

Appendix D Drainage Review

Proposed drainage for 3 modern purpose-built poultry houses (10,11&12) to provide an extra 97,000 production places, next to existing houses (poultry houses 1-9) has been reviewed to ensure conformance with the Best Available Techniques described in the Environment Agency (2010); EPR 6.09 Sector Guidance Note; How to comply; Version 2; Appendix 8; Undertaking a drainage review:-

Name of building	Function	Is Drainage Management BAT or not BAT?	Is Drainage Design BAT or not BAT?	Is it identified in Drainage Improvement Plan?
Proposed poultry houses 10,11&12	Broiler chickens for meat production	BAT	BAT	No

Drainage improvement plan

Area needing improvement	What needs to be done – possible solutions	Proposed cost	Proposed timescale for completion	Timescale agreed with the Environment Agency
Proposed poultry houses 10,11&12	N/a	N/a	N/a	N/a

	Question	Guidance	Answer Yes/No/N/a	Comments
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Receptors – where does the drainage end up – the outfall or destination of liquids

On the site drainage plan a receptor may be identified as either an engineered structure for the storage and subsequent managed disposal or a point of unmanaged discharge to controlled waters:

- Engineered structures = lagoons, above ground tanks, below ground tanks, reception pits – usually only receive contaminated water or slurries.
- Surface waters – ponds, rivers and ditches – these only receive uncontaminated water.
- Groundwater – swales and soakaways – these may only receive uncontaminated or lightly contaminated water

1	Are the receptors clearly identified on the plan?	Show the location and boundary of engineered structures. Ensure that the plans also show the location of surface waters and groundwater, swales and soakaways.	Yes	<p>Marked on the plan for poultry houses 10,11&12 (Proposed) same as for 8&9:-</p> <ul style="list-style-type: none"> • Stone filled French drains with perforated pipes also acting as soakaways into groundwater and conveying water into the:- • Stone filled soakaway for roof water and run-off from open concrete hardstanding areas (excluding dirty water from washing out) acting as a soakaway into groundwater and also conveying water into the:- • Off-site ditch, conveying water into an unnamed tributary of the River Tas. • Below ground storage tanks for dirty water from washing out. <p>Also marked on the drainage plan for houses 1,2,3,4,5,6&7:-</p> <ul style="list-style-type: none"> • Same off-site ditch for roof water and run-off from open concrete hardstanding areas (excluding dirty water from washing out) • Below ground storage tanks for dirty water from washing out.
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	Question	Guidance	Answer Yes/No/N/a	Comments
2	Are they accessible at all times?	Access paths should be kept clear of nettles/thistles, etc to allow inspection by both the operator and the Environment Agency at all times. Answer for each receptor identified if more than one.	Yes	<p>Marked on the plan for poultry houses 10,11&12 (Proposed) same as for 8&9:-</p> <ul style="list-style-type: none"> • Stone filled French drains, inspection chambers and the dirty water tanks which will be accessible at all times for inspection and maintenance. • Stone filled soakaways are passive below ground structures and entirely covered and require no inspection or maintenance. <p>Also marked on the drainage plan for houses 1,2,3,4,5,6&7:-</p> <ul style="list-style-type: none"> • Dirty water tanks and accessible at all times for inspection and maintenance. • Off site-ditch is accessible for inspection but most outfalls are submerged.
3	Are all sources identified that discharge to your receptors?	Where are the discharge points into ponds and ditches? As this water must be clean sources must be identified.	Yes	<p>Emission point marked on the plan for poultry houses 10,11&12 (Proposed):-</p> <ul style="list-style-type: none"> • Outfall W9 (Proposed) into the off-site ditch for uncontaminated roof water via the French drains and uncontaminated run-off from open concrete hardstanding areas (excluding dirty water from washing out) all via the soakaway. <p>Also marked emission points on the plan for houses 1,2,3,4,5,6&7 and 8&9:-</p> <ul style="list-style-type: none"> • Outfall W8 into the off-site ditch for uncontaminated roof water from houses 8&9 via French drains and uncontaminated run-off from open concrete hardstanding areas (excluding dirty water from washing out) all via the soakaway. • Outfall W7 into the off-site ditch for lightly contaminated roof water from poultry houses 5&6 (with capped roof fan outlets).

	Question	Guidance	Answer Yes/No/N/a	Comments
				<ul style="list-style-type: none"> • Outfall W6 into the off-site ditch for lightly contaminated roof water from poultry houses 2,3,4.5&6 (with capped roof fan outlets) and uncontaminated run-off from the open concrete hardstanding area (excluding dirty water from washing out). • Outfall W5 into the off-site ditch for lightly contaminated roof water from poultry house 4 (with capped roof fan outlets). • Outfall W4 into the off-site ditch for lightly contaminated roof water from poultry house 3 (with capped roof fan outlets). • Outfall W3 into the off-site ditch for lightly contaminated roof water from poultry house 2 (with capped roof fan outlets). • Outfall W2 into the off-site ditch for roof water and lightly contaminated run-off from open concrete hardstanding from poultry house 7 (with side wall fan outlets). Roof water is conveyed by gutter and downpipes on to the hard standing so also becomes lightly contaminated. • Outfall W1 into the off-site ditch for lightly contaminated roof water from poultry house 1 (with capped roof fan outlets).
		<p>Have you identified the source of all of the pipes discharging to your engineered structures and other receptors?</p>	<p>Yes</p>	<p>Marked on the plan for poultry houses 10,11&12 (Proposed), same as for 8&9:-</p> <ul style="list-style-type: none"> • Perforated pipes in the French drains. • Solid underground pipes from the French drains into the soakaways. • Solid underground pipes from the concrete hardstanding into the soakaways. • Solid underground pipes from the concrete hardstanding into dirty water tanks. • Solid underground pipes from the soakaways into the off-site ditch. <p>Also marked on the plan for poultry houses 1,2,3,4,5,6&7:-</p>

	Question	Guidance	Answer Yes/No/N/a	Comments
				<ul style="list-style-type: none"> • Solid underground pipes for roof water into the off-site ditch. • Solid underground pipe from the concrete hardstanding into the off-site ditch. • Solid underground pipe from the concrete hardstanding outside house 7 into a dirty water tank.
4a	Are inlet points known?	The inlet and outlet points to dirty water stores should be identified.	Yes	<p>Marked on the plan for poultry houses 10,11&12 (Proposed), same as for 8&9:-</p> <ul style="list-style-type: none"> • Grated inlets installed in the centre of the open concrete hardstanding. <p>Also marked on the plan for poultry houses 1,2,3,4,5,6&7:-</p> <ul style="list-style-type: none"> • Location of dirty water tanks/inlets in the floors of houses 1,2,3,4,5&6. • Grated inlet installed outside in the open concrete hardstanding for house 7.
		The inlet points to swales and soakaways should be identified.	Yes	<p>Marked on the plan for poultry houses 10,11&12 (Proposed), same as for 8&9:-</p> <ul style="list-style-type: none"> • Perforated pipes in the French drains (acting as soakaways). • Inlet pipes into the soakaways. <p>No swales or soakaways for poultry houses 1,2,3,4,5,6&7.</p>
4b	Are outlet points known?	How is water level maintained in ponds? Is there an outflow, where is it and to what does it discharge and is it controlled?	N/a	<p>No ponds relevant to drainage for poultry houses 10,11&12 (Proposed).</p> <p>Also no ponds relevant to drainage for poultry houses 1,2,3,4,5,6,7,8&9.</p>

	Question	Guidance	Answer Yes/No/N/a	Comments
6	Can receptors be managed to protect the environment?	<p>Can all the receptors be protected?</p> <p>Can all discharges to them be contained, blocked, by-passed or isolated if necessary (this should be established in the accident management plan)?</p> <p>Can they be monitored in an emergency? How do you know when they are full or empty?</p>	Yes	<p>For poultry houses 10,11&12 (Proposed), same as for 8&9:-</p> <ul style="list-style-type: none"> • Dirty water and foreseeable spillages (e.g. diesel, disinfectants, etc) can be blocked via diverter valves and contained in the dirty water tanks to protect the soakaways and off-site ditch. The tanks can be easily monitored and are being emptied by the operators. <p>For poultry houses 1,2,3,4,5,6&7:-</p> <ul style="list-style-type: none"> • Dirty water and foreseeable spillages (e.g. diesel, disinfectants, etc) can be blocked via a sluice and contained as a 'pond' on the open hardstanding itself outside houses 4&5 to protect the off-site ditch. Any spillage and the 'pond' can be easily monitored and removed by the operators same as during washing out.
7	Is the quality of run-off consistent in all cases even though the quantities may fluctuate?	<p>The quality of run-off can change?</p> <p>Clean water flows can become temporarily dirty (for example concrete driveways during shed cleanouts). If this can happen you will need a diversion system in place. If there's no diversion system installed then the run-off will need to be permanently treated as dirty water and directed to a suitable receptor. This may place a large storage burden on an engineered structure. There may also be subsequent disposal costs. This may be</p>	Yes	<p>For poultry houses 10,11&12 (Proposed), same as for 8&9:-</p> <ul style="list-style-type: none"> • Normally uncontaminated run-off the open concrete hardstanding changes to contaminated during cleaning out and there will be diverters into dirty water tanks to protect the soakaways and off-site ditch. • Roof water will always be uncontaminated. <p>For poultry houses 1,2,3,4,5,6&7:-</p> <ul style="list-style-type: none"> • Runoff from open concrete hardstanding changes from being lightly contaminated to contaminated during cleaning out and there is a sluice in the drain to contain dirty water outside houses 4&5 to protect the off-site ditch.

	Question	Guidance	Answer Yes/No/N/a	Comments
		an area where operators can make cost effective improvements to their site drainage.		<ul style="list-style-type: none"> • Roof water will always be lightly contaminated owing to capped roof fan outlets.

Pathways – how does the drainage get there – the route that liquids take

On the site drainage plan the pathway should be identified by arrows showing the direction of flows, the location of drain inlets and access points (manhole covers and inspection chambers). The pathways are likely to be one of the following three categories:-

- Gutters, downpipes and drains – may be piped pathways fixed or temporary (rigid or flexible), above ground or buried, gravity fed or pumped
- Overland flow – may be planned and marshalled (yards and slopes)
- Channels, gullies and drain inlets – may be directing flow or intercepting it (to protect the buildings and structures).

8	Are all pathways shown on the plan?	The route should be shown in its entirety including direction of flow.	Yes	<p>Marked on the plan for poultry houses 10,11&12 (Proposed), same as for 8&9:-</p> <ul style="list-style-type: none"> • Stone filled French drains with perforated pipes also acting as soakaways for uncontaminated roof water under the eaves of the houses, and next convey water via solid underground pipes under the concrete hardstanding into stone filled soakaways and next a solid underground pipe to the outfall into the ditch. • Overland flows of uncontaminated/contaminated run-off from the concrete hardstanding sloped into inlet gullies and solid underground pipes via a diverter into the soakaways and dirty water tanks respectively. <p>Marked on the plan for poultry houses 1,2,3,4,5&6 (with capped roof fan outlets):-</p>
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	Question	Guidance	Answer Yes/No/N/a	Comments
				<ul style="list-style-type: none"> • Gutters and downpipes convey lightly contaminated roof water into perforated underground pipes alongside the houses to the outfall into the ditch. • Gutters and downpipes convey lightly contaminated roof water on to the concrete hardstanding in between the houses, and sloped into an inlet gully and solid underground pipe to the outfall into the ditch. • Overland flows of dirty water on the concrete hardstanding during cleanout, and sloped into an inlet gully closed off with a sluice during cleanout so dirty water 'ponds' on the concrete and is pumped-off by the Operators to protect the ditch. <p>Marked on the plan for poultry house 7 (with side wall fan outlets):-</p> <ul style="list-style-type: none"> • Gutters and downpipes convey uncontaminated roof water on to the open concrete hardstanding sloped into an inlet gully and solid underground pipe to the outfall into the ditch. Roof water is conveyed by gutter and downpipes on to the hard standing so also becomes lightly contaminated. • Overland flow of dirty water during cleanout on to the concrete hard standing and sloped into an inlet gully, next a solid underground pipe into a dirty water tank. Note – there is a sleeping policeman here to prevent dirty water entering the same gully as the roof water to protect the ditch.
9	Are all manholes and inspection covers shown on the plan?	Use the standard symbols to describe these. The key to symbols to use is in the introduction to this document.	Yes	<p>Marked on the plan for poultry houses 10,11&12 (Proposed), same as for 8&9:-</p> <ul style="list-style-type: none"> • Symbols used to mark them are included in a key on the plan. <p>Marked on the plan for poultry houses 1,2,3,4,5,6&7:-</p>

	Question	Guidance	Answer Yes/No/N/a	Comments
				<ul style="list-style-type: none"> • Symbols used to mark them are included in a key on the plan.
10	Are they identified as - clean, dirty or lightly contaminated on the plan?	This refers to their identification and designation on the plan. Where a diverter is in place to deal with the flows of variable quality then the plan should show this and identify all of the categories that may use the pathway.	Yes	<p>Marked on the plan for poultry houses 10,11&12 (Proposed), same as for 8&9:-</p> <ul style="list-style-type: none"> • Flows and associated drain inlets and inspection chambers for diverters and dirty water tanks marked as uncontaminated (blue) and dirty (red) as suggested by the Environment Agency in How to comply. <p>Marked on the plan for poultry houses 1,2,3,4,5,6&7:-</p> <ul style="list-style-type: none"> • Flows and associated drain inlets and inspection chambers for diverters and dirty water tanks marked as uncontaminated (blue), lightly contaminated (purple) and dirty (red) as suggested by the Environment Agency in How to comply.
11	Are they identified on site as clean or dirty by coloured paints?	Are all manholes, inspection chambers, drain inlets, etc identified by paint marks of the appropriate colour to signify their contents – red for dirty, blue for clean? Mark the direction of flow in the appropriate colour.	No	Not considered necessary at this time, Operators are cleaning out themselves.

	Question	Guidance	Answer Yes/No/N/a	Comments
12	<p>Are all gutters downpipes and drains in good condition?</p>	<p>Are they entire (are there missing or broken gutters)? Do they connect to a satisfactory downpipe?</p> <p>Does it discharge to a drain and does the drain exclusively service the gutter (is the water clean and will it remain uncontaminated)?</p> <p>Are they adequately sized (downpipe frequency, diameter, etc?)</p> <p>Are they fitted with filters?</p> <p>Are they maintained and do they work?</p>		<p>Not applicable for poultry houses 10,11&12 (Proposed), same as for 8&9:-</p> <ul style="list-style-type: none"> • Stone filled French drains with perforated pipes also acting as soakaways for uncontaminated roof water under the eaves to be installed. • Professional builders will size and install any drains. <p>Gutters and downpipes installed on poultry houses 1,2,3,4,5,6&7:-</p> <ul style="list-style-type: none"> • Downpipes are discharging lightly contaminated roof water from houses 1,2,3,4,5&6 (with capped roof fan outlets) on to the open concrete hardstanding in between the houses and sloping into drain inlets, and outfalls into the ditch. Uncontaminated roof water from 7 (with side wall fan outlets) mixes with lightly contaminated surface-water run-off. • Downpipes on the northern sides of houses 1,2,3&4 and southern sides of 5&6 convey lightly contaminated roof water into underground solid pipes which outfall into the ditch via emission points marked on the drainage plan. • Professional builders sized and installed the gutters and downpipes when the houses were erected approximately 40 years ago and in 2015 when house 7 was converted from pig housing. None have any filters. • Checked in July 2019 the overall fabric of the gutters and downpipes on houses 1,2,3,4,5&6 was in poor condition, near their end-of-life. There was evidence of some maintenance/repairs to keep them working.

	Question	Guidance	Answer Yes/No/N/a	Comments
13	<p>Are sleeping policeman diverters or interceptors identified on the plan?</p>	<p>Overland flow is a major feature of all farm installations. For each surface flow pathway the following points should be considered and documented:</p> <ul style="list-style-type: none"> • Is it concrete and is it impermeable (not cracked or pot holed)? • Are there any deviation devices – sleeping policeman, interceptors? • Is there any sectioning for clean and dirty water separation and is this permanent or temporary. If so does it change during the year at peak times such as mucking out or stock movement? • Is the flow ever impeded or contaminated by temporary storage of manures, straw, feedstuffs, etc. If so, is it diverted if it was previously clean? 	<p>Yes</p> <p>Yes</p> <p>Yes</p> <p>No</p>	<p>Concrete hardstanding serving houses 10,11&12 (Proposed), same as for 8&9:-</p> <ul style="list-style-type: none"> • Designed, sized and installed by professional builders. • Impermeable with proprietary seals and hot tar in joints. • Sloping into the centre into drain inlets into soakaways/ dirty water tanks. • Diverter valves installed to convey water into dirty water tanks during cleanout. <p>Concrete hardstanding serving poultry houses 1,2,3,4,5,6&7:-</p> <ul style="list-style-type: none"> • Designed, sized and installed by professional builders when they were erected. • Sloping from east to west into drain inlets in between 1&7 and 4&6. • Drain inlets are closed with a sluice during cleanout to protect the ditch and the dirty water which simply pools on the open concrete hardstanding is pumped out by the Operators.

	Question	Guidance	Answer Yes/No/N/a	Comments
14	Does the plan show the limits of both concreted and grassed areas?	<p>Some clean water/rainfall may be disposed of on grassed areas or soakaways.</p> <p>Some run-off may initiate from grassed and non-concreted areas.</p> <p>Some areas may have surfaces made from tarmac, bitmac or compacted road planings.</p> <p>They should be shown on the plan as a source, pathway or receptor (or a combination).</p>	<p>Yes</p> <p>No</p> <p>No</p>	<p>Marked on the plan for poultry houses 10,11&12 (Proposed) same as for 8&9:-</p> <ul style="list-style-type: none"> • Stone filled French drains with perforated pipes also acting as soakaways into groundwater and conveying water into the:- • Stone filled soakaways. <p>Also marked on the drainage plan for houses 1,2,3,4,5&6:-</p> <ul style="list-style-type: none"> • Downpipes on the northern sides of houses 1,2,3&4 and southern sides of 5&6 convey lightly contaminated roof water into underground solid pipes into the ditch.
15	Are all drain inlets, channels and gullies identified on the plan?	<ul style="list-style-type: none"> • Where are they? • Are they part of an integrated system with junctions and inspection chambers? 	<p>Yes</p> <p>Yes</p>	<p>Marked on the plan for poultry houses 10,11&12 (Proposed) same as for 8&9:-</p> <ul style="list-style-type: none"> • Drain inlets in the concrete hardstanding for uncontaminated and dirty water. • Diverter valves installed to convey water into dirty water tanks during cleanout. • Part of an integrated drainage system designed, sized and installed by professional builders.

	Question	Guidance	Answer Yes/No/N/a	Comments
		<ul style="list-style-type: none"> What is near them and are there high risk activities upslope of them? If so are safeguards in place (kerbs installed, emergency drain covers etc)? Do they take clean or potentially clean water? 	<p>No</p> <p>Yes</p>	<p>Marked on the plan for poultry houses 1,2,3,4,5,6&7:-</p> <ul style="list-style-type: none"> Drain inlets in the concrete hardstanding for lightly contaminated and dirty water. Sluice gate inserted to contain dirty water tanks during cleanout and pumped out.
16	Do they take clean or contaminated water and does the plan show this?	Are they identified by either red or blue colouring on the plan as appropriate? If there are flows of variable quality then use more than one colour as appropriate.	Yes	<p>Marked on the plan for poultry houses 10,11&12 (Proposed) same as for 8&9:-</p> <ul style="list-style-type: none"> Flows and associated drain inlets are marked as uncontaminated (blue) and dirty (red) as suggested by the Environment Agency in How to comply. <p>Marked on the plan for poultry houses 1,2,3,4,5,6&7:-</p> <ul style="list-style-type: none"> Flows and associated drain inlets are marked as uncontaminated (blue), lightly contaminated (purple) and dirty (red) as suggested by the Environment Agency in How to comply.

	Question	Guidance	Answer Yes/No/N/a	Comments
19	Is the rainfall collected from yard areas uncontaminated?	Provided that they are kept clean, run-off from yards can be classed as uncontaminated. Yard cleanliness may be periodic. During shed emptying or livestock removal they may be dirty and some form of drainage diversion will be necessary.	Yes	<p>For poultry houses 10,11&12 (Proposed), same as for 8&9:-</p> <ul style="list-style-type: none"> • Run-off from the open concrete hardstanding will be uncontaminated. • Diverters installed below the concrete hardstanding to contain dirty water. • Keeping clean the hardstanding areas at all other times especially during chicken collection and litter removal. <p>For poultry houses 1,2,3,4,5&6 (with capped roof fan outlets):-</p> <ul style="list-style-type: none"> • Run-off from the open concrete hardstanding will be lightly contaminated owing to lightly contaminated roof water from downpipes flowing over the hardstanding. For 7 some yard water is retained within a sleeping policeman and conveyed into the dirty water reception tank.
20	Are all contaminated liquids directed to a managed receptor?	<p>Other materials may be generated from buildings may include:</p> <ul style="list-style-type: none"> • Slurry (from manure stores, seepage from buildings and passageways, scraping routes, etc) • Fuels and oils, pesticides, disinfectants • Feedstuffs – spillages and dust from milled products • Pressure washing areas can also be sources of contaminated water. 	Yes	<p>For poultry houses 10,11&12 (Proposed), same as for 8&9:-</p> <ul style="list-style-type: none"> • Contaminated liquids (e.g. with manure, litter, feedstuffs and disinfectants, etc) are directed into dirty water tanks. • Otherwise keeping clean the hardstanding areas at all times especially during chicken collection and litter removal. <p>For poultry houses 1,2,3,4,5,6&7:-</p> <ul style="list-style-type: none"> • Contaminated liquids (e.g. with manure, litter, feedstuffs and disinfectants, etc) are contained at the bottom of the sloping hardstanding for pumping out/removal. • Otherwise keeping clean the hardstanding areas at all times especially during

	Question	Guidance	Answer Yes/No/N/a	Comments
				chicken collection and litter removal.
21	Are any lightly contaminated sources directed to swales and soakaways?	Dust from buildings with side-wall ventilation systems and rainfall from roof-vented sheds may create contaminated water. This may be disposed of via a swale or a soakaway taking account of groundwater vulnerability. Soakaways may not be appropriate if the site is on a major aquifer.	No	<p>For poultry houses 10,11&12 (Proposed), same as for 8&9:-</p> <ul style="list-style-type: none"> • No lightly contaminated sources owing to design and installation of high velocity ventilation fans on the roofs with uncapped outlet cones. <p>For poultry houses 1,2,3,4,5&6 (with capped roof fan outlets) and 7 (with side wall fan outlets):-</p> <ul style="list-style-type: none"> • There is always lightly contaminated sources with gutters and downpipes on the northern sides of houses 1,2,3&4 and southern sides of 5&6 conveying lightly contaminated roof water into underground pipes conveying water into the ditch. • Also lightly contaminated sources with gutters and downpipes on the southern side of houses 1,2,3&4 and northern side of 5&6 conveying lightly contaminated run-off on the open concrete hardstanding and overland flow into an inlet and pipe conveying water into the ditch. <p>Checked DEFRA Magic Map Applications, and the existing installation and proposed extension for 3 poultry houses (10,11&12) in 2019 are located on a major aquifer with low vulnerability. The installation with 3 proposed new houses will not be located in a Groundwater Source Protection Zone or in a Drinking Water Safeguard Zone.</p>

	Question	Guidance	Answer Yes/No/N/a	Comments
22	Has the release of all contaminants been minimised where possible?	The risk from contaminants may occur continuously from rainfall, scraping down, seepage, ventilation fans etc. Other contaminants may be only occasionally released from delivery of fuels, pesticides, feedstuffs, shed clearance and cleaning at the end of rearing cycles. Rarer risks arise from accident and emergency situations. Most sources and risks can be minimised by bunding stores, kerbing muck pads, installing sleeping policeman in muck passage doorways etc.	Yes	Covered in question 20 above.

	Question	Guidance	Answer Yes/No/N/a	Comments
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Checklist – are the following included on your drainage plan

Points to be shown on plan	Tick if included on plan
The location of all receptors	✓
All buildings, structures and other sources of drainage	✓
Points where clean water discharges to ditches, rivers and watercourses	✓
Outfall points into dirty water lagoons and their emptying points	✓
Boundaries of grassed areas, swales and soakaways	✓
Pathways using blue where the flows are clean water	✓
Pathways using purple where flows are lightly contaminated water	✓
Pathways using red where the flows are dirty water	✓
Access points into the pathways and coloured accordingly	✓
Inspection points and manholes and coloured accordingly	✓
Diverter, interceptors and sleeping policemen	✓

kc/13/08/2019