

Chestnut Park Future Maintenance and Management Plan

Background

Chestnut Park Flood Alleviation scheme is proposed for installation in Chestnut Park to address issues of residential flooding downstream of the park and to clean water in the surface water sewers ahead of it joining the River Lea.

This document lays out the future maintenance and management plan of the asset once installed within the park.

Appendix 1 tables all the actions, frequency and responsibilities.

Maintenance

Planting

The first 3 years of the project the maintenance will be undertaken by the term maintenance contractor's sub-consultant who installs the planting. The maintenance regime is laid out Appendix 2 – "Landscape and Seeding and planting Palette". The Park's Management Team will monitor the contractor's performance against this specification and will require an inspection certificate to be signed by the contractor on completion of each visit.

Following the 3-year contractor maintenance period The Parks Management team commit to following the same specification as per Appendix 1.

The Flood and Water Management Team commit to funding the replacement of the reeds, if required, after a 10-year period.

Pipework

The Flood and Water Management Team will be responsible for the maintenance of all drainage elements of the scheme, i.e. pipework, interceptors, filters etc. They may commission Parks to undertake the works on their behalf, or another specialist contractor but will be responsible for the monitoring and management of these elements, as per appendix 1.

Litter

The Parks Management team will be responsible for litter collection in and around the feature and this will be undertaken as part of their usual park maintenance.

Informal play items and seating

The Parks Management team will be responsible for visually inspecting the seating and informal play elements along with their inspections of all other furniture within the park.

Water Quality

The Water being brought into the park is from a surface water sewer system. However, there is the risk of foul water misconnections upstream thereby potentially bringing polluted water into the park. The Reedbeds will filter the majority of the pollutants, however the following processes are in place if there is a significant issue of misconnections or pollutants.

Public Protection

Signage will be erected around the area with a permanent water flow to alert the public to not touch or drink the water.

Regular Water Quality Testing

The Highways Maintenance group, will undertake water quality testing 6 months after installation and further testing if visual inspections deem it necessary. If high levels of E.coli or BOD5 is detected (suggesting mis-connections) these will be reported to the Environment Agency (0800 80 70 60) and Thames Water (0800 316 9800).

Appendix 3 - Investigation and rectification of drainage misconnections Good Practice Document by Water UK/Environment Agency details the process to be followed where misconnections are identified.

“Following identification of the problem, Thames Water will spend up to two days investigation time to try to identify pollution sources with their drainage contractors. Where a small number of misconnections can be easily identified within this timescale, actions to rectify misconnections will be carried out by Thames Water. In these cases the need to undertake further steps may not be required.

However, if up to two days investigation time shows many pollution sources from misconnections then a structured approach is required. In these cases the pollution location and details will be captured onto a list of outfalls requiring detailed investigation. Thames Water, in partnership with the Environment Agency and Haringey Council will then follow the full methodology of investigating and rectifying sources of pollution [see Appendix 2].”

Project monitoring

The Highways and Parking Teams will be responsible for monitoring the success of the scheme for attenuation purposes . The results will be shared quarterly with the Friends of Chestnut Park and Haringey Rivers Forum.

Success of the scheme will be monitored through:

- Water quality testing within the park – 6 months after installation and if visual inspections deem it necessary.
- Comparable water quality testing of the flow up stream and down stream of the feature – 6 months after installation
- Annual bio-diversity audit – to be developed in collaboration with the Friends of Chestnut Park and the Council’s Nature Conservation officer

Appendix 1 Management and Maintenance Table

Feature	Action	Time of year	Frequency	Notes	Responsible Department
Drainage Features					
Wetland Inlets and Outlets	Inspect inlets and outlets for blockages (includes silt, vegetation, litter and other debris)	Continuous	Every 3 months	Do not undertake unless appropriately trained	Highways Maintenance Team
	Remove accumulated silt at inlets and outlets to ensure free flow of water and allow to de-water	Continuous	As required	Inlets / outlets with high silt accumulation may require jetting by specialist teams	
	Cut and rake all wetland vegetation away from inlets and outlets (including roots) by 1m distance	Continuous	As required		
Overflows	Check overflow from wetland cells and pond. Note any long term pooling / localised flooding	Continuous	Every 3 months		Highways Maintenance Team
	Cut and rake all wetland vegetation at a 1m easement around overflows (including roots)	Continuous			
Manhole/ culvert grills	Inspect grilles and remove litter and debris	Continuous	Every 3 months		Highways Maintenance Team

Planting Features					
Wetland Vegetation	In autumn / winter cut 1m wide strips, perpendicular to inlet and outlets. Leave 2m of vegetation between each strip. Rake and dispose of all compost matter except for all of the roots. Alternate the strips year by year.	Autumn / winter	Annually/ on a 3 year rotation	Do not enter the wetland after periods of high rainfall, or when heavy rainfall is predicted	Years 1-3 Contractor – managed by Parks Management. Years 3+ Parks Management Team
	Cut vegetation out of open channels in order to ensure that flow can pass freely			Removal/ thinning of any wetland plant material may be required after the 3 year establishment period to maintain flow and function. Replacement of reeds may be required after 10 years (cost to be borne by Flood and Water Management Team)	
	All prunings and cuttings disposed to agreed wildlife piles within the park corridor - alternatively these can be taken off site for composting (as agreed with Parks)				

Scrapes and Marginal Grassland areas	Annual strimming with periodic vegetation management	October	annual	Allow for seeding before collecting cuttings	Years 1-3 Contractor – managed by Parks Management. Years 3+ Parks Management Team
Amenity Grass areas	Regular cutting	Continuous	Monthly	Best practice to remove cuttings to prevent build-up of nutrients.	Parks Management Team
Litter Collection	Remove litter from whole site i.e. footpaths, seating features, outdoor classrooms, wildflower meadows and other amenity spaces	Continuous	Monthly		Parks Management Team
Boardwalk, seating areas, informal play equipment, interpretation features	Inspect these features for functionality and report any breakages or faults	Continuous	Monthly		Parks Management Team

within social spaces					
Replacement of plants	Removal and replacement of dead and vandalised plants.	Continuous	Monthly		Years 1-3 Contractor – managed by Parks Management.
Pruning	Pruning of herbaceous and semi-native shrubs	February	Annually	No more that once per year, before or after nesting season	Years 3+ Parks Management Team
Pests/ disease	Pest and disease control	Continuous	Monthly		
Mulch	Topping-up of bark mulch.	Continuous	As required		
Watering	Watering of lawns, trees and shrubs as necessary.	Continuous	Monthly in first 3 years, only during dry periods in years 3+		
Monitoring					
Water Quality	Inspect all open water around the site for signs of pollution/ cloudiness/ contamination.		Every 2 months for first year	Any suspected or known pollution incidents must be reported to the	Highways Maintenance Team

	Collection of water quality samples, sent for testing		6 months after installation and if visual inspections deem it necessary.	Environment Agency and or Thames Water.	
	Report any pollution incidents to the Environment Agency (0800 80 70 60) and Thames Water (0800 316 9800)		As required		

APPENDIX 2 - Landscape Seeding & Planting Palette - 12609983-GHD XX-XX RPT-LA0002



Client:	Haringey Council
Project:	Chestnuts Park
Location:	London
Date:	25/07/23
Created by:	Lewis Stevenson

The planting and seeding proposals as illustrated with the Landscape Proposals Plan Drg No 12609983/ 0014 have been developed mindful of the requirements to consider the existing parkland context, regarding visual amenity, landscape character, heritage setting and ecological value.

The species outlined within this document look to balance the specific design feature function with the longer-term habitat/ biodiversity enhancement alongside the current and future maintenance objectives of the Haringey Parks Department.

The flood alleviation scheme is located within the recreational grassland that has currently little ecological value. The landscape proposals concentrate upon the development of the following:-

- Native Mixed Hedgerow
- Wetland with reedbed, sedges and marginal habitats
- Mosaic of conservation wildflower meadow and neutral grassland

Native Mixed Hedgerow – species to consider within the scheme include -

Botanical Name	Common Name	Description	Images
<i>Corylus avellana</i>	Common Hazel	The Common Hazel is a native multi-stemmed shrub or small to medium-sized tree. The long, pale yellow catkins make a fine display in early spring. The relatively large, rounded, green serrated foliage often turns to yellow shades in autumn, when the clusters of edible nuts are ripe. Thrives in a wide range of soils and in sun/light shade	
<i>Crataegus monogyna</i>	Common Hawthorn	The Common Hawthorn is widely used for hedging. This variable native has small, lobed foliage and brown or grey bark. Masses of clusters of scented white flowers in May and small red fruits in autumn. The best growth is produced in good soil, but the plant is very tolerant of cold, occasional water-logging and wind.	

Botanical Name	Common Name	Description	Images
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Lonicera periclymenum	Common Honeysuckle	The Common Honeysuckle is a strong growing twining climber with oval to elliptic leaves, glaucous underneath. Very fragrant purplish-red tubular flowers open to white or pale yellow in June and July and possibly later, followed by round red berries in tight clusters. Due to its dense growth, provides a nesting site for birds.	 
Rosa canina	Dog Rose	The Native Dog Rose has white or more usually pink, single scented flowers followed by red hips on vigorous thorny stems.	   
Cornus Sanguinea	Common Dogwood	Common Dogwood. This native has green stems, flushed red. Green leaves turn an eye-catching reddish-purple in autumn. Black fruits.	  

Wetland Mix – species to consider within the scheme include -

Botanical Name	Common Name	Description	Images
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Carex pendula	Pendulous Sedge	A native sedge, strong growing and rhizomatous perennial, forms dense evergreen clumps of shiny green leaves to 100cm high. Brown catkin-like flowers on tall stems up to a height of 1.6-2.0 metres are produced in May-June followed by gracefully drooping heads of green seed spikes, ageing to brown. A tough plant for a wide range of conditions, that is, sun to shade, dry to wet.	   
Molinia caerulea	Purple Moor Grass	This is a tussock-forming perennial grass with green linear leaves which in winter turn straw-coloured and fall away around the base which is a feature in itself. Long, narrow purple-green flower spikelets on upright and arching green stems in June to July. A grass for damp moors, heaths and fens, reaching an overall height of 80-100cm.	

Wetland Mix (Marginals-Aquatics) – species to consider within the scheme include -

Botanical Name	Common Name	Description	Images
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Caltha palustris	Marsh Marigold	The Marsh Marigold is a rhizomatous, marginal aquatic perennial forming a clump of toothed, kidney-shaped, green leaves. Bright golden-yellow flowers on green stalks are produced in April and May followed by tiny orange-brown seeds in June. Wildfowl tolerant. Grows to 30-40cm high with a spread of 40-50cm.	
Carex acutiformis	Lesser Pond Sedge	A tuft-forming strong growing sedge forming tall dense clumps of linear, rough green leaves, blue-grey when young. Flowers are brown consisting of male above female on upright spikes from July with seeds forming by September. Grows on wet ground and standing water such as pond margins and marshes to a height of 90-120cm.	
Iris pseudacorus 'Variegata'	Variegated Yellow Flag Iris	A strong growing rhizomatous beardless iris ideal for waterside margins with grey-green strap-shaped leaves with prominent yellow-white stripes giving an overall impression of variegation. Yellow flowers with brown markings appear from the end of May into June. Grows to 80-100cm high.	

Lythrum salicaria	Purple Loosestrife	The Purple Loosestrife is an indigenous herbaceous perennial forming a clump of upright, 4-sided, red-tinged, green stems with lance-shaped, dark green leaves which can turn a light red in autumn. Spikes of small, star-shaped, pink-purple flowers are produced from July to September. Use as a marginal aquatic. Wildfowl tolerant. Grows to a height of 90-100cm with a 45cm spread.	   
Mentha aquatica	Water Mint	A rhizomatous herbaceous perennial with oval, hairy green leaves strongly scented of mint on square reddish-purple upright stems. Pale lilac-pink flowers in July-September which are attractive to butterflies and bees. A plant for damp and wet ground, even in shallow water such as along a pond edge. Grows to 90cm high with a spread of 80cm and beyond.	   
Myosotis scorpioides	Water Forget-me-not		

Ranunculus flammula	Lesser Spearwort		   
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Wildflower Meadow Mix:

Grass Accompaniment

Slender Creeping Red Fescue	22.5%
Hard Fescue	22.5%
Crested Dogstail	12%
Smooth Stalked Meadow Grass	7.5%
Rough Stalked Meadow Grass	5%
Small Leaf Timothy	3.75%
Browntop Bent	3.75%
Sweet Vernal	1.5%
Meadow Foxtail	1.5%

Wildflowers

Species	100%	80:20 Grass:Wildflowers
Yarrow	3%	0.6%
Common Knapweed	12%	2.4%
Lady's Bedstraw	8%	1.6%
Oxeye Daisy	4%	0.8%
Birdsfoot Trefoil	1.5%	0.3%
Ragged Robin	1%	0.2%
Ribwort Plantain	2%	0.4%
Cowslip	1%	0.2%
Selfheal	8%	1.6%
Meadow Buttercup	12%	2.4%
Yellow Rattle	10%	2%
Hedge Bedstraw	2%	0.4%
Agrimony	5%	1%
Meadow Vetchling	4%	0.8%
Meadowsweet	3%	0.6%
Common Sorrel	4%	0.8%
Betony	6%	1.2%
Tufted Vetch	4%	0.8%
Meadow Cranesbill	1.5%	0.3%
White Campion	8%	1.6%

Neutral Grassland Mix:

E16 – Embankment & Ground Cover by Barenbrug.co.uk

Composition:

20% Perennial ryegrass

20% Strong Creeping Red Fescue

15% Tall fescue

15% Annual ryegrass

15% Slender Creeping Red Fescue

10% Hard Fescue

5% Browntop Bent

Planting Maintenance & Management

The soft landscape maintenance and management is seen as a vital part of achieving and sustaining the overarching objectives of the landscape design.

These include:

- visual values, focussed on the creation of a varied, attractive, engaging spaces, where the planting forms a key part of placemaking and the landscape experience;
- functional values, the creation of a landscape that is mindful of the heritage setting and frames different activities and uses across the parkland, including play, relaxation and new wetland feature;
- biodiversity values, maximising the ecological value of all planting types, creating diverse habitats for both flora and fauna, as well as allowing people to interact with and observe nature in an urban parkland setting. The biodiversity values are key and strongly linked to the other two points, forming part of what defines also the visual character of the landscape - naturalistic with seasonal variation. The maintenance operations will therefore be adapted to support the existing varied ecological features also mindful of the amenity and ornamental setting of the parkland.
- A range of different habitat types will be created across the application site, all with their specific maintenance requirements. All planting typologies have been selected to suit the varied conditions across the site and all will be designed with robustness and ease of maintenance in mind.

Outline soft landscape maintenance tasks to cover years 1-3 post completion are summarised below:

- Watering as required during the establishment period, to ensure successful establishment, growth and development;
- Species appropriate formative pruning of hedgerow to maintain desired form, and to ensure they do not grow to obstruct paths, viewing platforms, play equipment and seating areas. Any tree work to be in line with good arboricultural practice BS 3998;
- Regular check for health and performance of all planting;
- Removal of damaged play equipment/ furniture replaced on a like for like basis;
- Removal of dead plants if required and replacement planting in the next planting season;
- Annual hay/ grassland cut of the wildflower meadow habitat areas, allowing for seeding before collecting cuttings;
- Regular mowing of the amenity grassland areas primarily the grass ramped access and route to/ from the viewing platform.
- Mowing all, or some of the scrape/ marginal areas annually may be required;
- Annual strim/ cut of herbaceous perennial planting in late winter, retaining any evergreen species uncut;
- Compost/mulch; check and top up once a year;
- Weeding as required
- Litter clearance as required.

Outline Specification

General

All operations will be carried out by a competent and qualified landscape contractor in line with best practice methods suitable for the works as outlined below:

In addition to those standards listed within the specification, all works to conform to the following British Standards:-

BS 3882 - Specification for Topsoil

BS 3969 - Recommendations for Turf for General Purposes

BS 3998 - Recommendations for Tree Work

BS 4428:1989 - General Landscape Operations Excluding Hard Surfaces

BS 5837 - Trees in Relation to Construction - Recommendations

Vegetation Protection

All existing vegetation to be retained in line with the recommendations of BS 5837. The position of the fencing will be as set out with submitted Arboricultural Assessment and Method Statement and remain in place until all site works are complete.

Site Preparation

Soils

Existing soil to be utilised on site where possible and should be to the following minimum depths:-

Shrubs - 600mm (300mm topsoil)

Grass area - 300mm (150mm topsoil)

Wildflower areas – 300mm of a 50:50 mixture of subsoil and topsoil. Subsoil alone can be used, but if the soil structure is poor and the fertility very low there will be a very slow establishment of wildflowers and dominated by unwanted plants. Soil testing to be undertaken to verify topsoil fertility prior to site preparation.

Should depths of soils not fall within these minimum standards soils depths will be increased using imported soil to BS 3882 or existing approved soil from elsewhere on site. Refer to Site/ Ground Investigation Report for further information as to suitability of existing soils.

Any topsoil brought onto site must conform to BS3882 and be approved by the Landscape Architect.

The top 300mm layer of compacted topsoil in planting area shall be broken up prior to planting. No digging or soil cultivation shall be carried out within the root spread of trees and shrubs to be retained.

All plants in containers will be watered prior to planting.

All planting areas will be hand stone picked before planting commences.

Storage of Soil

Site won topsoil will be stored in locations as agreed by the Site Manager and in line with the British Standards.

Native Planting with the Native Mixed Hedge

Timing of planting

Deciduous shrubs to be planted late October to March/ April.

Evergreen shrubs to be planted September / October or March / May

Shrub planting pits

Size of pit wide enough to accommodate roots when fully spread and 75mm deeper than root system.

Break up base of pit to a depth of 150mm, incorporating 25g slow-release fertiliser per plants pit. Backfilling material: re-use excavated material.

Marginals-aquatic planting

Position marginal planting along the boundary of the wetland.

Plants should be planted to the same depth as in the original container.

Hedgerows

Hedge planting 6 per linear/metre at staggered rows, maintaining 330-400mm gap between each plant.

Once cultivated, trim back hedging no more than once a year in February/March to allow flowers to fruit.

Trim hedge before or after nesting season.

Watering

All planted areas will be watered as appropriate after planting.

Mulch

All hedge planting area to have a coarse grade bark mulch spread over the entire soil area at a depth of 75mm, to protect root systems, prevent surface crust and suppress weeds. Mulch shall have a natural appearance and shall not deplete the nitrogen content of the soil.

Plant Protection

Contractor to review the site and context to inform plant protection strategy. Tree / shrub shelters or protective fencing.

Care shall be taken to avoid covering low growing species.

Seeding

Timing of seeding

Seeding work will be carried out in the appropriate growing season and when weather conditions are suitable.

Preparation for seeding

The Contractor shall ensure that all grass seeded areas develop into a healthy, vigorous grass sward, free from the visible effects of pests, weeds and disease. They shall form a closely knit, continuous ground cover of even density, height and colour.

All soiled areas will be rotary cultivated to at least 300mm, stone picked and raked level prior to seeding/ turfing. Any areas where machinery cannot gain access will be prepared by hand. Seeded areas will be rolled with a lawn roller, to ensure a level surface after establishment of the grass as set out in the guidance given in BS 4428. No digging or soil cultivation shall be carried out within the root spread of trees and shrubs to be retained.

Mowing

Regular mowing of the amenity grassland areas. Mowing all or some of the scrape / marginal areas annually may be required.

Annual hay / grassland cut of meadow habitat areas, allowing for seeding before collecting cuttings.

Watering

All grass areas will be watered as necessary until established.

Scrapes

Make sure the scrape has an irregular shape, to maximise the length of its edge.

Grade the sides of the scrape so that there is a gentle slope from the shallow margins (5cm – 10cm deep) to a maximum depth of 40cm to 50cm at the centre.

Leave the surface of the scrape rough. Scrape should be shallow (less than 1m deep) but not a uniform depth all over. If possible, the scrape feature should be approx. 20m² (min). Create a varied shoreline of spits and bays, with some shallower sides and some deeper sides.

Maintenance

Schedule of Landscape Maintenance

Maintenance will be for a period of 3 years from the date of Practical Completion Certificate, and in line with the approved Management Plan.

Generally visits will be made on regular, monthly bases i.e. 12 visits per year and include operations set out below. A satisfactory certificate of completion will be required on every visit. On each visit the following operations will be carried out and an inspection certificate signed by the Site Manager completed:-

- Litter collection.
- Removal and replacement of dead and vandalised plants.
- Watering of lawns, trees and shrubs as necessary.
- Weeding of beds and borders.
- Pruning of herbaceous, wetland planting and semi-native shrubs once a year.
- Pest and disease control.
- Topping-up of bark mulch as needed.
- Grass cutting and trimming of edges as set out in the grass cutting
- Removal of any wetland plant material/ debris within 1 m of the inlet and outlet features.
- Removal/ thinning of any wetland plant material may be required after the 3 year establishment period to maintain flow and function.

Appendix 3 – Mis-connection Good Practice Document



Investigation and rectification of drainage misconnections

Good Practice Document

Water UK/Environment Agency

Investigation and rectification of drainage misconnections

Good Practice Document – Water UK/Environment Agency

Supporting and participating Water and Sewerage Companies (WASCs):

Anglian Water
Dwr Cymru
Northumbrian Water
Scottish Water
Severn Trent
Southern Water
South West Water
Thames Water
United Utilities
Wessex Water
Yorkshire Water

An agreed partnership approach between Water UK, the Environment Agency and other key stakeholders in order to tackle the misconnections issue effectively and consistently on a national basis.



Phill Mills (Deputy Chief Executive – Water UK)



(Head of Land Quality – Environment Agency)

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Introduction

It has been recognised that we need consistency in tackling pollution of watercourses caused by polluted surface water outfalls (PSWOs). Sources of pollution can include “grey water” from the misconnection of household appliances (e.g. washing machines), raw sewage sources (toilets) and in other cases trade effluent from factories. The term misconnection or wrong connection is ill defined. In addition to including the misconnection of ‘white goods’, washing facilities and toilets to surface water (rainwater) drains, it is sometimes extended to cover cross connections between foul and surface water sewers. The regular misuse of surface water drains on commercial sites is another diffuse pollution source. Misconnections are distinct from one-off operational incidents, such as sewer blockages, which WASCs deal with every day.

Polluted surface water drainage from outfalls with misconnections can have a dramatic impact on rivers and the use of rivers, and cause failure of bathing water standards. It can cause visual and odour nuisance, or even a health risk due to the levels of untreated sewage. The Environment Agency’s Water Quality Standards are put at risk and all this can affect the recreational use of rivers or legitimate use of water resources. WASCs are now working in conjunction with the Environment Agency, Local Authorities and the local community to reduce pollution in rivers and streams and thereby improve the quality of our environment.

This Good Practice method statement identifies an operational approach for investigation and resolution of pollution from surface water sewerage systems affected by misconnections. It is based on proven good practice followed by Severn Trent, United Utilities and Thames Water in tackling the misconnection problems in their operational areas. Water UK is an organisation that represents the interests of all UK WASCs. A sub-group of WASC representatives has in turn reviewed existing procedures, in conjunction with the Environment Agency (EA), to produce this nationally agreed good practice document.

This document forms an agreed partnership approach between Water UK, the Environment Agency and other key stakeholders in order to tackle the misconnections issue effectively and consistently on a national basis.

It is recognised by the WASCs and the Environment Agency that nothing in this Operational Good Practice shall affect the statutory duties or responsibilities of either party and that it does not preclude enforcement action by the Environment Agency where it is appropriate to do so.

The Environment Agency is responsible for taking legal action where necessary in respect of pollution incidents to controlled waters. It is also able to reclaim its own costs incurred in dealing with a pollution incident.

Phase 1 outlines the process of compiling the list of known PSWOs and **Phases 2-7** describe the overall approach to the investigation and resolution of misconnections.

Phase 1 Identification of Need - to list and investigate a PSWO

The need for investigation of a PSWO often arises as a result of a recorded pollution incident or reporting from a member of the public, developer or water company operative.

Following identification of the problem, the WaSC will spend up to two days investigation time to try to identify pollution sources with their drainage contractors. Where a small number of misconnections can be easily identified within this timescale, actions to rectify misconnections will be carried out by the WaSC. In these cases the need to undertake further steps within the method statement may not be required.

However, if up to two days investigation time shows many pollution sources from misconnections then a structured approach is required. In these cases the PSWO location and details will be captured onto a list of outfalls requiring detailed investigation. The WaSC in partnership with the Environment Agency and Local Authority will then follow the full methodology of investigating and rectifying sources of pollution.

The WaSC and Environment Agency should conduct an initial pollution impact assessment of the PSWO. The water quality impact of a PSWO is assessed on a number of factors. General visual impact, amenity value and accessibility, water users affected, water quality and ecological standards are all considered.

The basic outfall assessment sheet (**Appendix A**) allows a high, medium or low investigation priority to be assigned, using the simple pollution impact assessment scoring. Depending on the level of contamination additional assessment may be needed, for example chemical or bacteriological assessment (**see Appendix F – bacteriological assessment guide**). Records of pollution incidents generated from the Environment Agency's National Incident Recording System (NIRS), local environmental factors and urgency of action are also taken into account in this assessment.

Some complex PSWO investigations may involve tracing hundreds of misconnections within catchments of several thousand properties, so timescales on large investigations may continue for years rather than months.

1.1 Listing PSWOs for investigation

Once the need for investigations has been established, a PSWO will be placed onto the WaSC list of polluted outfalls. The Environment Agency are asked at this stage to agree confirmation onto the PSWO list. The individual outfall investigation project will then be assigned a specific WaSC reference.

The PSWO assessment principles allow prioritisation of investigation work within the programme of PSWO improvements managed by the WaSC. Regular liaison meetings between Environment Agency and WaSC are essential in order to continually review and prioritise PSWO improvement schemes. This partnership working will give better direction and cost-effective environmental improvements through PSWO pollution reduction plans.

The Environment Agency will see the benefit of water quality improvements, which link to its 'Creating a Better Place' vision.

Once a PSWO scheme has been identified and listed, the WaSC will then complete an investigation costing, based on the approximate number of misconnected properties in the drainage catchment associated with a defined PSWO.

The WaSC then conducts an internal bid for funding of the works to be completed. A WaSC may elect to fund investigations from their Capital Maintenance Budget for sewers. (However, it is not the purpose of this Good Management Practice document to cover funding issues, should they arise.)

Phase 2

Define the project - Pre-survey works

2.1 Public Awareness

The WaSC will consider the need for pre-survey communication to raise public awareness of local misconnections issues and the investigations that will take place. **Appendix E** shows a new national misconnections awareness leaflet. This may be used by the WaSC (or in a partnership approach with the Environment Agency), to develop a local publicity or awareness campaign.

2.2 Drainage Catchment Analysis

The WaSC will complete a desktop analysis of the drainage catchment to determine the size, land use and nature of the catchment area. From this the WaSC will produce a catchment plan, which identifies the contaminated outfall, drainage catchment, and residential, commercial and industrial areas. The WaSC can also take history of previous incidents, operational problems, local knowledge and records into account.

2.3 Preliminary Investigations

A preliminary outfall assessment to check location and severity of pollution from the PSWO should be carried out by the WaSC and Environment Agency. This preliminary inspection will help confirm the type and severity of pollution using the common outfall assessment sheet. It is important at this stage that the PSWO description and location are accurately recorded and jointly recognised by the WaSC and Environment Agency. Assessment visits will be planned on the basis of agreed water quality impact, but should be at least two visits per annum. Assessment is continued until the outfall is shown to have improved sufficiently for joint sign-off.

Successful completion of an outfall improvement project needs to be clearly defined.

Experience shows that a significant number of PSWOs identified through customer complaints are based on visual signs of pollution. In these situations visual inspections could form the main assessment criteria for improvements in water quality leading to joint sign-off as an improved PSWO.

In other more sensitive cases the Environment Agency will wish to confirm water quality impact and improvements through wider assessments. Bacteriological sample analysis, measurement of biotic indices and water quality samples may all be used to confirm both initial pollution impact and final signed-off improvements in water quality.

PSWO site assessment visits and environmental impact recorded will identify the method of investigation highlighted below:

2.4 Chart A

Category	Example of pollution	Investigation method
Visual & Solids	sewage, debris, fungus	visual, caging & sample analysis e.g. bacteriological
Visual	washing machine, sink waste, fat, oil and grease, and discolouration	visual inspection & sample analysis
Visual & Odour	petrol, diesel	visual & smell detection, sample analysis
Non - Visual	evidence of chemical/ organic pollution	chemical water sample analysis, assessment of faecal contamination levels, measurement of biotic indices

2.5 Project Management

Any scheme to improve a PSWO needs to be project managed by the WaSC, with a number of specific areas of responsibility:

- WaSC places the outfall on the PSWO list.
- WaSC ensures funding is in place to undertake the project.
- WaSC raises a purchase order for the work to investigate and facilitate rectification for each project.
- WaSC ensures that the necessary Health & Safety procedures are followed and undertakes site audits to ensure compliance with guidelines.
- Quarterly PSWO update reports should be forwarded to Environment Agency contacts involved with the project. Local liaison meetings are an alternative approach.
- WaSC reviews the spend profile in order to monitor progress against PSWO project targets.
- WaSC holds regular liaison meetings to update progress against target expenditure.
- WaSC and Environment Agency jointly manage stakeholder and media contact.
- WaSC PSWO project team pass details of additional issues to the relevant WaSC department. These may include:
 - o Sewer integrity issues and blockage clearances.
 - o CSO or cross connections through dual manholes - model and remove, or screen as necessary.
 - o Passing details of the need for highway gulley maintenance to the relevant Local Authority Highways department.
 - o Pass details of commercial / industrial misconnections to the WaSC Trade Effluent team, (when re-directed to foul sewer).

- o Recommending visits on industrial estates as required, to advise on the correct storage of disposal of wastes and wastewater.
 - o Recommending visits to high street premises as required, advising on correct storage and disposal of fats, oils and greases.
- WaSC confirms improvement of the outfall to Environment Agency satisfaction.

2.6 Relevant and Available Legislation

Section 171 Water Industry Act 1991 - confers a right of entry to a sewerage undertaker for the purpose of carrying out its sewerage functions. This includes the power of entry in order to investigate whether there has been an offence and whether the Sewage Undertaker should take action. Sections 158, 159 and 168 confer a right of entry to lay pipes and carry out investigations where the WaSC is authorised to carry out such works.

Section 106(2)(b) Water Industry Act 1991 – this states there is no right to discharge foul water into a surface water sewer where separate sewer systems exist.

Section 106(2)(c) of the Water Industry Act 1991: prohibition on connections to storm water overflow sewers.

Section 109 Water Industry Act 1991 – this section makes it an offence to cause a drain or sewer to communicate with a public sewer in contravention of section 106.

Section 109(2) of the Water Industry Act 1991: disconnection of wrongly connected drains and sewers to the public sewer by sewerage undertakers, and the recovery by them of their costs.

Section 113 of the Water Industry Act 1991 – allows the WaSC to carry out work on private drainage should the company believe that drainage to be objectionable. There are no powers for the WaSC to recover costs in altering the drainage in these circumstances.

Section 59 of the Building Act 1984 – This is a power exercisable by the Local Authority dealing with the satisfactory provision of drainage for existing buildings. Where the private drainage is unsatisfactory or is a hazard to health or a nuisance, the Local Authority can serve notice requiring the owner to make satisfactory provision for the drainage of the building. If the person on whom the notice is served fails to execute the works then the Local Authority has powers to carry out works in default and recover its costs in doing so under section 99.

Section 161A Water Resources Act 1991 – The Environment Agency has anti-pollution works notice powers under Section 161A. This allows the Environment Agency to serve works notices requiring persons to carry out anti-pollution works where any noxious, poisonous or polluting matter has entered or seems likely to enter controlled waters.

Section 85 Water Resources Act 1991 – sets out principal offences relating to pollution of

watercourses. Foul water misconnections to surface water sewers may result in pollution of controlled waters at the point of discharge, which is a strict liability offence under section 85 Water Resources Act 1991.

Sewerage (Scotland) Act 1968 Part 1 S15 - Owner or occupier to remedy defects in drains and other works. This gives both Scottish Water and the Local Authorities powers to issue notices to require owners or occupiers to remedy drainage defects, and undertake the work in default and recharge for the full cost of this work, if the owners do not comply with the terms of the notice. This legislation mirrors the powers within S59 of the Building Act in England and Wales, allowing Scottish Water to enforce work to rectify outstanding misconnections.

2.7 Guidance notes for application of the legislation

A letter to property owners from the WaSC, quoting Sections 168 & 171 of the Water Industry Act 1991, explains a right of entry in order to carry out a property by property survey, and the context for the survey work. A detailed inspection of the property's private drainage system can then proceed on expiry of the notice period. It is preferable to agree a mutually convenient time for inspection. This survey process can involve evening and weekend work.

A letter is then sent to all properties with misconnections identified as contributing to the pollution, advising them to undertake rectification work. If after a reasonable timescale no contact has been received from them, or if they refuse to carry out the work, a second follow up letter is sent. If this letter receives no response then the matter is passed to the Local Authority Environmental Health Officer (EHO). In England and Wales, WaSCs will normally escalate enforcement of misconnections through Local Authority Environmental Health Departments, as they have powers under private buildings drainage - (Section 59 of the Building Act 1984).

Issuing a notice under this power allows the Local Authority to arrange for removal of the misconnection to the surface water sewer, make the correct connection to the foul sewer and recover all costs in so doing. There may be local agreements within Local Authorities that bring in other departments, e.g. Highways. These should be resolved at the early stages of the PSWO project and may require a meeting with all parties to plan further action (Environment Agency, WaSC and Local Authority).

An allowance is made under Section 59 of the Building Act 1984 for cases where hardship is shown to be the reason that the work to rectify a misconnection is not completed. The Local Authority can make the costs of default action a charge against the property when the owner is unable to meet the cost of the work. Costs can be recovered when the property is subsequently sold.

The Water Resources Act S161A is applicable for cases where significant pollution has occurred, or where there is a clear risk of pollution. The individual source, pathway and receptor (usually a watercourse) must be identified. The environmental cost benefit of individual rectification work must also be shown. The Environment Agency will normally, where available, take both preventative, remedial and criminal enforcement action when an offence has been proven to have occurred and the offender detected.

Subject to taking into account the WaSCs' and Local Authorities' enforcement powers and liaising with them, the Environment Agency will consider prevention/remediation or criminal enforcement action when an offence appears to have occurred and the apparent offender detected. For serious pollution cases, and where clear evidence allows, the Environment Agency will itself consider prosecuting individual offenders themselves.

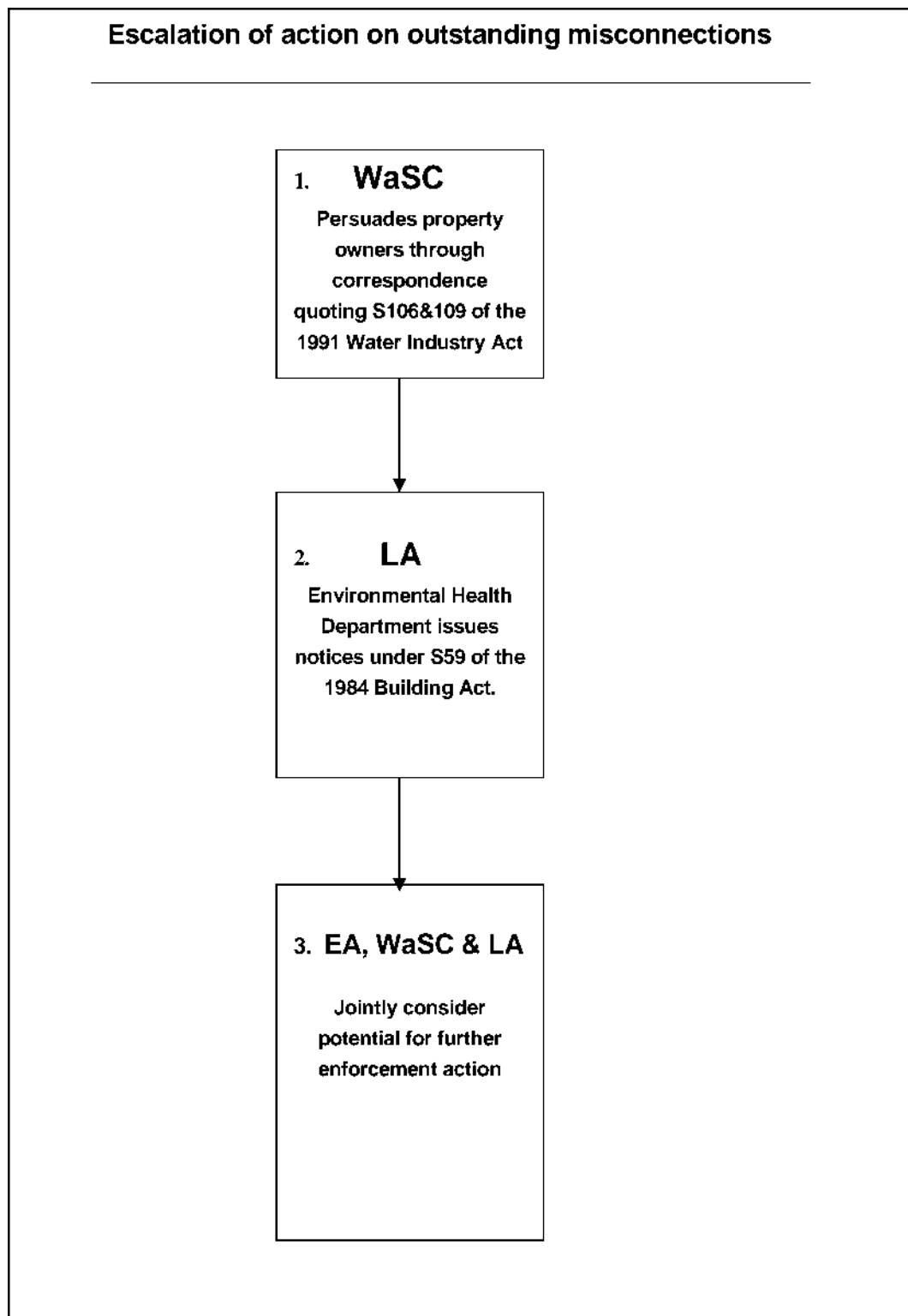
Flowchart B (next page) indicates a route for escalation of action on misconnected properties, the relevant body and associated legislation. This may be subject to change due to new legislation or the application of existing legislation being reviewed.

Flowchart in Appendix C shows the entire misconnections investigation process.

It should be noted that in all cases an initial strategy of persuasion as opposed to enforcement through legislation should be used.

Reporting of polluted surface water outfall incidents on the Environment Agency NIRS system is the subject of an ongoing review. The recommendations and final policy are awaited shortly. This good practice document will include an update on the approach for recording surface water outfall incidents when the review is complete.

2.8 Flow Chart B



2.9 Action Plan

As required by the size and complexity of the pollution tracing investigation, the WaSC should communicate an action plan, together with a copy of the catchment plan, to the Environment Agency. The action plan should include an explanation of the issues that have been identified from preliminary investigations, such as complaints of debris and sewage litter or recorded water quality downgrades. The action plan serves to agree the scope of work within the project before commencement on site. It also provides a breakdown of this good practice approach that the contractors will follow during the improvement work.

Before the site survey work begins, the Local Authority Environmental Health Department will be informed of the work and the potential need for enforcement action under Section 59 of the 1984 Building Act.

Phase 3 - Site Surveys

Prioritisation of Sub-Catchments

3.1 Initial Investigation

Visual inspections of manholes are initially carried out to determine which sewer lengths are polluted. In small catchments this “lift and look” approach may be sufficient to identify polluted sewer lengths and programme the necessary property surveys.

Where visual inspection fails to detect obvious pollution then a caging exercise can be undertaken. These cages may be fixed across the lower half of the inlet pipe to trap faecal matter or kitchen waste, whereby heavy pollution encountered can continue to flow safely without causing blockage. Cages should be inspected regularly, with checks taking place after a reasonable period of dry weather. The investigation is started at the manhole immediately upstream of the point of pollution; cages are placed across all inlet pipes, checked for evidence of pollution, and then removed. Occasionally, man entry of manhole chambers may be required to place and/or remove the cages. This work must be carried out in accordance with Code of Practice for Work in Confined Spaces.

Where evidence of pollution has been observed, the original cages are cleared and replaced and upstream manholes caged. If pollution is found only on the original cages then this confirms that just this length of sewer is polluted. If the upstream cages also show signs of pollution, then the next stage of caging is commenced from there. As the investigation progresses the schedule of caging is amended to take into account both results obtained and access difficulties.

When polluted sub catchments and lengths of sewer are confirmed and identified, these sewer sections can be put forward for cleaning. A CCTV survey may be carried out to identify the location of misconnections.

The presence of sewage fungus is a useful marker for identifying pollution sources and may be tracked within the drainage system upstream from the outfall.

3.2 Results Analysis/Further Action

The results of the investigations and any CCTV surveys are analysed and the affected areas programmed to have a detailed property-by-property survey carried out.

Phase 4 - Property Inspections

An initial letter from the WaSC contractor explains the context for the drainage survey work and quotes Clauses 168 & 171 of the Water Industry Act 1991, identifying a notice period for right of entry in order to carry out a property by property survey. A detailed inspection of the property's private drainage system can then proceed on expiry of the notice period. It is preferable to agree a mutually convenient time for inspection. This survey process can involve evening and weekend work.

The property survey should involve tracing using fluorescent dye to confirm the connectivity of misconnected sanitary ware/appliance to the surface water system. This allows full confidence in confirming the rectification work required by the property owner. Records should be kept of each property surveyed, the date of survey and misconnection(s) identified. This is captured on a property survey sheet, which can also be provided to the Local Authority Environmental Health department as required. Details of all misconnected properties found should be entered onto the misconnection records sheet for each outfall.

Whilst conducting property surveys, the nature of the drainage problem and possible solutions should be provided to the property owners.

In certain circumstances the catchment investigation and subsequent property inspections may indicate a particularly widespread problem across a catchment. On an individual case-by-case basis a WaSC may propose, subject to consultation with the Environment Agency, a novel engineering solution designed to minimise continuing pollution. This would only arise for a small number of PSWOs with large catchments, complex and extensive pollution sources, and where engineering arrangements would allow.

Phase 5 - Drainage Rectifications

5.1 Survey Results/Further Action

A letter is sent to all properties with confirmed misconnections contributing to the polluted outfall, advising them to undertake rectification work. A customer survey sheet is included in the Good Practice Guide (**Appendix B**), in order to gain feedback on the causes of misconnections and customer awareness. If after a reasonable timescale (normally two weeks) no contact has been received from them, or if they refuse to carry out the work a second follow up letter is sent.

If this follow-up letter receives no response then the WaSC passes the matter to the Local Authority EHO as the next enforcement step.

The Environment Agency may, having discussed and taken into account the WASCs' and Local Authorities' enforcement powers, consider prevention, remediation or criminal enforcement action when an offence appears to have occurred and the apparent offender identified.

Information placed in the misconnection record sheet should be updated to show properties where misconnections have been corrected. The WaSC contractors should revisit to check corrections on a random selection of properties where reported rectification work has been completed.

It must be ensured that all cages are removed from the network and disposed of in an appropriate manner.

5.2 Final Report

A report is produced confirming the extent of the problem identified and rectification work completed. This final report will confirm completion of the scope and actions identified in the action plan.

Phase 6 - Outfall Assessment and Sign-off

6.1 Outfall Assessment and Sign-off

At this stage, requiring joint Water Company and Environment Agency sign-off, reference should be made to the action plan agreed at the outset of the project, to confirm that the improvement plan has been met. The WaSC presents the final PSWO project report to the Environment Agency.

A PSWO is jointly agreed as significantly improved using the sign-off sheets shown in **Appendix D**.

Where assessment of further evidence to confirm water quality improvements is undertaken, post-works analysis should be compared with the results obtained at the outset of the project.

Should pollution due to misconnections re-occur at an outfall already signed off, the WaSC will reinvestigate. The outfall is returned to the PSWO list, but where possible dealt with immediately by the WaSC, or to a timescale jointly agreed with the Environment Agency.

If an outfall is unsafe to be inspected where it discharges to the watercourse, the first manhole upstream may be designated as the sign-off point.

The Environment Agency will judge the success of a PSWO project on water quality criteria and local environmental benefit. The outfall improvement project may not be considered complete until water quality improvements are acceptable.

In some cases a WaSC may claim project completion but residual pollution may not meet an Environment Agency "significantly improved" sign-off. This situation typically arises due to some property owners ignoring written requests from the WaSC requesting rectification of identified misconnections.

If this occurs it is expected that a meeting be arranged to consider potential for further enforcement action and the way ahead. The principal enforcement legislation remaining is to serve a Notice to rectify misconnections under S.59 of the Building Act 1984, administered through Environmental Health Officers. It is suggested that a senior level meeting between the Environment Agency, WaSC and Environmental Health department is arranged to agree an enforcement strategy.

Should an individual PSWO project prove difficult to achieve sign-off to the satisfaction of the local Environment Agency, WaSC and Environmental Health officers, the case could be referred to the National Misconnections Strategy Group. This group would endeavour to use its influence to resolve a way ahead from an operational as well as a 'political' standpoint.

Phase 7 - Publicity

7.1 Publicity

Satisfactory completion of investigation and rectification works at selected outfalls may demand publicity of the success to the local community. This exercise should involve the Environment Agency, WaSC and Local Authority External Relations Departments, and confirm that the continued success of the project depends on the ongoing support and cooperation of all involved.

Appendix A (Outfall assessment sheet)

PSWO pollution impact score sheet

NGR: WaSC outfall ref:

Location: Street Name

Watercourse name:		Watercourse Width - M	
Man made/natural bed			
Outfall size (mm):		Rate of flow	
(Box or pipe)		(X in the box)	
Outfall type:	Headwater	No flow	
(X in the box)	Within culvert	Trickle	
	CSO	Low	
	SWO to river	Moderate	
		High	

A) - General Visual impact

Score
0
2
5
15
25
TOTAL

B) - Aesthetics at outfall

No odour or visible aesthetics
Faint smell only odour
Grey water / foam / scum
Strong smell /sewage fungus / litter
Faeces / gross litter or fungus
Score
0
2
5
15
25
TOTAL

C) - Accessibility / downstream users

No public access / single dwelling access
Minor public access / rear to properties
Public access via footpath or highway
Recreational area / park / water sports
Score
2
5
15
25
TOTAL

D) - Current WQ value of watercourse

(subject to change under WFD)
GQA 1 or 2
GQA 3
GQA 4
GQA 5 or no classification
Score
25
15
5
2
TOTAL

Total Pollution Impact Score

Comments: (last significant rainfall, river flows, preceding weeks weather, previous score)

NIRS Ref:

Environment Officer:

WaSC engineer:

Date ----/----/---

Appendix B

Misconnected Customer Questionnaire

Project Results Sheet

Please complete the boxes giving the totals for each category across the project as a whole.

Outfall Name:

Total Number of Misconnected Properties:

1. What pollution sources are there at the properties?

Washing Machine	Kitchen Sink	Dishwasher	Hand Basin	Shower	Bath	Foul/Surface Crossover	Other (Please describe)

2. When were the misconnections made (please tick)?

Within 1 Year	Within 5 Years	Within 5-10 Years Ago	10 Years +	As Built	Not Known

3. Who made the misconnections?

Plumber	Builder	Customer	DIY Store	Other (Please describe)

4. Are the Occupiers of the Properties?

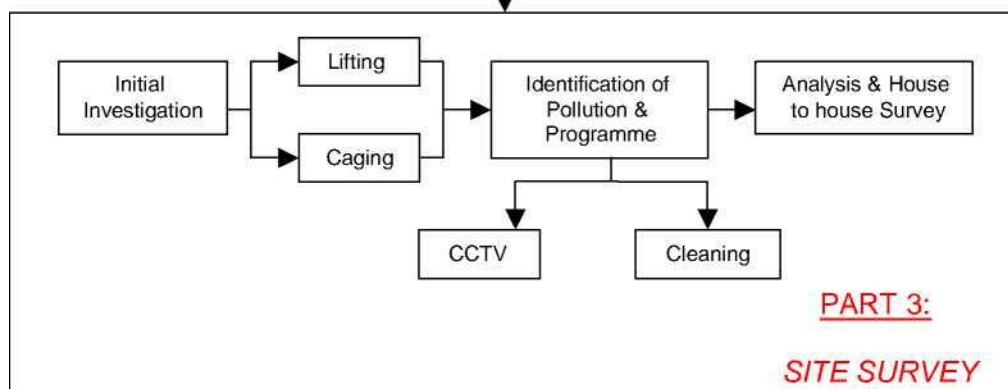
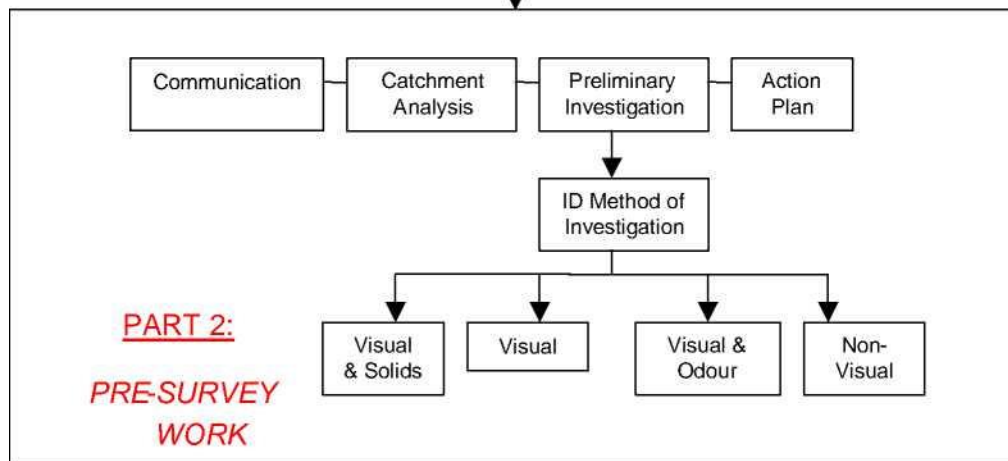
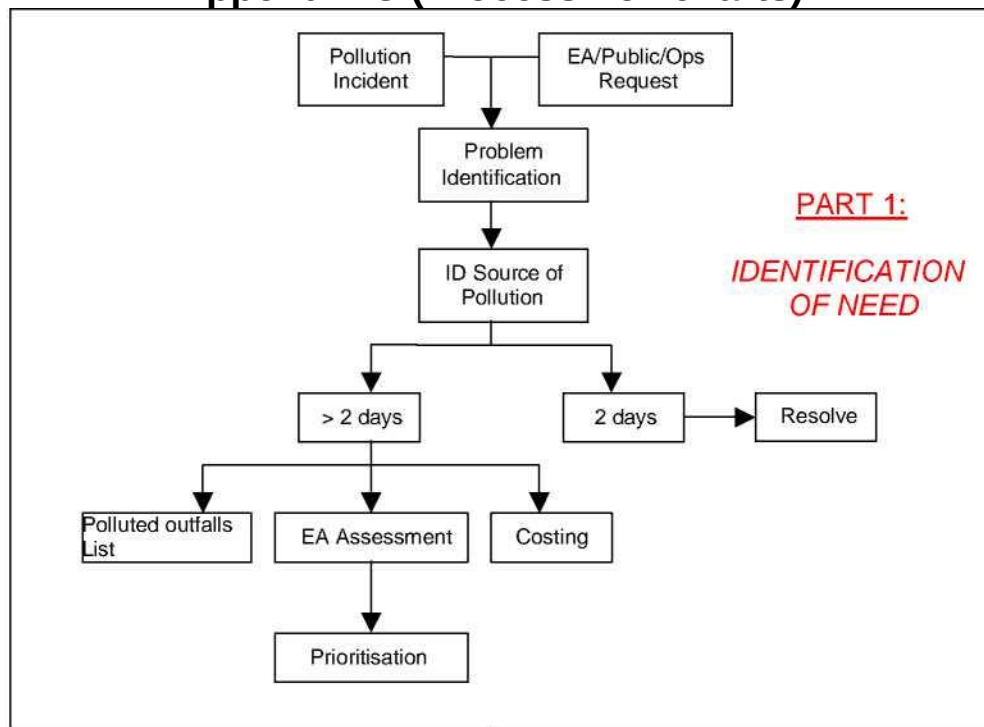
Owner	Tenant	Other (Please Describe)

5. Would you describe the occupier's reactions to being misconnected as?

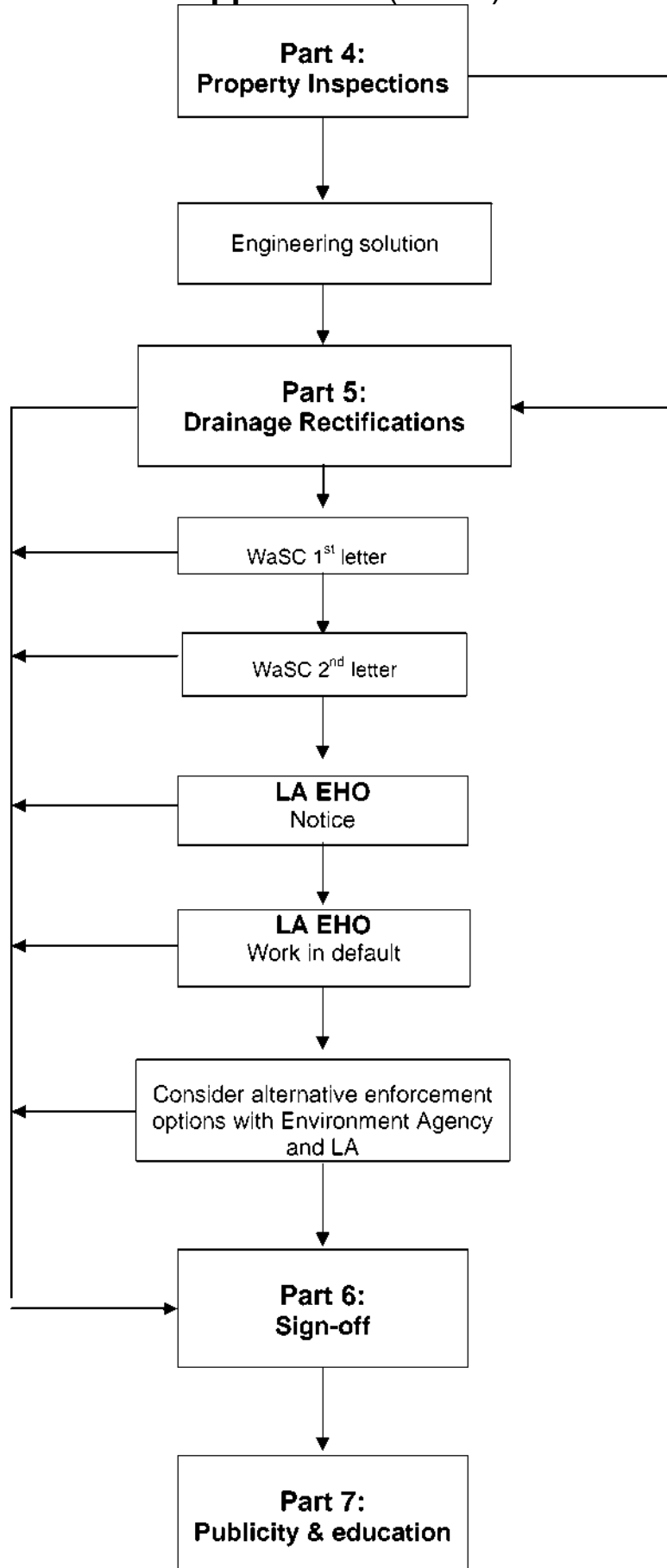
Disinterested	
Shocked but not too concerned with changing it	
Shocked but wants to change it	
Calm but wants to change it	
Angry/Upset	
Not My Fault – wants someone to blame	
Other (Please Describe)	

6. Were the customer's aware of separate drainage systems? (Please circle) Yes No

Appendix C (Process flowcharts)



Appendix C (cont'd)



Appendix D

Water and Sewerage Company and Environment Agency

PSWO Project Sign Off Form

PSWO ID reference:

PSWO Grid ref:

Location:

Initial PSWO Assessment Score:

Final PSWO Score:

Watercourse:

Environment Officer Name:

Area:

Region:

Date of the Project Completion:

Report from WaSC Received Y/N

Date:

I have reviewed the work undertaken, as indicated in the final report, by(WaSC) at (Location of PSWO), as part of the PSWO (ref ID) Project.

I am satisfied that(WaSC) has undertaken and satisfactorily delivered the solution as agreed through the PSWO outfall project action plan ref:..... (WaSC outfall ID).

Using the results of the attached visual sign-off inspection record, and any other agreed monitoring evidence, this PSWO is deemed significantly improved.

I am not satisfied that(WaSC) has undertaken and satisfactorily delivered the solution as agreed through the PSWO outfall project action plan ref:..... (WaSC outfall ID).

The PSWO shows evidence of continued pollution. Further monitoring and investigation required – Sign-off could not be completed

Environment Officer signature:

WaSC signature

Appendix D (cont'd)

Water and Sewerage Company and Environment Agency

PSWO Visual Sign-off Inspection record

Date: .../.../.....	Y	N	Comments
Are there any foul odours from the outfall?			If Yes – not suitable for sign-off
Are there any foul odours from the watercourse d/s of the outfall?			If Yes – not suitable for sign-off
Sewage debris present at the outfall?			If Yes – not suitable for sign-off
Sewage debris present d/s?			If Yes – not suitable for sign-off
Sewage fungus present downstream?			If Yes – not suitable for sign-off
Is sewage fungus slime present at the outfall?			If Yes – may not be suitable for sign-off
If Y then is the degree of contamination thought to be significant?			If insignificant consider improved outfall sign-off – or further visit(s) to confirm
Water Quality improvements d/s evident?			If yes – should be suitable for sign-off
Water Quality Samples?			
Biological assessments?			
Digital Photograph taken?			

Previous Site Inspections : PSWO Scoring

Initial PSWO score - commencement of project:

PSWO score after completion of project:

% Improvement on assessment scores:

Joint Comments:

Appendix E (Misconnections Leaflet Guide)

Misconnections guide (Water UK/Environment Agency leaflet & pdf format – available through local WASCs)

River free from pollution caused by misconnections

River polluted by household misconnections

WATER AND SEWERAGE COMPANIES
4/Bf18t7 B&re#;06457-^4 5145
fl*rC)mfu14W
.....QQ(iQG&5?S55
W&teMr157t7 1100
ScolSsff W&te.....
.....0345501 5855
ftvanr/writeftr..... i?3iW7f13 4444
SMSI rt&r..... .PW n-M awtfwm l4^(r
Tfismes WWW;..... 0845278 0R45
..... 0845&20 0800
..... 03457462200
.....

ENVIRONMENT AGENCY GENERAL ENQUIRY LINE
06708 506 506
ENVRDNMHIT AGENCY EMERGENCY LINE

WATER UK
CONSUMER COMPANY PART
Chartered Institute of Environmental

Water
Environment Agency

if unsQfH ofyDurlacal draFE's system rantajlyourlocaJ Water and SmeragB Company vltio Mill te aQle to assist you.

Are
YOU
polluting
rivers
and

Appendix F (Bacteriological assessment guide)

The levels below are for presumptive faecal coliforms/100ml

Faecal Coliform Guide (presumptive coliforms)	Guide levels for PSWO contamination
<500	Background levels - watercourse
500 - 999	Low or intermittent contamination
1,000 – 9,999	Evidence of sewage contamination
10,000 – 99,999	Inadequately treated sewage levels
100,000 +	Untreated sewage & health risk potential

Note: This is a “rule of thumb” guide for the purposes of PSWO outfall assessments.

- Watercourses will tend to have much higher dilution than end of pipe PSWO samples, and so the bacteriological count will be lower. E.coli counts higher than 2,000 could be used as a baseline for further investigation on watercourses.
- (Bathing Water Standard: no greater than 2000 per 100ml in 95 % of samples at the Bathing Water)
- Wastewater Treatment plants can also influence background counts in watercourses.
- This guide is based on many years of experience of monitoring a variety of polluted surface water outfalls in Thames Region. It is a “rough guide” that can be used to signpost further investigation and action on PSWOs.
- Faecal coliform counts above one million could constitute a health risk, with potential for pathogens. The higher levels of contamination will also have potential to affect Bathing Water Standards at local bathing waters.