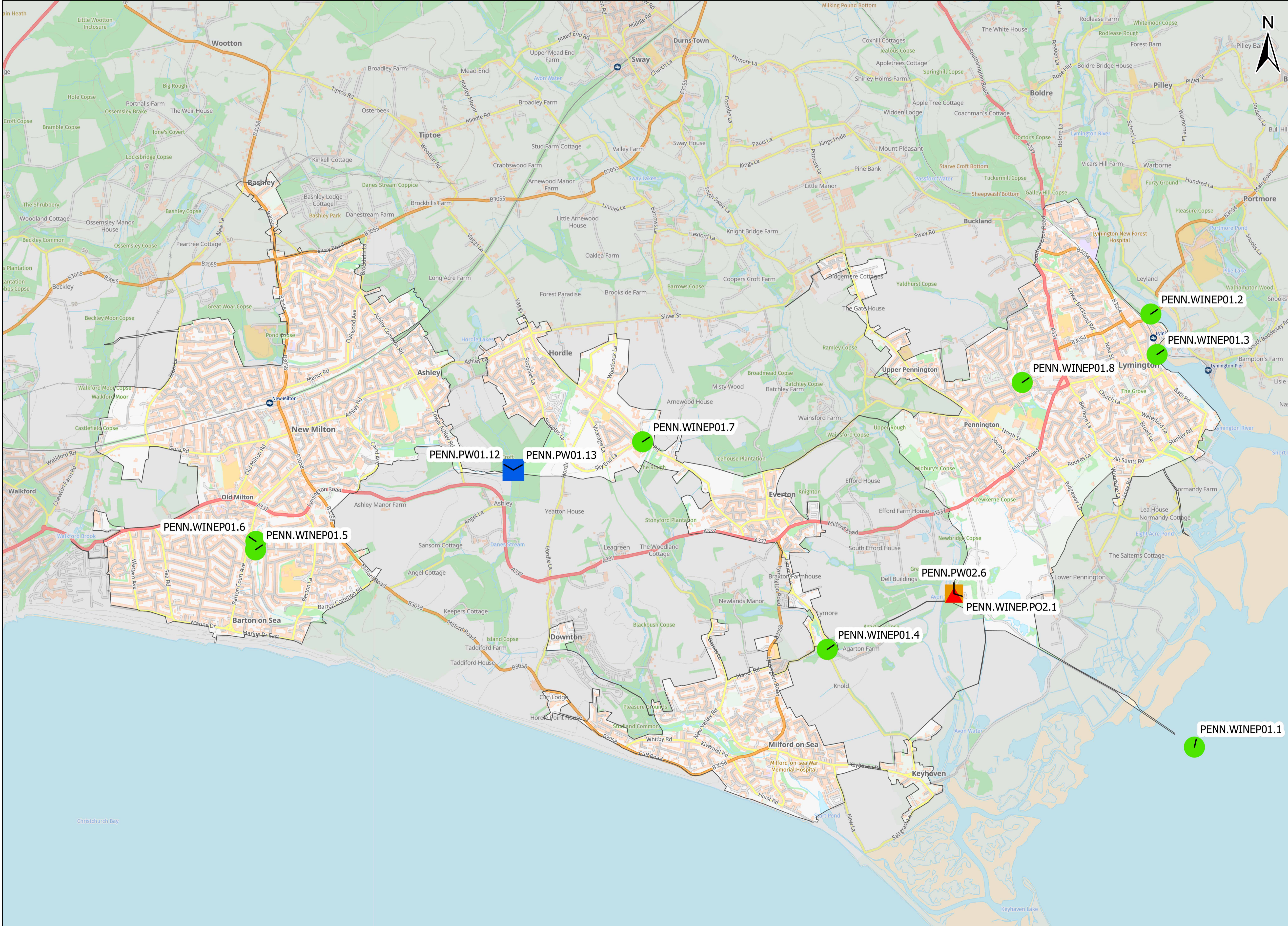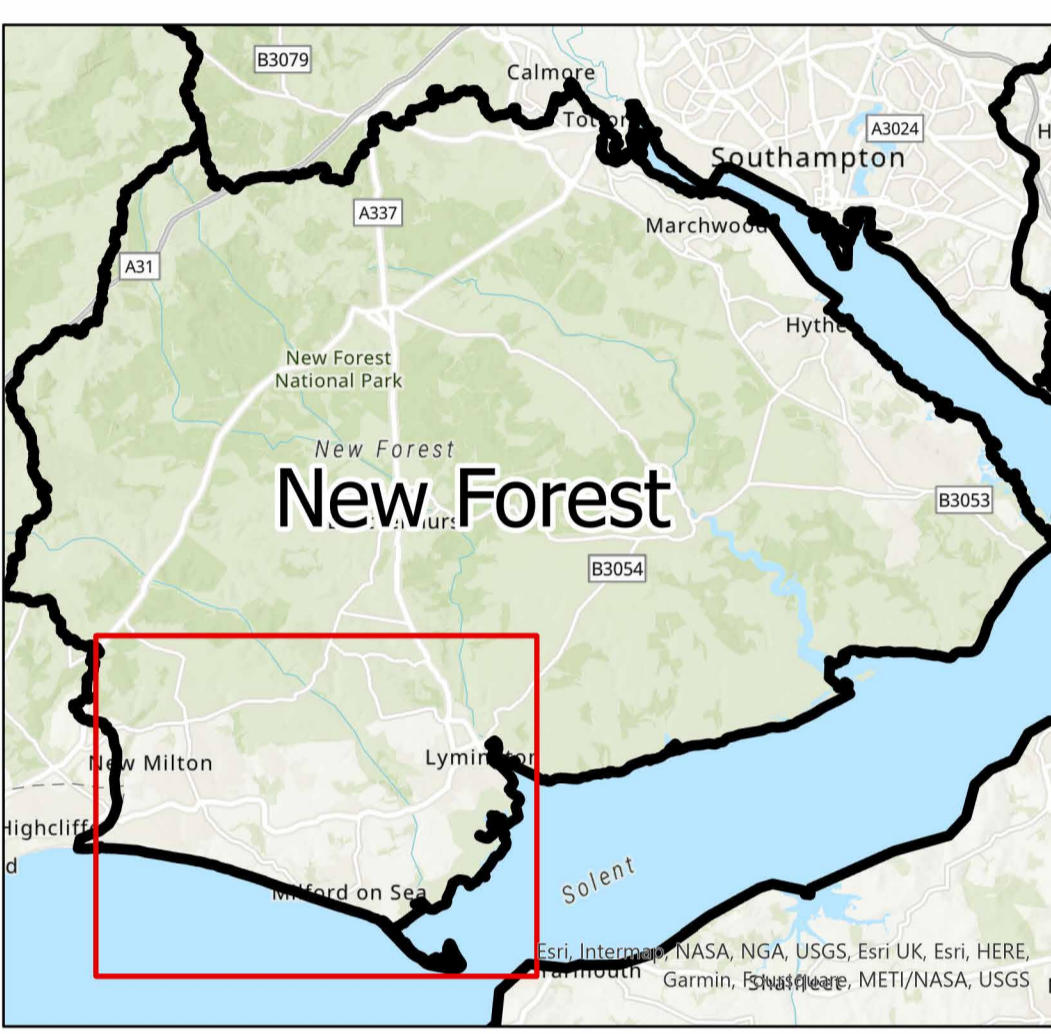
Legend:
- Customer Education
- Pipe Rehabilitation
- Asset Resilience
- Wastewater Treatment
- WINEP Nutient Neutrality
- WINEP Storm Overflows

PENN.WINEP01.2
PENN.WINEP01.3
PENN.WINEP01.8
PENN.WINEP01.7
PENN.PW01.12    PENN.PW01.13
PENN.WINEP01.6    PENN.WINEP01.5
PENN.PW02.6
PENN.WINEP.PO2.1
PENN.WINEP01.4
PENN.WINEP01.1

N

0    0.4    0.8    1.6    2.4    3.2
Kilometers