Presentations from Citizen Crane Forum

14 November 2016
Held at the
Zoological Society of London

Crane Valley Partnership
Citizen Crane Forum

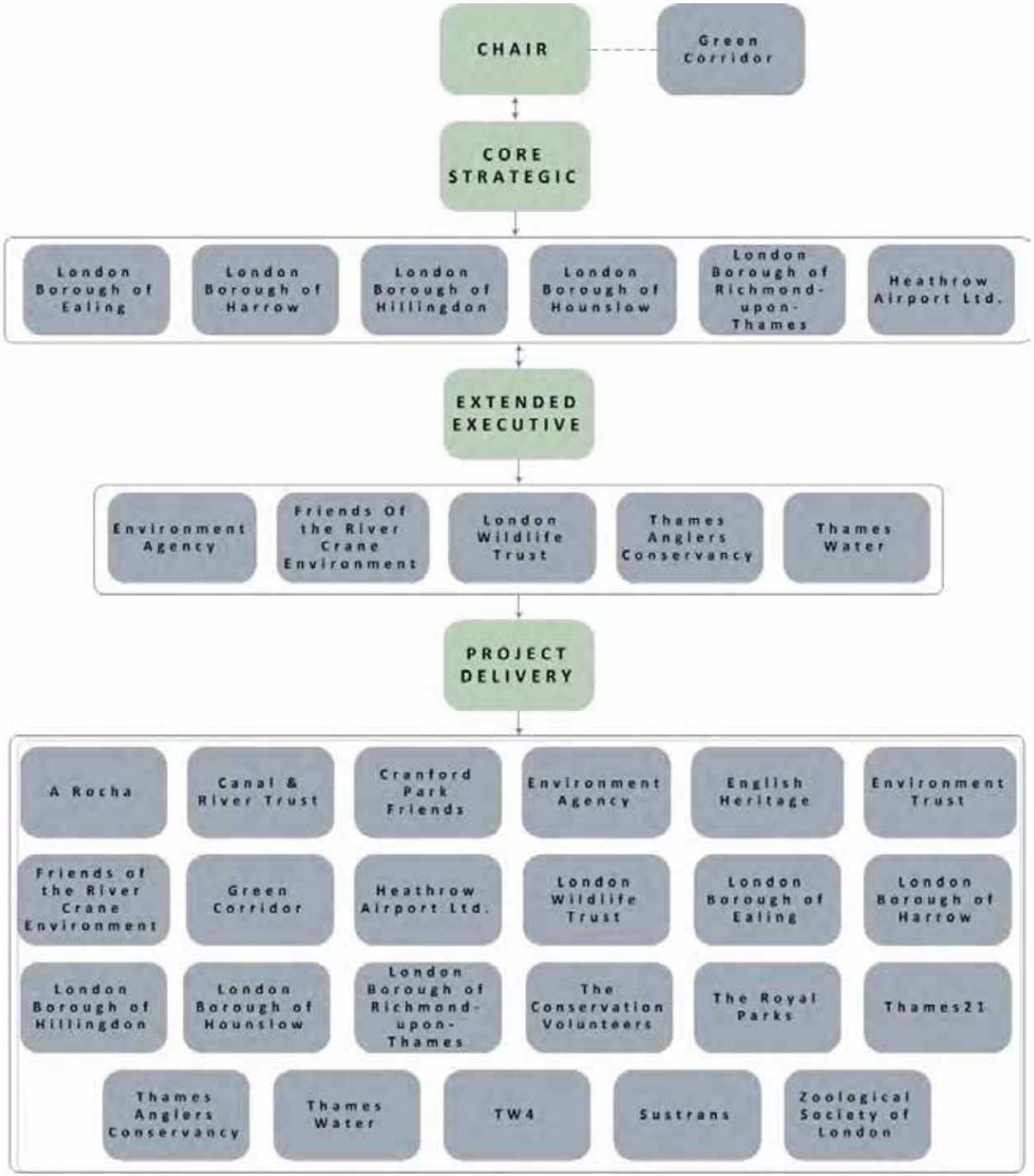
www.cranevalley.org.uk

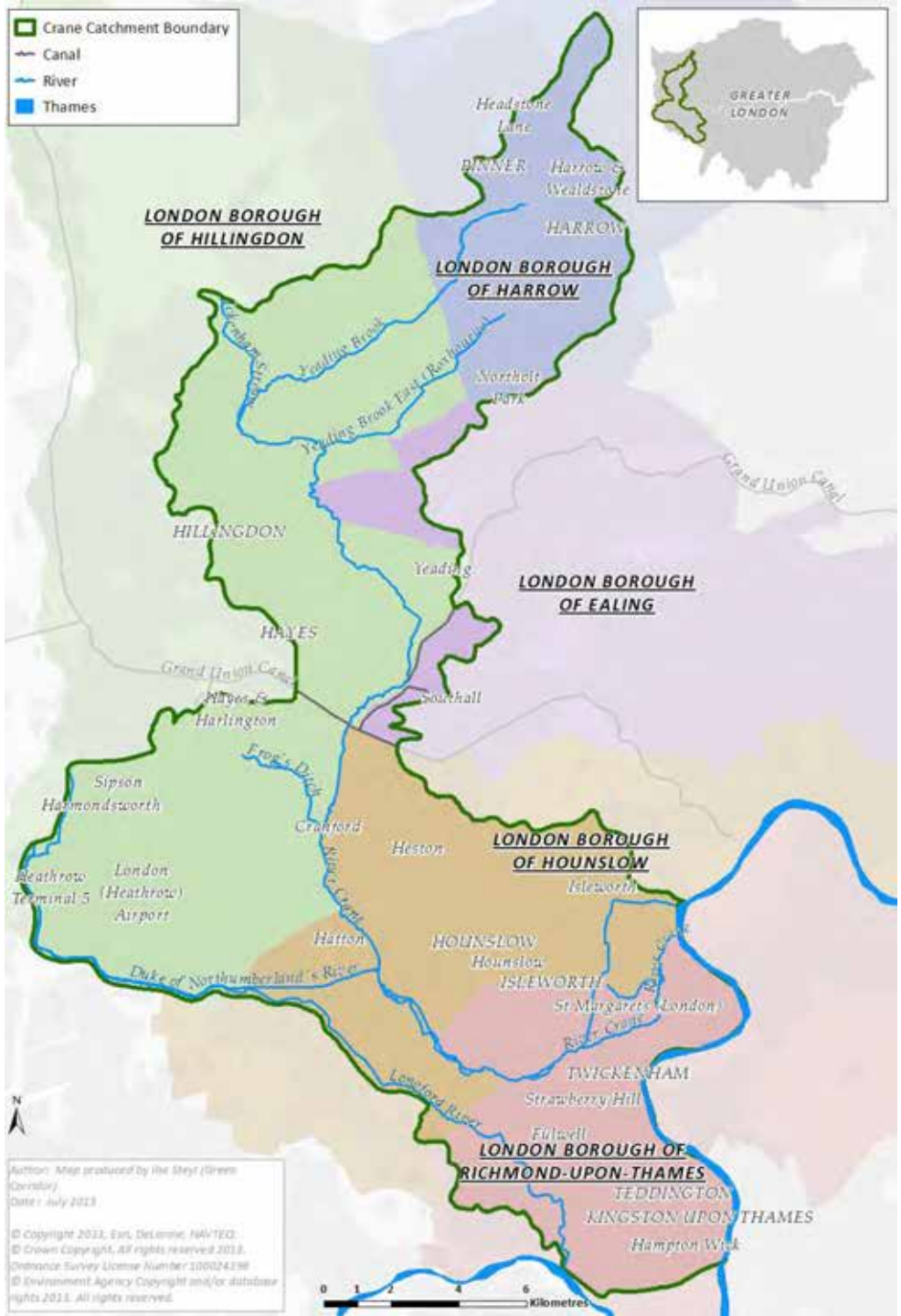
Dr Ilse Steyl

CVP Development Manager

ilse@greencorridor.org.uk

Location of Crane catchment within Greater London


CHAIR
Green Corridor
CORE STRATEGIC
London Borough of Ealing
London Borough of Harrow
London Borough of Hillingdon
London Borough of Hounslow
London Borough of Richmond-upon-Thames
Heathrow Airport Ltd.
EXTENDED EXECUTIVE
Environment Agency
Friends Of the River Crane Environment
London Wildlife Trust
Thames Anglers Conservancy
Thames Water
PROJECT DELIVERY
A Rocha
Canal & River Trust
Cranford Park Friends
Environment Agency
English Heritage
Environment Trust
Friends of the River Crane Environment
Green Corridor
Heathrow Airport Ltd.
London Wildlife Trust
London Borough of Ealing
London Borough of Harrow
London Borough of Hillingdon
London Borough of Hounslow
London Borough of Richmond-upon-Thames
The Conservation Volunteers
The Royal Parks
Thames21
Thames Anglers Conservancy
Thames Water
TW4
Sustrans
Zoological Society of London



- 5 London Boroughs
- Area – *c.* 125 km^2
- Water course length – *c.* 132 km (*c.* 5 km canal)
- *c.* 62 km classified as main river by EA

2016 Citizen Crane Forum Agenda

10:00	**Arrival, registration and coffee**
10:15	Welcome - Alison Debney, ZSL
10.20	Introduction - Dr Ilse Steyl, Green Corridor
10.30	Citizen Crane project presentations Water Quality and RMI - Richard Haine, Frog Environmental Outfall Safari - Joe Pecorelli, ZSL Real time monitoring and long term outfall data; plus an overview - Rob Gray, FORCE
11.00	Update on Thames Water's Surface Water Outfall Programme- Ruta Akelyte, Thames Water
11.10	Pollution Prevention Work in the Crane Catchment – Shahnaz Isaac and Mat Reed, EA.
11.20	**Citizen Crane video**
11.40	Plans to improve the river in Harrow - Michael Bradshaw, Harrow Council
11:55	Impact of Roads on Rivers and mitigation options - Moragh Stirling, South East Rivers Trust
12.10	Options for Year 4 and Discussion
13:00	**Break for Lunch**

Photo and Health and Safety Review for volunteers

After Lunch you are free to visit the zoo if you wish

FORCE
Friends of the River Crane Environment

frog environmental

ZSL
LET'S WORK FOR WILDLIFE

Thames Water

Crane Valley Partnership
HARROW · EALING · HILLINGDON
HOUNSLOW · RICHMOND

Environment Agency

Citizen Crane

Water Quality and RMI

Richard Haine CEnv
frog environmental

Crane Catchment Map & Monitoring Points

- 35 km main channel length
- Passing through 5 London boroughs
- Monthly monitoring for RMI and water quality

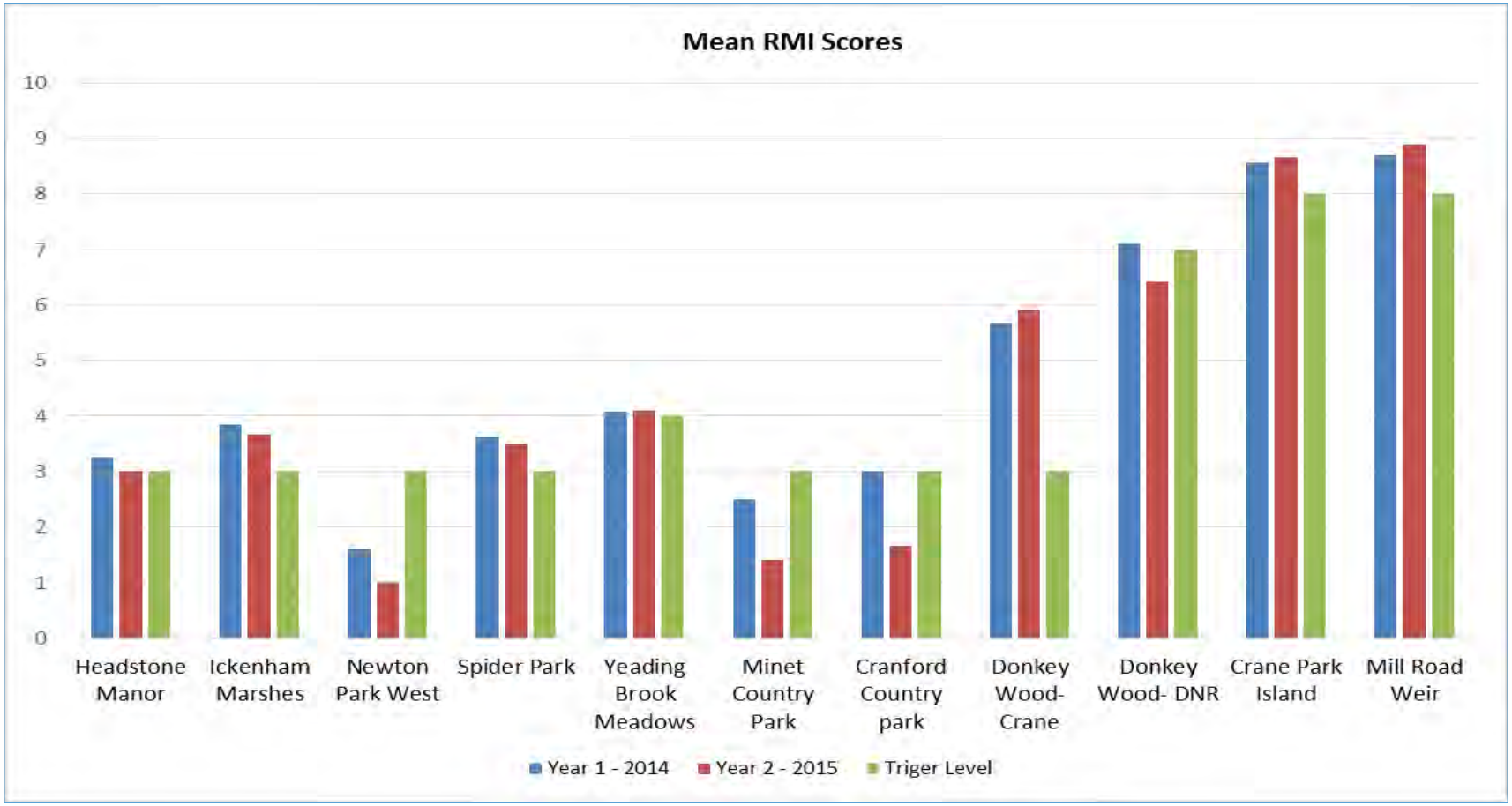
Citizen Crane Project Chronology

Winter 2013	Feasibility study
Spring 2014	Recruitment, training, pilot and start monitoring, formation of steering group
Summer 2014	Increase number of monitoring sites
Spring 2015	Complete year 1, commence year 2 monitoring
Summer 2015	Outfall monitoring feasibility study
Winter 2015	Development of Outfall Safari
Spring 2016	Complete year 2, commence Year 3 monitoring
Summer 2016	Outfall Safari & Real time monitoring
Autumn 2016	Production of Y2 report and forum

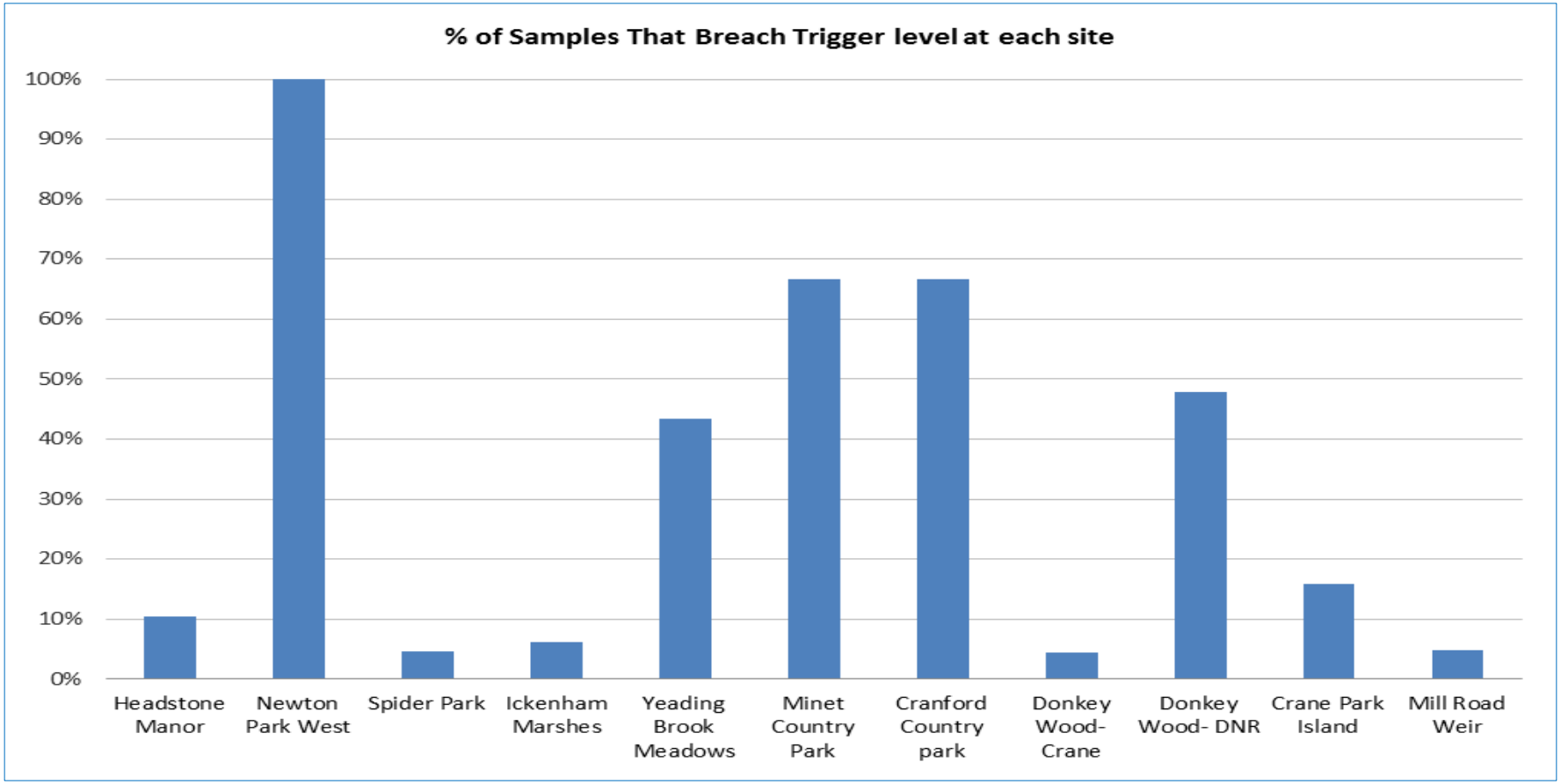
Riverfly Monitoring Initiative

- Helps to Identify problem areas in catchment
- Detection of pollution incidents
- Raise awareness of issues impacting the river and empower local groups to take action

Mean RMI Scores by Site



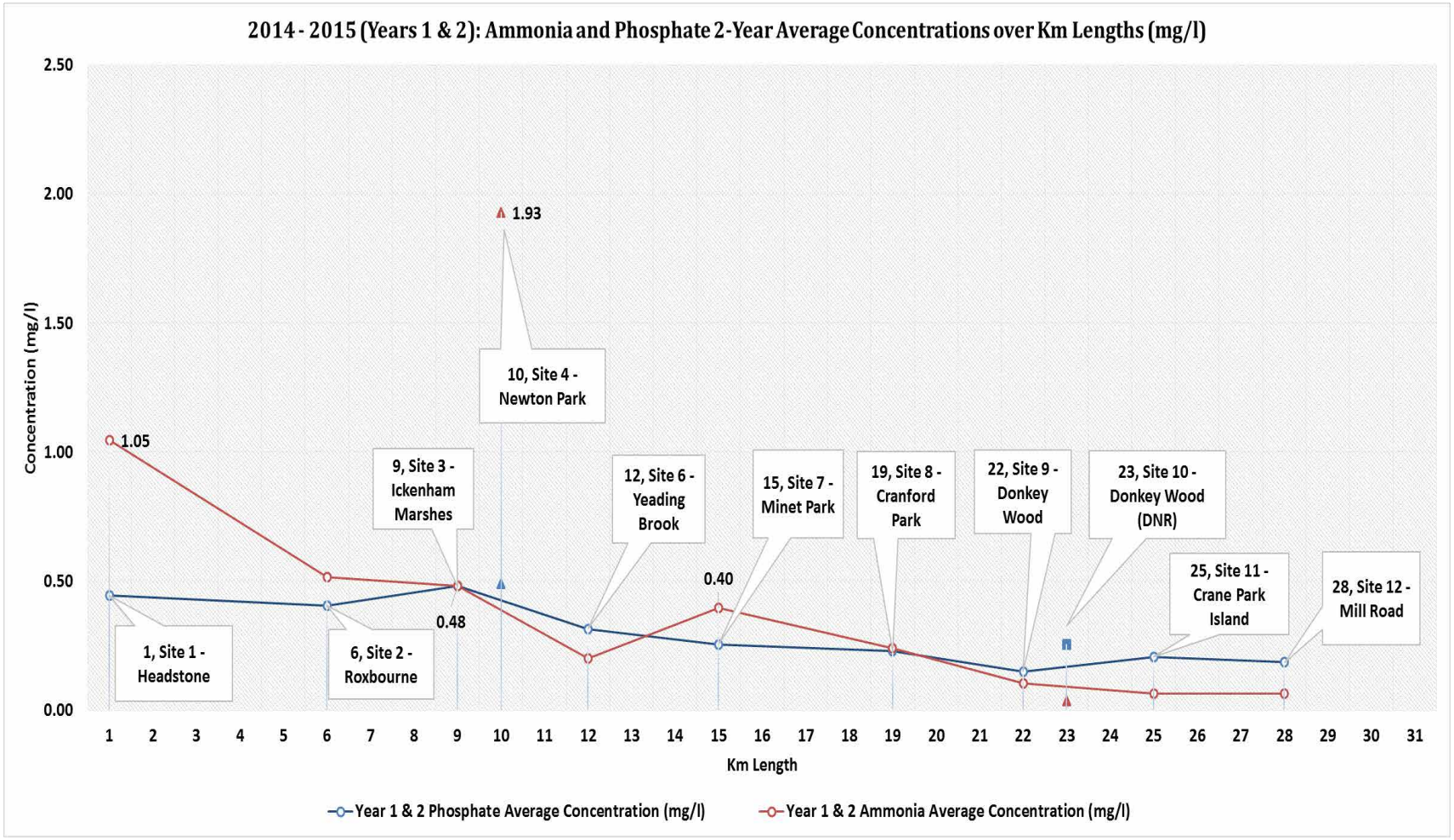
Trigger Breaches by Site



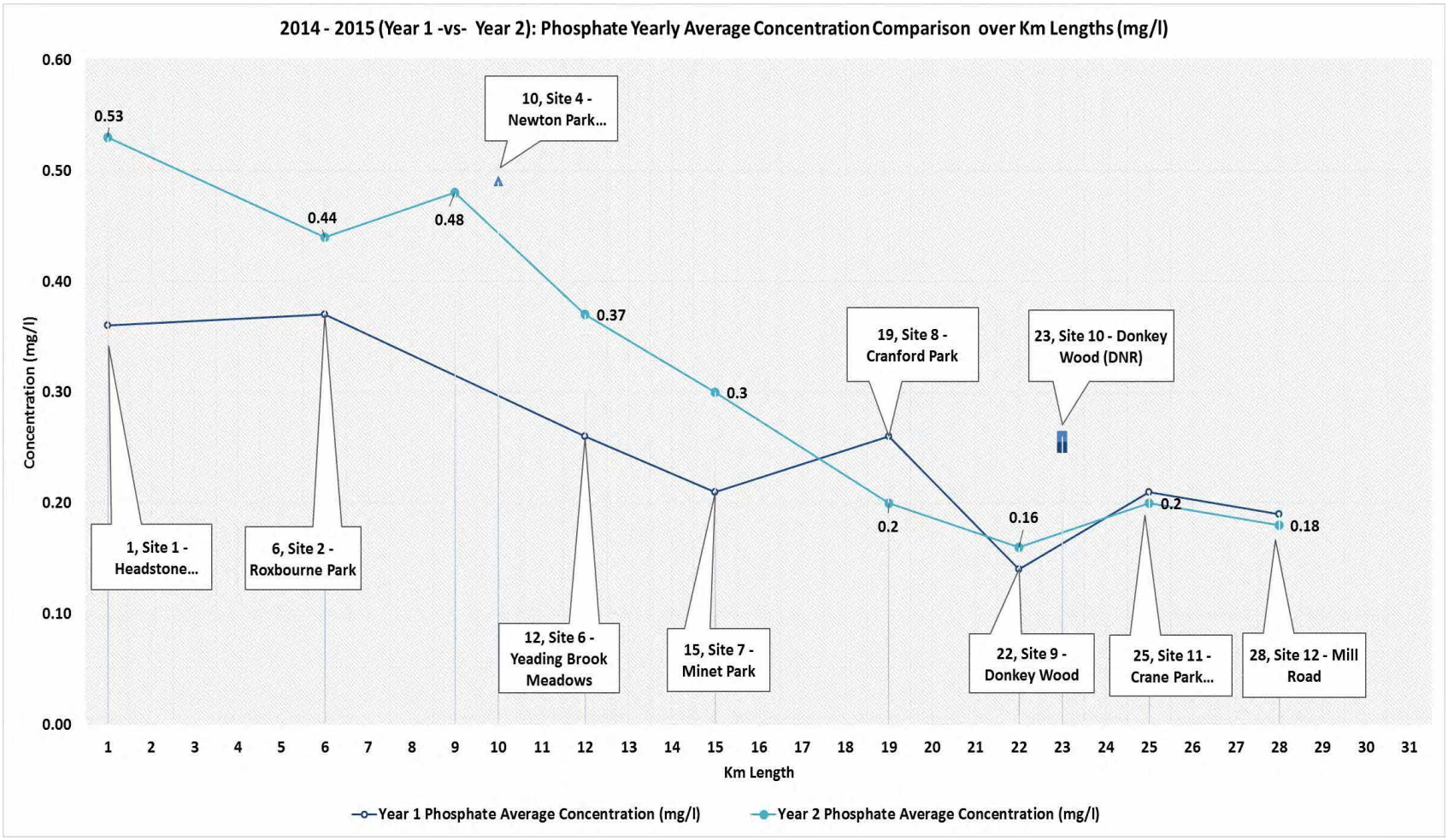
Water Quality Monitoring

- High data return
- High confidence in data
- UKAS accredited lab used to analyse data by Thames Water
- Data being used by EA and Thames Water

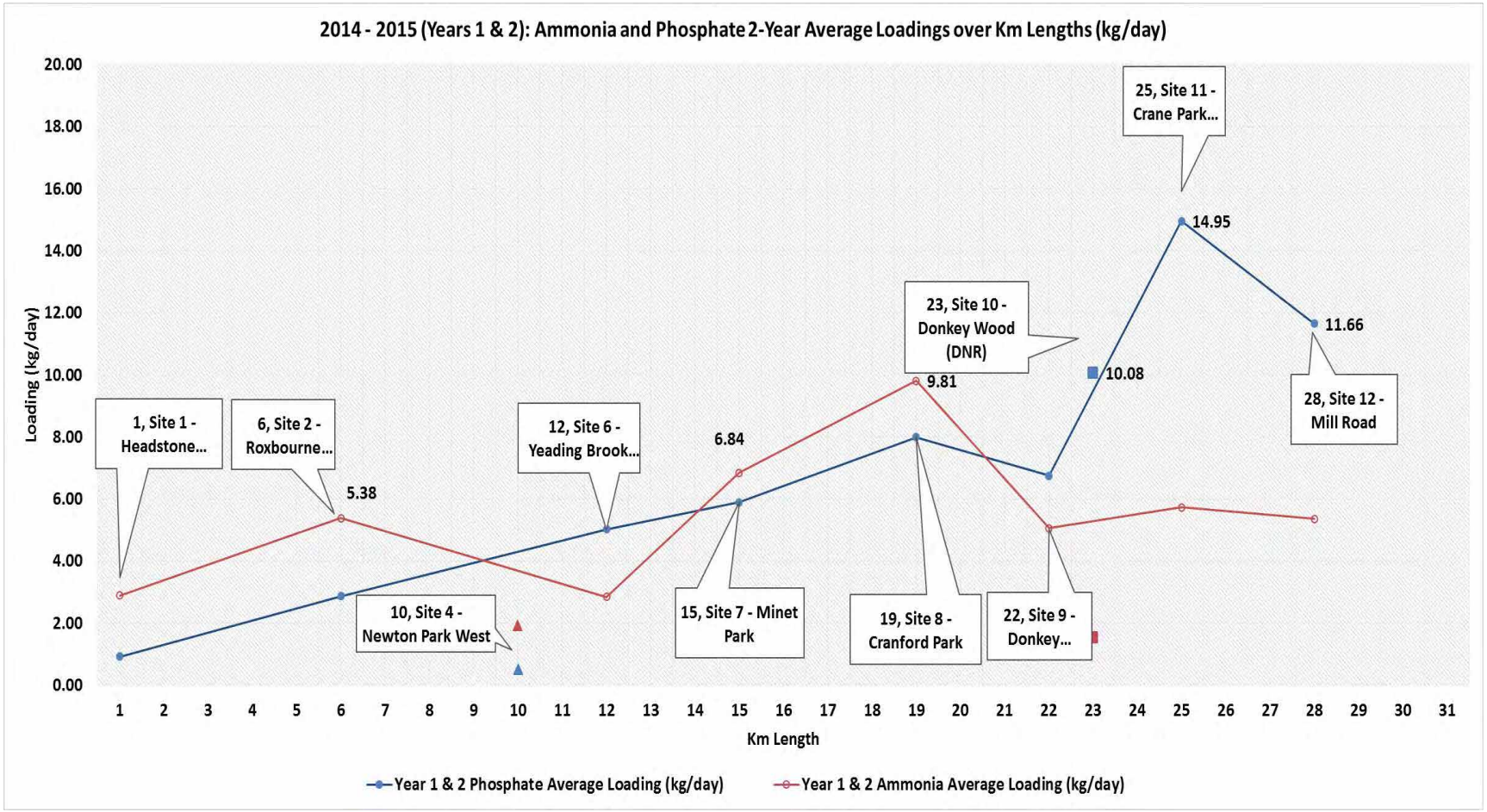
Mean Concentrations across the Catchment



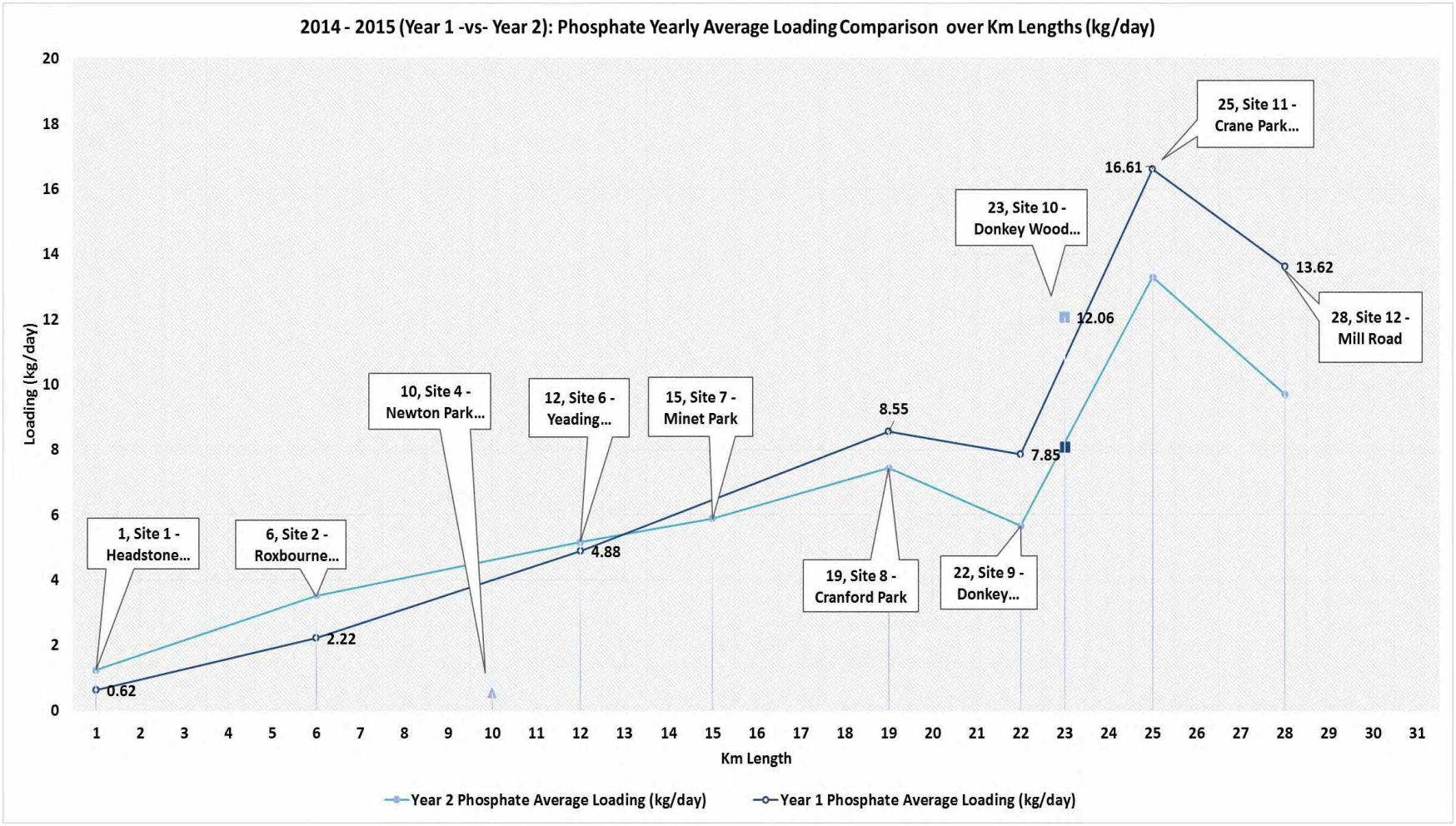
Year on Year Phosphorus Concentration Data



Mean Loading across the Catchment

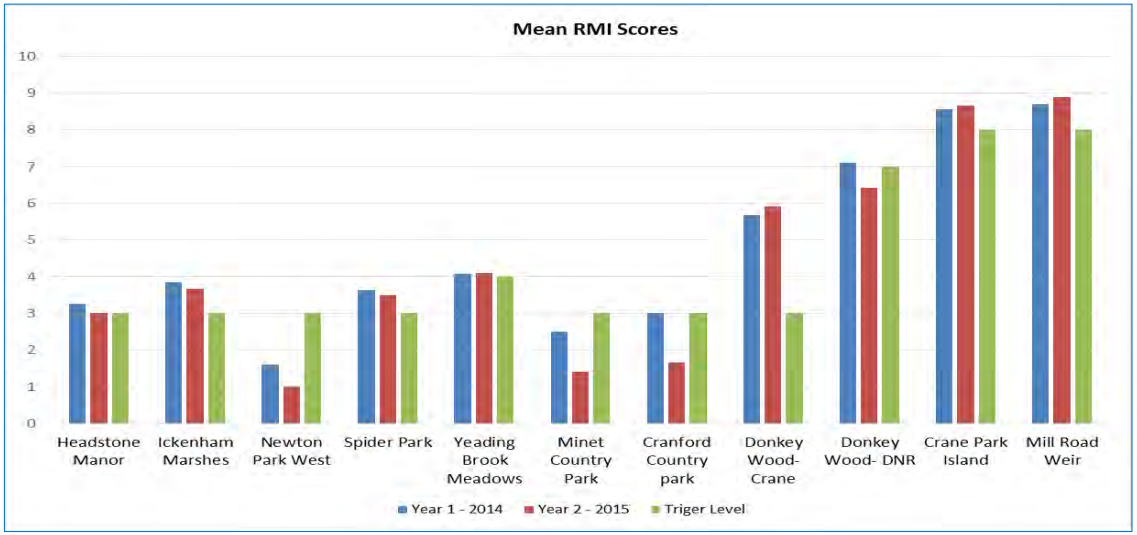


Year on Year Phosphorus Loading Data



Linking RMI and Water Quality

	22-Jun-15			
	Site 1	Site 2	Site 3	Site 4
	Headstone Manor	Roxbourne Park	Ickenham Marshes	Newton Park West
Sample Number	F6019968	F6019969	F6019971	F6019972
Phosphorus Total by ICP (mg/l)	1.46	1.17	1.15	1.31
Phosphorus Dissolved by ICP (mg/l)	1.25	1.08	0.33	1.47
Ammoniacal Nitrogen (mg/l)	2.41	1.07	0.73	4.82
Sulphate as SO4 (mg/l)	108.5	104.1	0.97	173.7
P SOL Reactive (mg/l)	1.26	1.02	0.99	1.32



Summary

- 2 complete years of data and half way into third year: good baseline from which to measure change
- The data gives a good impression of catchment characteristics and where we need to focus resources
- Citizen Science data is helping shape the future of the catchment

Richard Haine CEnv
richard@frogenvironmental.co.uk

frog environmental

Outfall Safari

Joe Pecorelli
Zoological Society of London
joe.pecorelli @zsl.org

Thames Water

Crane Valley Partnership
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Environment Agency

FORCE
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ZSL
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Outfall Safari developed on the River Crane as part of the Citizen Crane Project

Systematically **inspect, record and map** the dry weather condition behavior of surface water outfalls in the catchment

Thames Water

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Questions used in the App to assess each outfall and derive an Impact score

Question	Options	EA score
1. Volunteer name 2. Date of Survey 3. GPS location 4. Photo of the outfall 5. Description of the nearest landmark		
6. Ranking of the flow coming out of the outfall		
	a. No Flow	
	b. Trickle	
	c. Low Flow	
	d. Moderate Flow	
	e. High Flow	
7. Ranking of the visual impact of the outfall		
	a. No visible effect	0
	b. With 2m of outfall	2
	c. Impact 2 to 10m	4
	d. Impact 10 to 30m	6
	e. Impact greater than 30m	10
8. Ranking of the aesthetics of the outfall		
	a. No odour or visible aesthetics	0
	b. Faint smell, no visible impact	2
	c. Grey water foam of scum	4
	d. Strong smell, sewage fungus or litter	6
	e. Faeces, gross litter or fungus	10

EpiCollect+

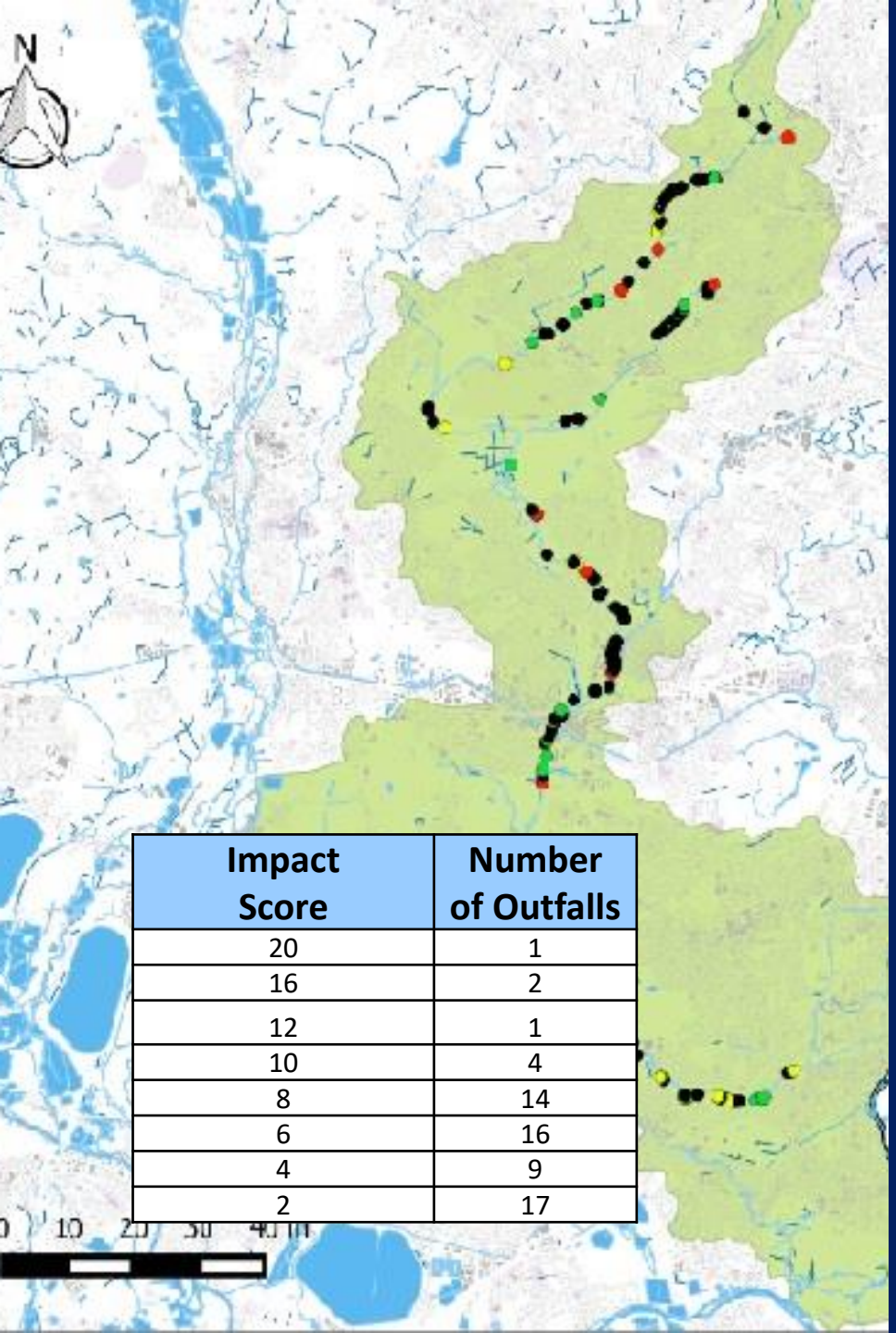
- Geolocate, photograph and upload a form at each outfall.
- Based on Thames Water's standard assessment method
- EA conversion of assessment to impact score


Minet Country Park


Brook Drive, Harrow

The Survey

- May 16th to June 23rd, 2016
- 17 People took part (13 volunteers , 2 EA staff, 2 ZSL staff)
- 34 km of river surveyed
  - 20km riverbank survey
  - 14km in-channel work through inaccessible reaches (different H&S rules apply)
- Local Authority Infrastructure staff and Environment Agency involvement was essential and much appreciated



Impact Score	Number of Outfalls
20	1
16	2
12	1
10	4
8	14
6	16
4	9
2	17

Crane Data

- 227 outfalls assessed 64(28%) showed signs of pollution scoring >0.
- 8 outfalls with impact scores of ≥10 - now being investigated by EA
- Thames Water are using the data to help re-prioritise SWOP works in the catchment

Other Outcomes

- Photos now exist of all outfalls recorded during the OSaf, 2016- problems with epicollect.
- A methodology has been created and can be refined for future use
- The methodology is already being adopted by other catchment partnerships
- Increasing collaborative working with the EA and Thames Water and built capacity to monitor pollution sources on the river

18 February 2016

The Catchment Partnerships in London Group

Position of the Partnership Hosts on Misconnections

The Catchment Partnerships in London Group (CPiL) consists of the River Catchment hosting organisations operating wholly or partly within Greater London. The purpose of the group is to support the work of the partnerships including sharing lessons and experiences to help achieve a coordinated approach to delivering cleaner rivers and Water Framework Objectives. This Position Statement is supported by the following organisations -

Due to misconnected domestic drains, foul water is discharging directly into rivers across London. As a result, pollution is killing wildlife, damaging ecosystems, risking human health and turning rivers and streams into 'no-go' areas. The Catchment Partnerships in London call for increased attention, action and investment to tackle this unacceptable situation.

1. Misconnections in London

Investigations by Thames Water (TW) suggest that 3% of properties in London are misconnected to allow foul water to discharge into the rainwater system, and in some areas the misconnection rate may be significantly higher. Three percent of the total number of households in London is 98,000 and when it is taken into account that a property may contain a number of households, the scale of the problem is clear.

In addition, there are problems caused by rainwater drains wrongly connected into the sewerage system, resulting in sewage treatment facilities being overwhelmed.

1

Wider Context

'CPiL action – CPiL will support Environment Agency and Thames Water by gathering evidence on the scale of the problem'

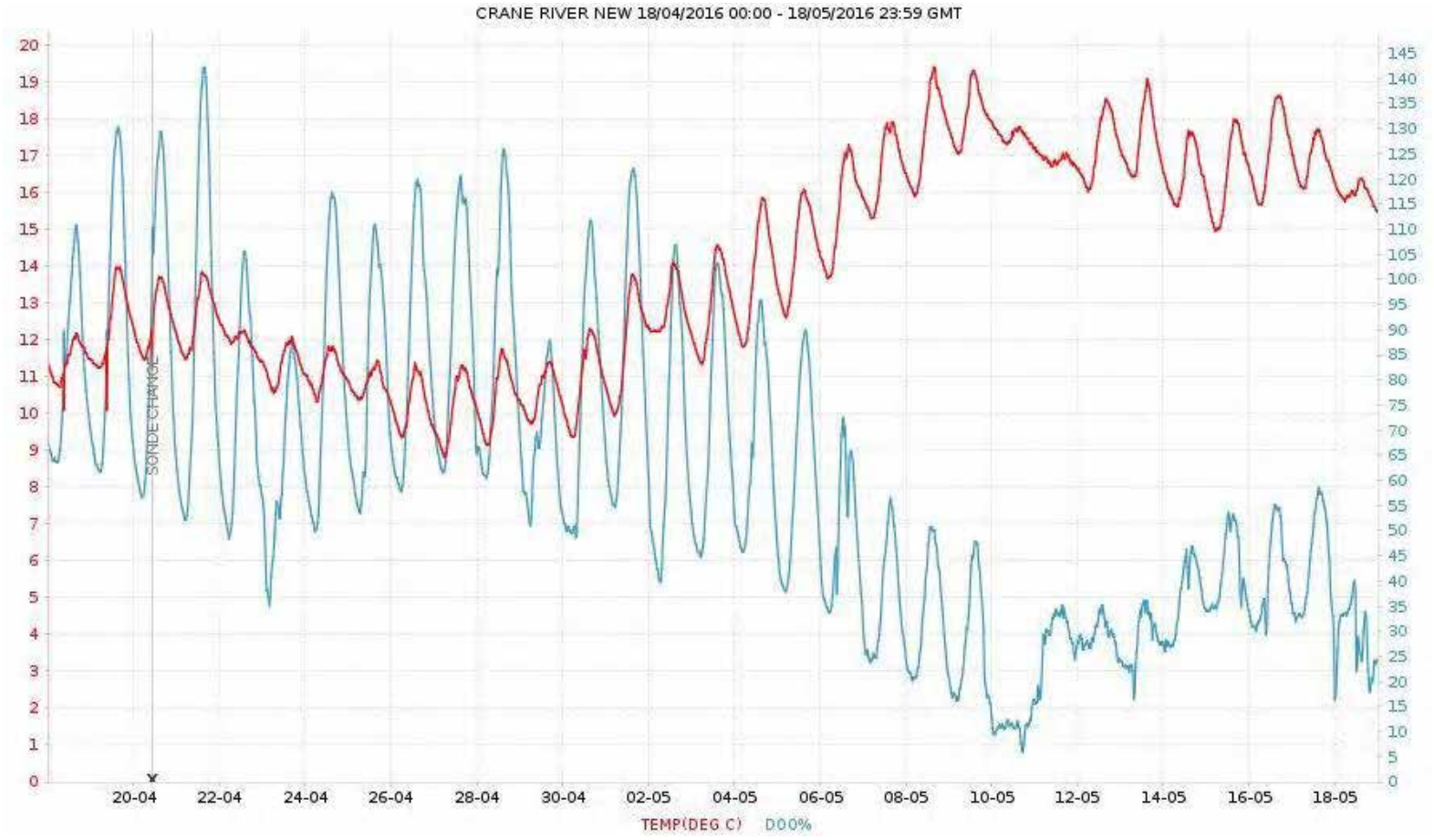
To help prioritize outfalls for inclusion in the 2020 Thames Water Surface Water Outfall Programme

This work is made possible with thanks to our funders, partnership organisations and intrepid citizen science volunteers

Joe Pecorelli
Zoological Society of London
joe.pecorelli @zsl.org

Real Time Monitoring

- What is it?
- Review of EA and HAL monitoring
- Diurnal variations in DO
- Peak ammonia events



Long Term Outfall Monitoring

- Monitoring in Crane Park for 18 months
- Visual records of 6+ SWOP outfalls monthly with occasional samples
- Assessing the effectiveness of the SWOP programme
- Typically 15 to 35 misconnections per outfall (90% positive response)
- Reporting problems with outfalls that had been signed off
- In-river loading reduction of 15% Phosphate and 40% Ammonia

An Overview of the River

Upper Tributaries

- Several kg/day (NH3 and P) from culverted channels
- Low RMI scores despite having good geomorphology
- New focus for TW investigations

Middle Reaches

- Further NH3 and P inputs but concentrations reduce
- Low RMI due more to poor condition – engineered, shaded, hidden
- Needs improved geomorphology and more public access

An Overview of the River

Upper DNR

- Improved RMI, low NH3 but high P (over half the load)
- P increase in 2016 – STWs on River Colne

Lower Reaches to Kneller Gardens

- Concentrations and loads reduce
- Improved river condition drives improved quality and ecology – better access and high public use also helps

Tidal reaches

- Initial outfall survey only

Summary of Year Two Findings

RMI and WQ data revealing the nature of the river system

Real time data provide further insights

Outfall Safari – assessment for 200+ outfalls

10+ significant pollution problems identified and being resolved

SWOP benefitting from the findings

Measurable WQ benefits in the lower catchment

Focus now on the upper reaches

Citizen Science teams are huge added benefit for the catchment

Steering Group essential link with decision makers

Thames Water Surface Water Outfall Programme

14 November 2016

Ruta Akelyte
Environmental Protection Technologist

Misconnected?

Environmental Protection Team

- A team of 6 individuals – environmental science background, passionate
- Based throughout London (mainly within M25)
- Main role – managing and delivering SWOP projects
- Additional roles – Event Scientist response, pollution investigation.

SWOP

- Programme developed by Thames Water and Environment Agency
- Funding approval from Ofwat
- Funding released in Asset Management Plans (AMP) – over a 5 year period
- Current (AMP6) PSWO Programme is largest ever with biggest delivery profile yet 200 (40/year)
- 61 delivered to date, 21 – in year 2
- ~ 100 live projects

AMP6 Review

- 61 outfalls have been significantly improved to date
- 1126 properties with misconnections were identified in the process
- 2515 misconnected appliances identified
- 89% of these property owners resolved the issue voluntarily
- The remainder are passed over to local authorities for enforcement

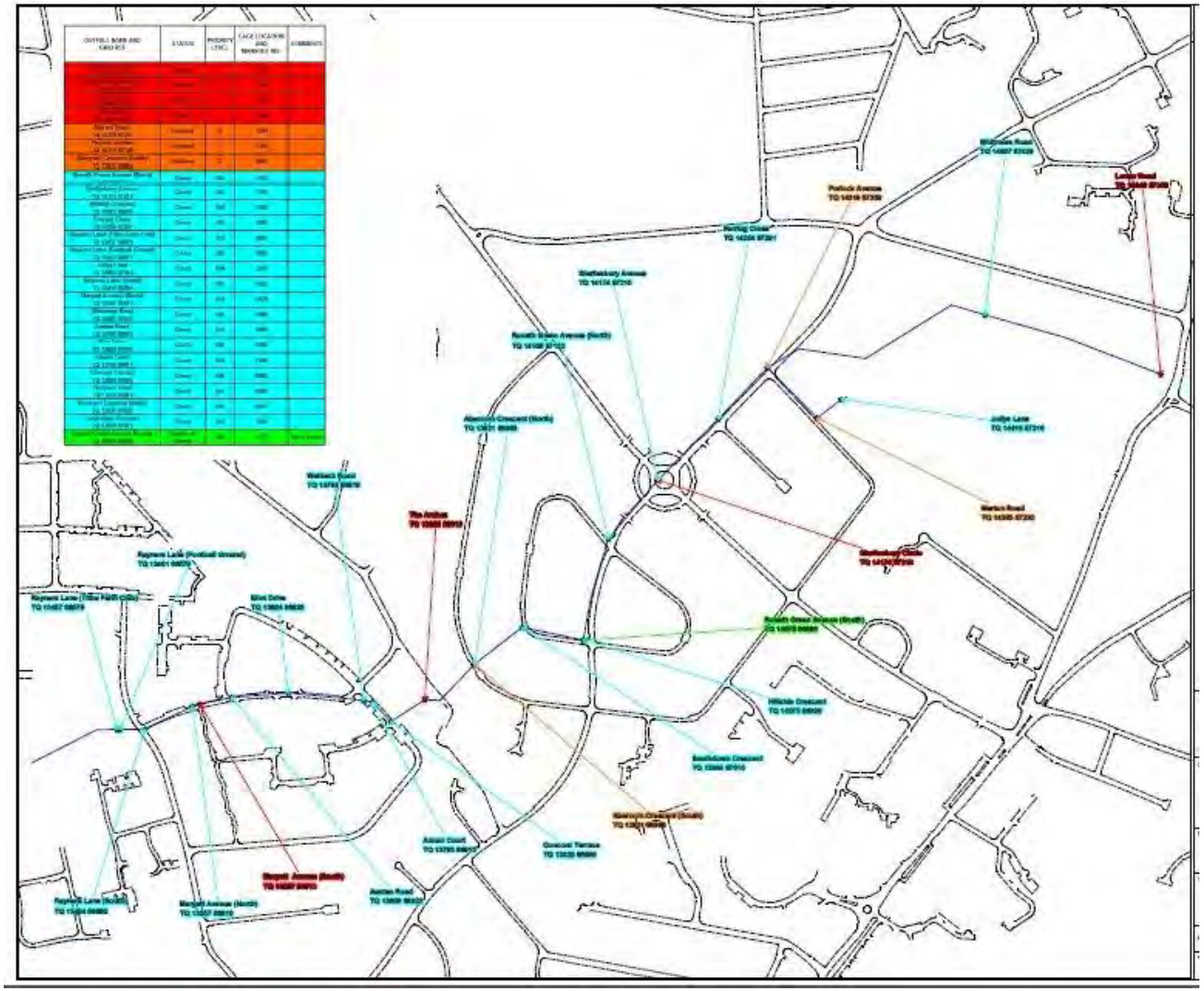
Misconnection	Amount
Kitchen Sink	623
Washing machine	546
Hand Basin	530
Toilet	250
Dishwasher	169
Bath	156
Shower	180
Other	61

River Crane Projects

- 8 projects singed off to date
- 4 – on River Crane, 4 – on Yeading Brook
- 96 properties with misconnections were identified in the process
- 208 misconnected appliances identified
- Misconnection rate – 2.55%
- Live Projects – 27 (10 on River Crane, 9 on Yeading Brook, 8 on The Roxbourne aka Yeading Brook East Arm), Rayners Lane due to start in Feb 2017 (The Roxbourne).

Misconnection	Amount
Kitchen Sink	48
Washing machine	59
Hand Basin	36
Toilet	8
Dishwasher	28
Bath	12
Shower	15
Other	1

Newton Park – The Roxbourne Investigations



Loading

Watercourse	Total in estimated swimming pool (2,500,000 L)/since 1st April 2015	Total in estimates 1L bottles since 1st April 2015
All watercourses	25.0	62.5m
River Crane and Yeading Brook	1.7	4.3m

Outfall Safari

- One of the aims - develop a low cost method that can be used periodically in the catchment to inform ongoing catchment management decisions. In particular to help identify (and potentially prioritize) outfalls for inclusion in the AMP 7 Thames Water Surface Water Outfall Programme (SWOP), due to start in 2020

- Impact score 2 and above – 64

- Impact score 6 and above – 38

- 11/38 – not on SWOP or TW radar

- 11 to be re-assessed by EPT

Figure 1. In-channel survey work in Harrow during the 2016 OS (taken from Citizen Crane Project Year 2 Progress Report)

- TW will investigate these outfalls with the aim of resolving them in the short term

- If the source is suspected to be widespread intermittent discharges from misconnections, the outfall will be added to the SWOP waiting list

Future Work

- Approximately 20 projects on River Crane, Yeading Brook and Roxbourne River on AMP6 Waiting List
- Emerging outfalls – prioritised accordingly
- Close collaboration with Citizen Crane in shaping AMP7 SWOP
- Sample analysis at TW labs
- Thanks for helping to shape an efficient SWOP

connect right
Stop pollution

Thames Water

Thank you

Pollution prevention & Incidents in the Crane Catchment

Shahnaz Isaac & Mat Reed
Technical Specialist – Urban Diffuse Pollution
Water Quality Enivironment Officer – Brent and Crane Catchment
Nov 2016

Proactive work in the Crane Catchment

- Water Framework Directive Investigations on priority watercourses commence 2017 in the Crane Catchment

- Citizen Cranes data helps us to understand and prioritise work in the catchment when working with Thames Water or carrying out pollution prevention work

Reactive Incident Work

Freephone from landline or mobile:

0800 80 70 60

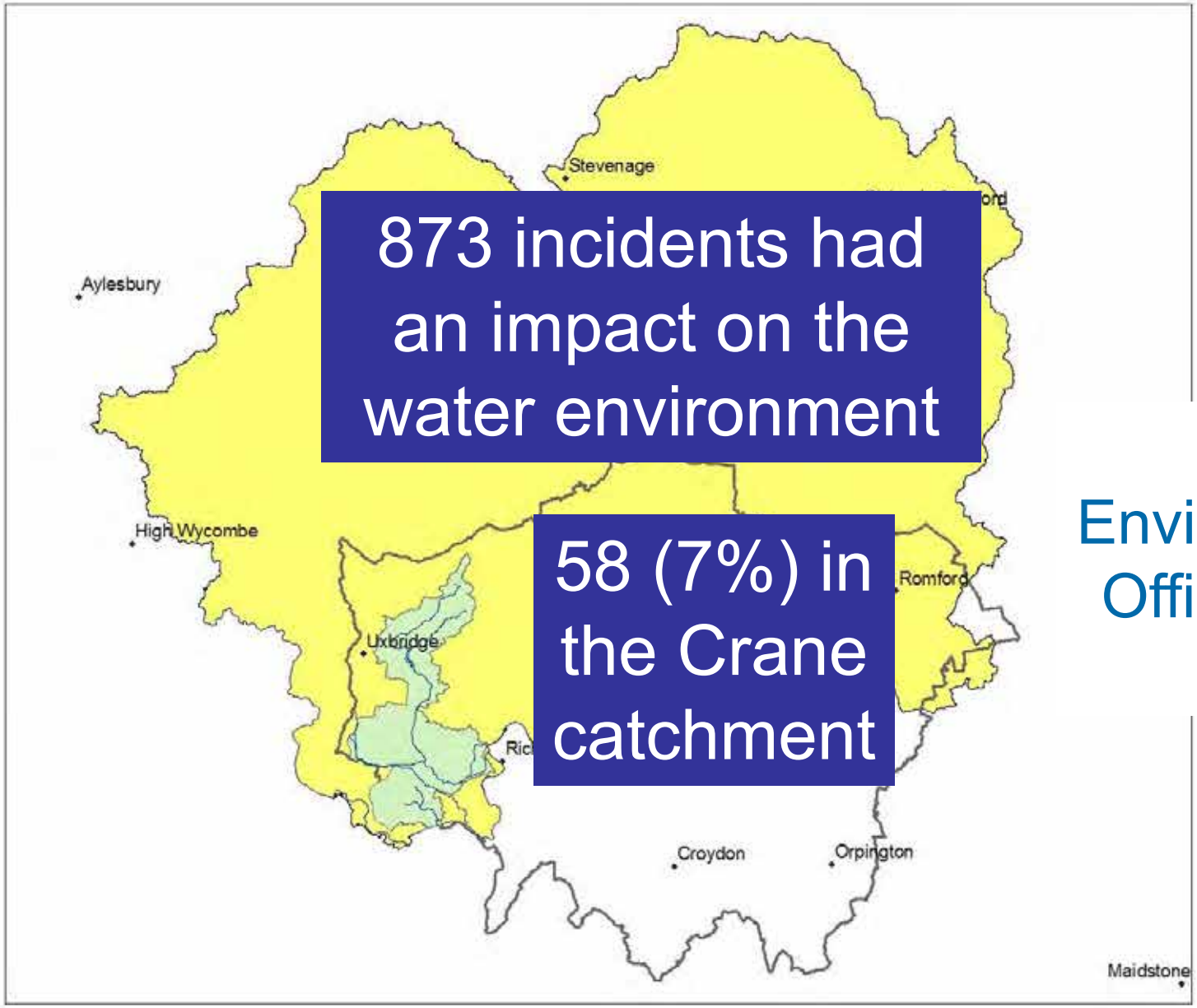
- Where is it?
- Is the water discoloured?
- Is there an odour?
- How big is the area affected?
- Have you seen any dead or distressed fish or other wildlife?

- What is the cause of the problem/where is the pollution entering the stream?
- Has this ever happened before?
- Do you have any pictures?
- Your contact details

Environment Agency

Working hours

Out of hours



Environment Agency

3 Environment Officers on call

Production Database

Help

OK

Agency Impact | Env. Impact | Water | Fisheries | Source Type/Sector | Pollutant | Details | Re

Incident substantiated

Agency action mini

Impact on Water

- [ ] No Impact
- [ ] Minimal effect on water quality
- [ ] Minor damage to ecology
- [ ] Minor effect on amenity value
- [ ] Minimal damage to agriculture / commerce
- [ ] Minimal effect on human health
- [ ] Minor effect on a potable abstraction
- [x] Significant effect on water quality
- [ ] Significant damage to ecology
- [ ] Significant effect on a potable abstraction
- [ ] Significant effect on amenity value
- [ ] Significant effect on human health
- [ ] Significant damage to agriculture / commerce
- [ ] Serious effect on human health
- [ ] Major effect on water quality
- [ ] Major damage to ecology
- [ ] Major effect on a potable abstraction
- [ ] Major effect on amenity value
- [ ] Major damage to agriculture / commerce

Water Impact Category 4

Water Impact Category 3

Water Impact Category 2

Water Impact Category 1

- [ ] Minimal effect on human health
- [ ] Minor impact on property
- [ ] Significant damage to agriculture / com
- [ ] Significant effect on human health
- [ ] Serious effect on human health
- [ ] Major effect on amenity value
- [ ] Major damage to agriculture / commerce

- [ ] Major damage to nature conservation

Water Impact Category: Level 2

Land Impact Category: Level 4

Air Impact Category: Level 4

Team: HNL Area (Read Only) | User: Amanda MacLean

Working with Thames Water

- We have an Environment Agency dedicated hotline
- Attendance via the Pollution Control Desk is between 2-4 hrs.
- Hotspots List for any unresolved polluted surface water outfall

Freephone from landline or mobile:

0800 80 70 60

Environment Agency

Mill Stream Pollution 2014

Environment Agency


Professional Plus
4.83
773
0.38
7.27
2.49
0.02

77	Conductivity at 25 C	26	1037 uS/cm
85	BOD : 5 Day ATU	21	<3 mg/l
92	Chemical Oxygen Demand :- {COD}	21	28 mg/l
11	Ammoniacal Nitrogen as N	22	6.27 mg/l
85	Solids, Suspended at 105 C	21	5.87 mg/l
72	Chloride	22	73 mg/l
06	GCMS Scan : Semi-Volatile Scan	21	1 UNITLESS

All results are approximate concentrations. Trichloroethylene 4.4 ug/L 1,4 Tetrachloroethylene 3.3 ug/L Chlorobenzene < 0.5 ug/L Toluene 0.5 ug/L Trimethylbenzene < 0.5 ug/L 1,3- Dichlorobenzene < 0.5 ug/L 1,2- Dichlo 0.5 ug/L Acetophenone < 0.5 ug/L Metaldehyde < 0.5 ug/L Linalool 2.0 ug Diethyl -m- toluamide < 0.5 ug/L Benzophenone < 0.5 ug/L Tributyl phosp Prosulfocarb < 0.5 ug/L Diethyl phthalate 1.1 ug/L di-n- butyl phthalate 1.1 Sulphur < 0.5 ug/L Bisphenol A 0.6 ug/L DEHP 8.8 ug/L 3,5,5- Trimethyl h 4- Trimethyl -3- cyclohexene -1- methanol < 0.5 ug/L 5- methyl 1H- benzo

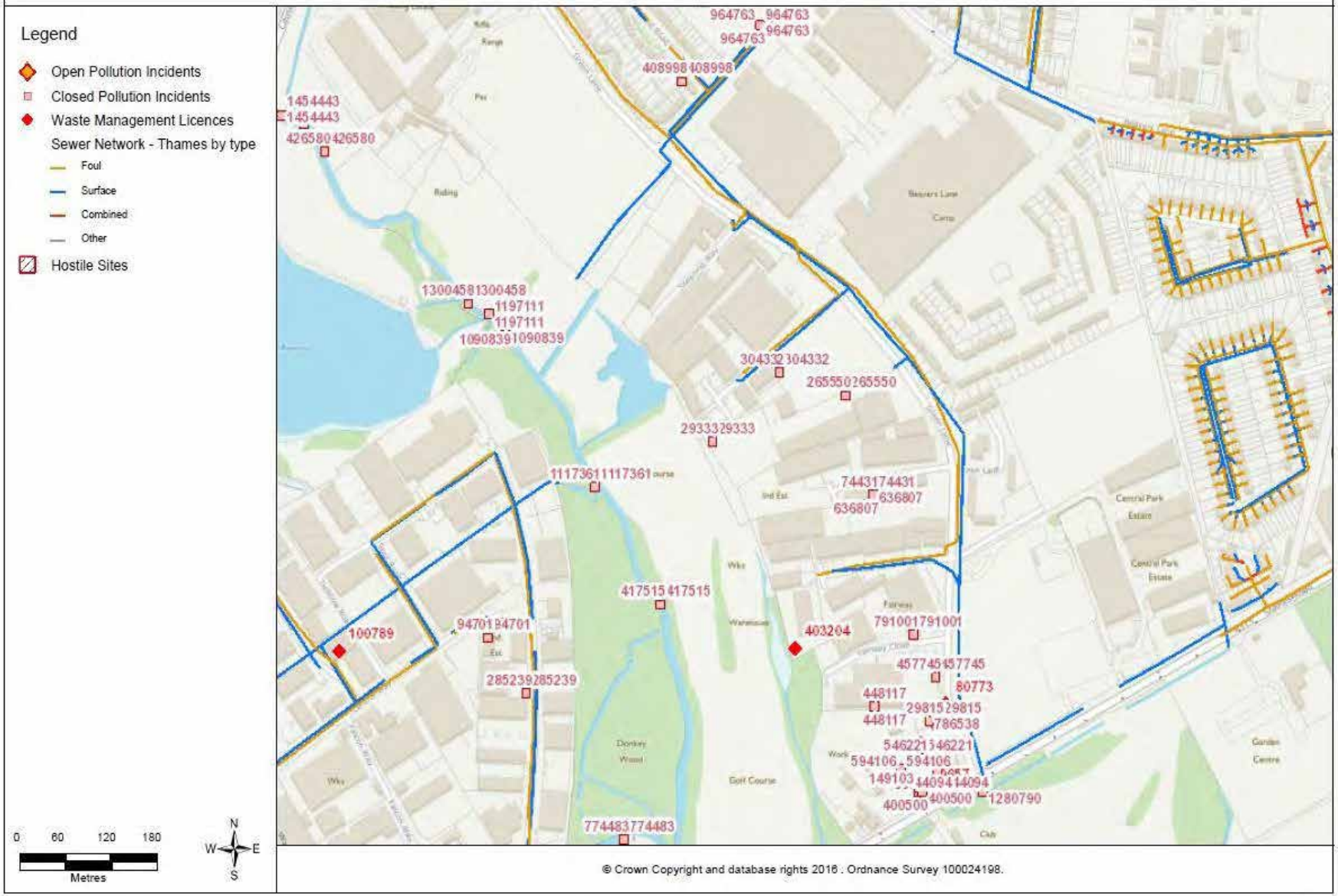
0135	Solids, Suspended at 105 C	21	240 mg/l	Y	U	U	U	U	U	N
0172	Chloride	22	238 mg/l	Y	U	U	U	U	U	N
3106	GCMS Scan : Semi-Volatile Scan	21	1 UNITLESS	Y	U	U	U	U	U	N

All results are approximate concentrations. Tetrachloroethylene 32 ug/L Styrene < 5 ug/L Benzyl alcohol < 5 ug/L p- Cresol < 5 ug/L Naphthalene < 5 ug/L 2- Methyl naphthalene < 5 ug/L Eugenol < 5 ug/L N,N- Diethyl -m- toluamide < 5 ug/L Benzophenone < 5 ug/L Tributyl phosphate < 5 ug/L Caffeine < 5 ug/L Sulphur < 5 ug/L Bisphenol A < 5 ug/L Fluorene < 5 ug/L Phenanthrene < 5 ug/L Fluoranthene < 5 ug/L Pyrene < 5 ug/L Sorbic acid 1440 ug/L 3,5,5 - Trimethyl hexanoic acid < 5 ug/L 2- phenoxy ethanol < 5 ug/L Dodecanal < 5 ug/L 1- Dodecanol 13 ug/L N- methyl -N- nitroso 1- dodecanamine < 5 ug/L n- Hexadecanoic acid 7 ug/L Capsaicin 43 ug/L Dihydrocapsaicin 15 ug/L

4063	Ethylene glycol :- {Ethan-1,2-diol}	21	<1 mg/l	Y	U	U	U	U	U	N
7072	Trimethylene glycol :- {Propan-1,3-diol}	21	<1 mg/l	Y	U	U	U	U	U	N

Green Lane Industrial Area

Environment Agency



Search Results

'All' by 'PostCode Search' - '1 km' - 'TW4 6BL'

+ Environmental Permits (Industrial Installations)	1 Results
+ Environmental Permits (Waste Operations)	4 Results
+ Environmental Permits (Radioactive Substances)	0 Results
+ Environmental Permits (Water Discharge)	7 Results
+ Water Discharge Exemptions	0 Results
+ Scrap Metal Dealers	2 Results


TRICHLOROETHYLENE SOLVENT
CONTAINER RETURNABLE FOR RECYCLING
UN 1710
DANGER
TOXIC
6


Gear oils

REGULATIONS AND ENFORCEMENT

- **THE HAZARDOUS WASTE (ENGLAND AND WALES) REGULATIONS 2005**
- **CONTROL OF POLLUTION (OIL STORAGE) (ENGLAND) REGULATIONS 2001 (OSR)**
- **ENVIRONMENTAL PROTECTION ACT 1990**
- **ENVIRONMENTAL PROTECTION (DUTY OF CARE) REGULATIONS 1991**
- **ENVIRONMENTAL PERMITTING (ENGLAND AND WALES) REGULATIONS 2010**

ACTION: Please provide evidence that waste oil storage areas have been modified to comply with the Control of Pollution (Oil Storage) (England) Regulations 2001.

DEADLINE: 24 March 2015

PLEASE BE AWARE, FAILURE TO ADHERE TO THIS DEADLINE MAY RESULT IN ENFORCEMENT ACTION.

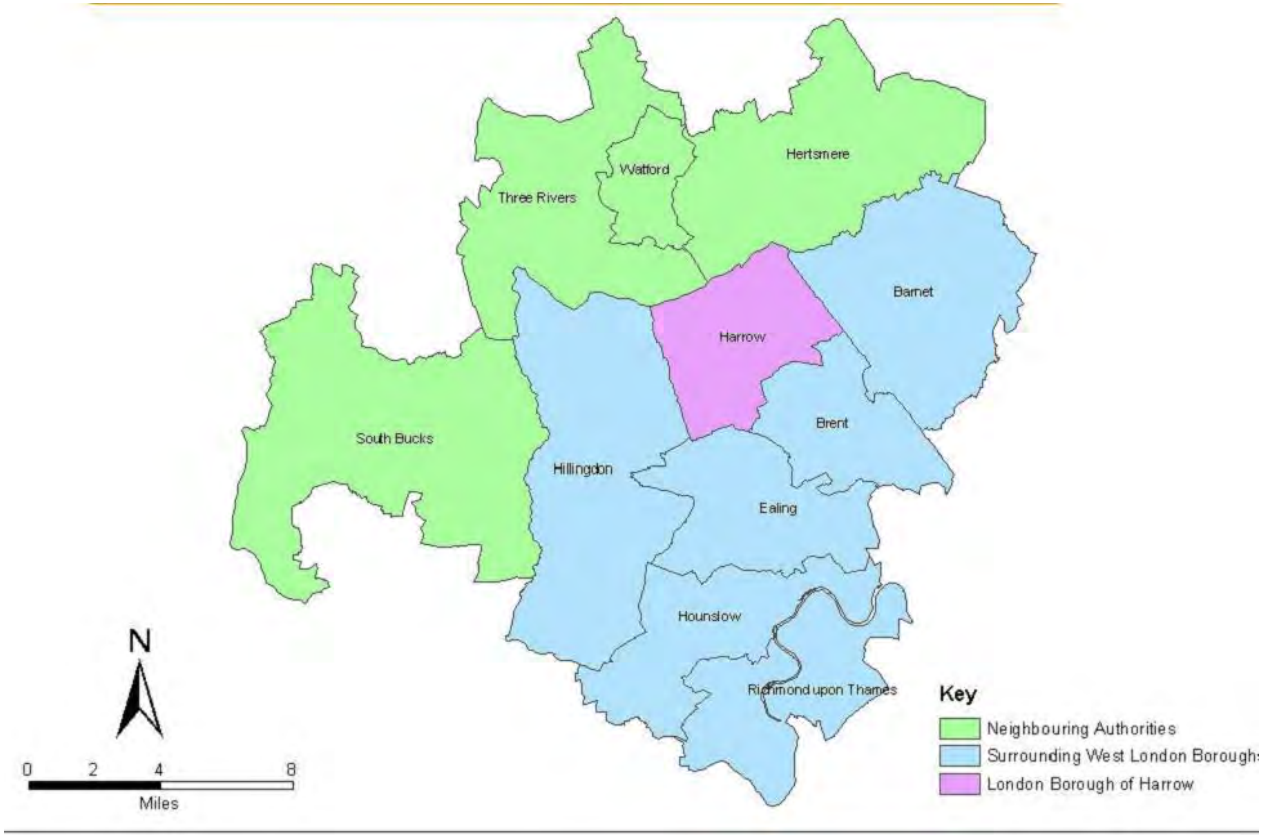

QUESTIONS

November 2016

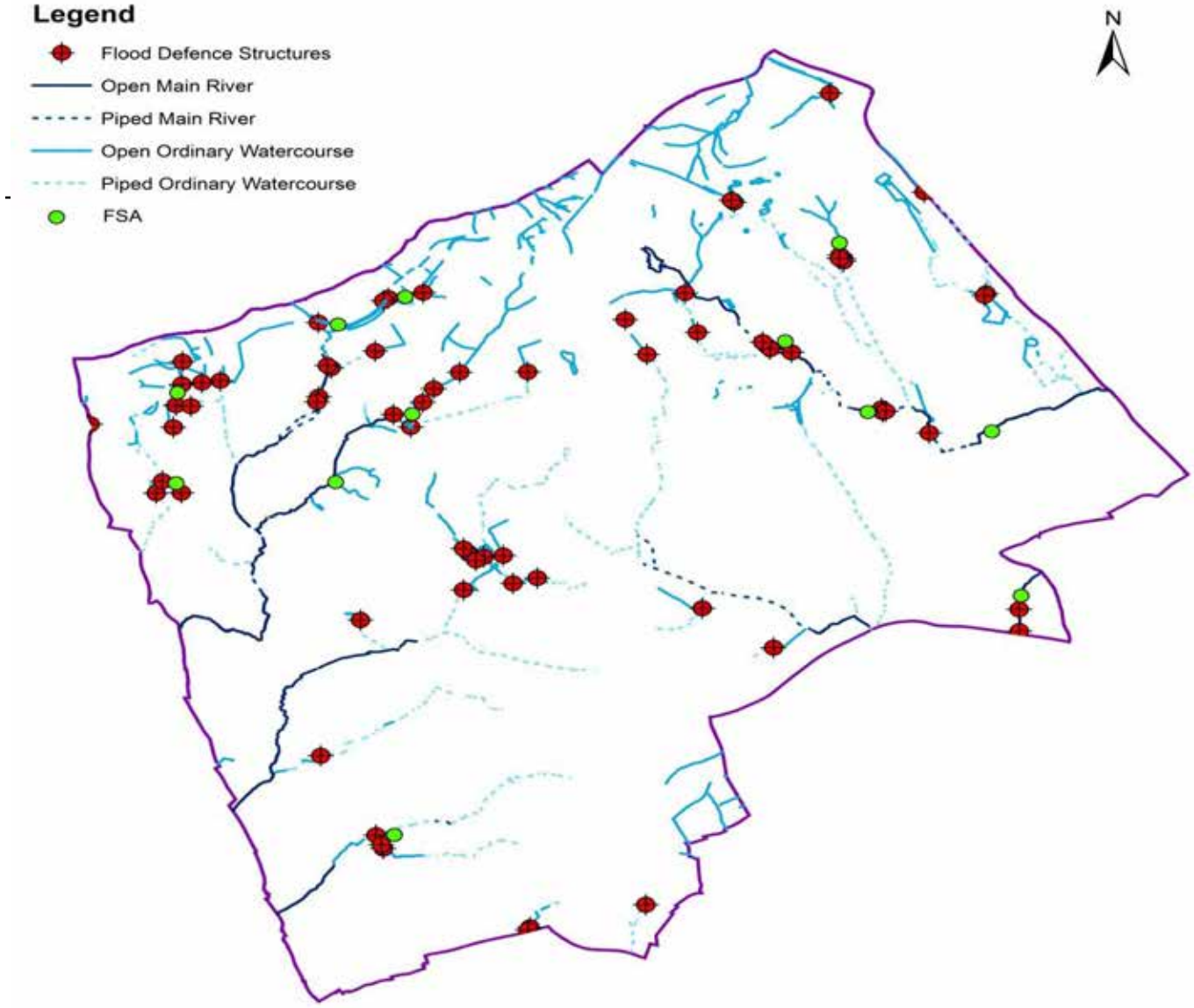
Yeading Brook & Roxbourne Stream River Improvements

Harrow COUNCIL
LONDON

The London Borough of Harrow is located in North West London and covers an area of 55km² with a population of 240,000



Harrow COUNCIL
LONDON

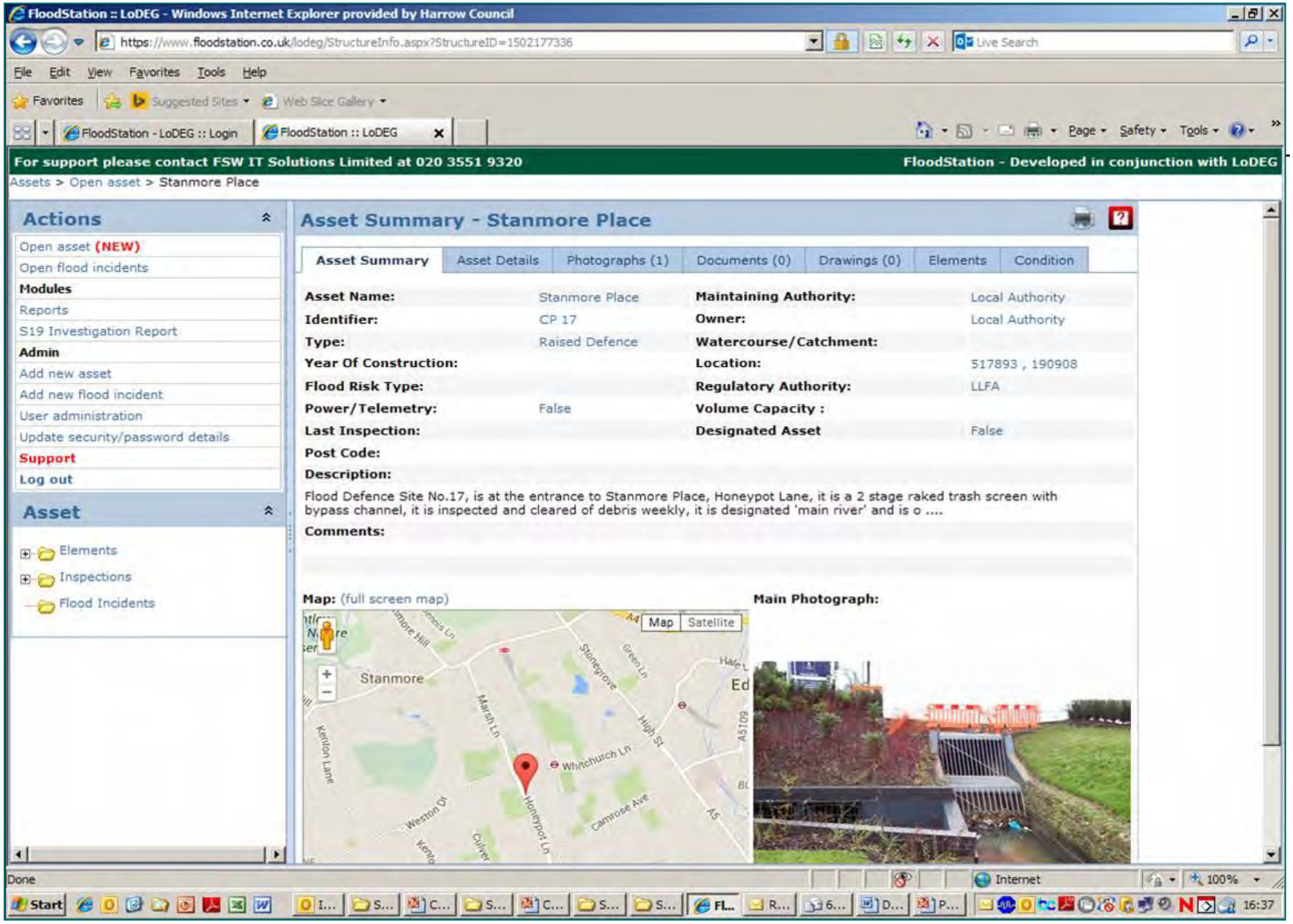


Harrow COUNCIL
LONDON

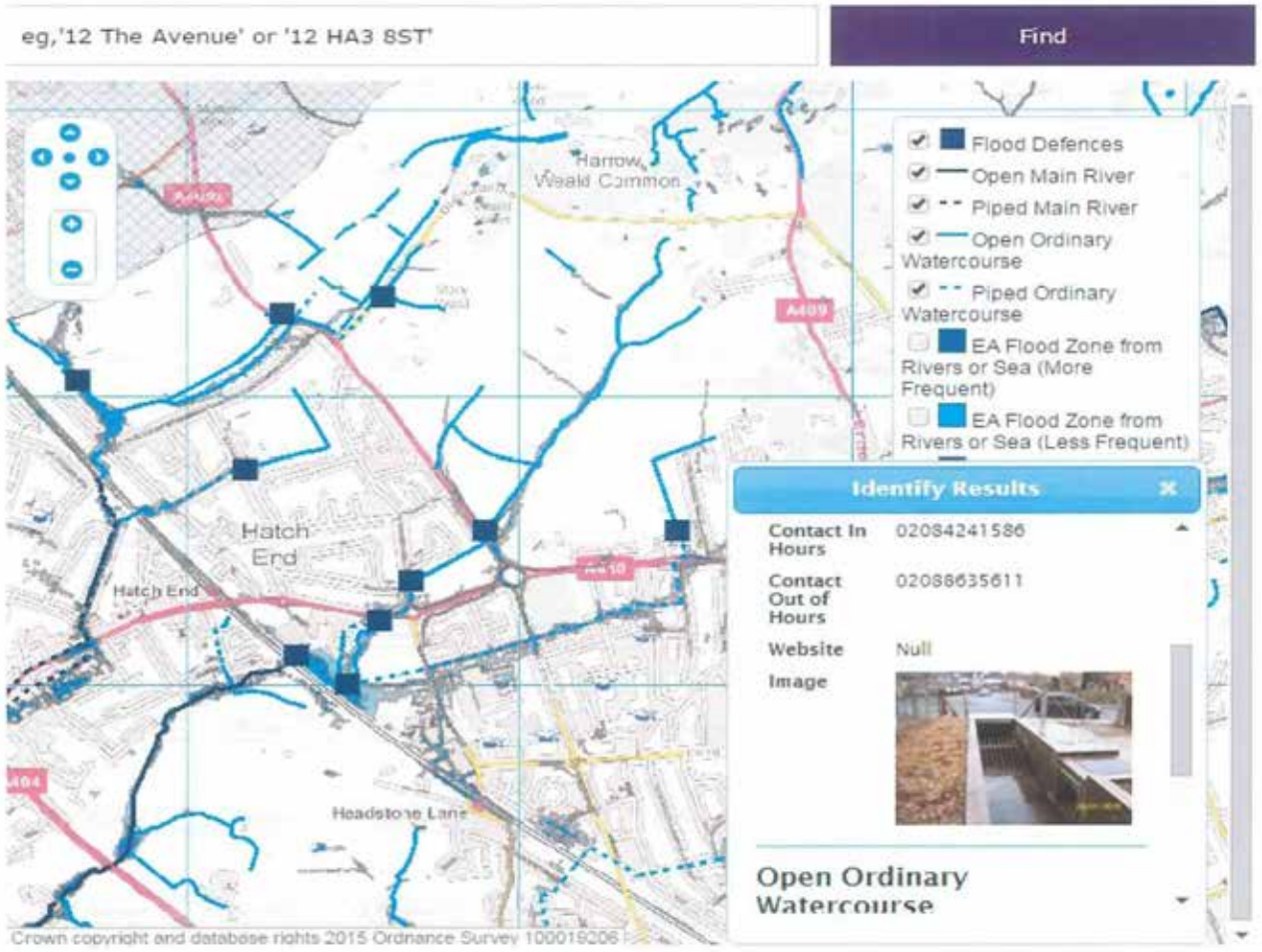

30/01/2009


31/05/2011


03/01/2004


FloodStation :: LoDEG - Windows Internet Explorer provided by Harrow Council
https://www.floodstation.co.uk/lodeg/StructureInfo.aspx?StructureID=1502177336
File Edit View Favorites Tools Help
FloodStation - LoDEG :: Login
FloodStation :: LoDEG
For support please contact FSW IT Solutions Limited at 020 3551 9320
FloodStation - Developed in conjunction with LoDEG
Assets > Open asset > Stanmore Place
Actions
Open asset (NEW)
Open flood incidents
Modules
Reports
S19 Investigation Report
Admin
Add new asset
Add new flood incident
User administration
Update security/password details
Support
Log out
Asset
Elements
Inspections
Flood Incidents
Asset Summary - Stanmore Place
Asset Summary
Asset Details
Photographs (1)
Documents (0)
Drawings (0)
Elements
Condition
Asset Name: Stanmore Place
Identifier: CP 17
Type: Raised Defence
Year Of Construction:
Flood Risk Type:
Power/Telemetry: False
Last Inspection:
Post Code:
Maintaining Authority: Local Authority
Owner: Local Authority
Watercourse/Catchment:
Location: 517893 , 190908
Regulatory Authority: LLFA
Volume Capacity :
Designated Asset False
Description:
Flood Defence Site No.17, is at the entrance to Stanmore Place, Honeypot Lane, it is a 2 stage raked trash screen with bypass channel, it is inspected and cleared of debris weekly, it is designated 'main river' and is o ....
Comments:
Map: (full screen map)
Map
Satellite
Stanmore
Whitchurch Ln
Honeypot Ln
Main Photograph:
Done
Internet
100%
Start
16:37

http://www.harrow.gov.uk/info/200074/planning/283/flood_zones_and_rivers/2

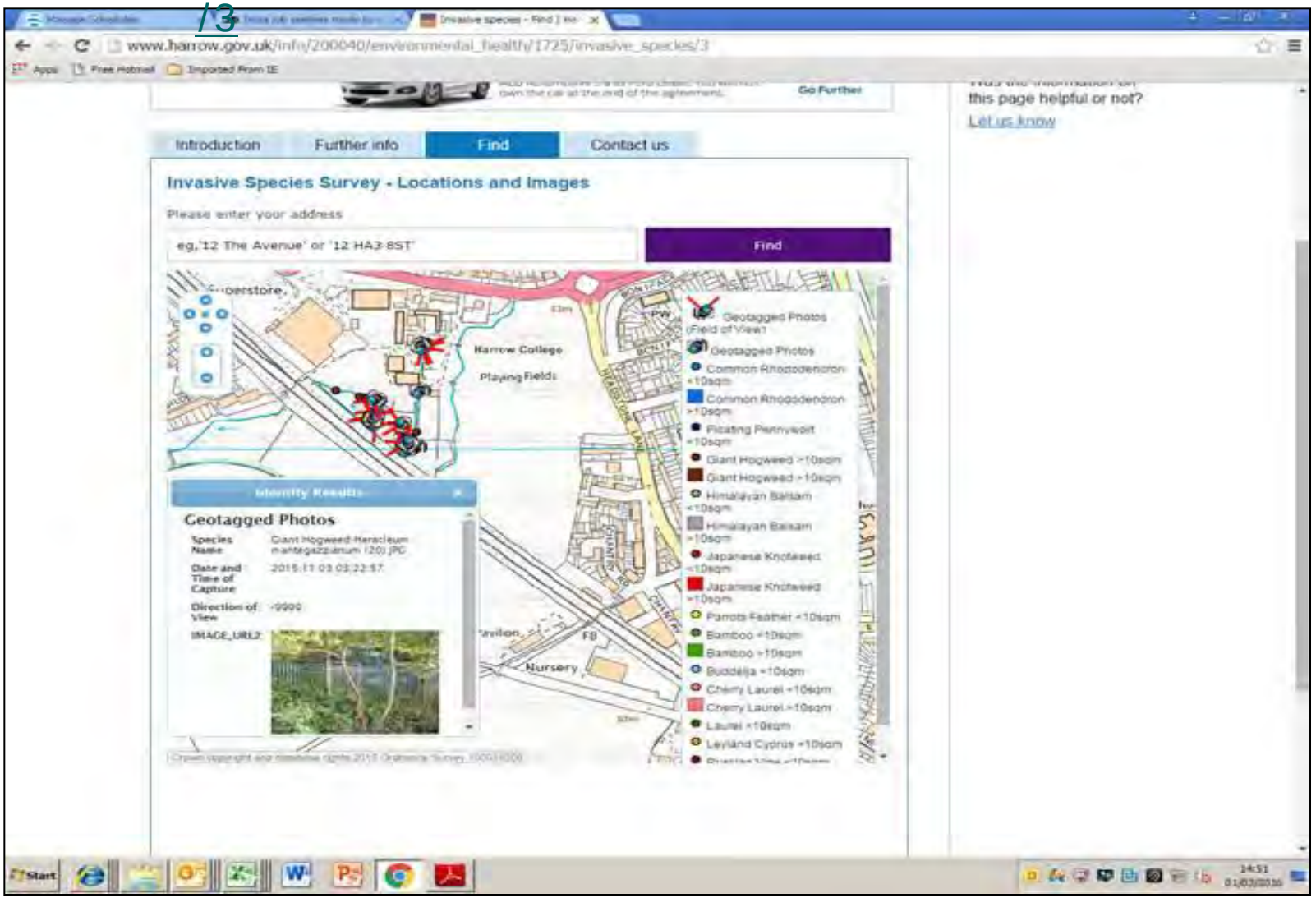


Fluvial Flooding

From this

To this in 20mins

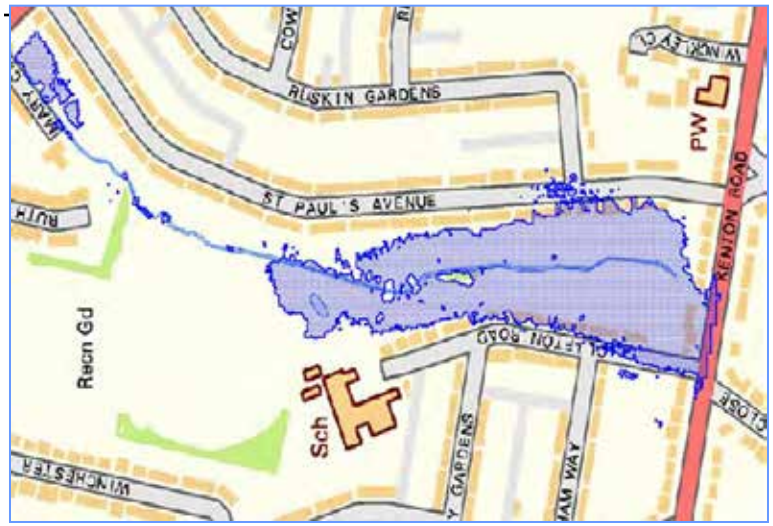
http://www.harrow.gov.uk/info/200040/environmental_health/1725/invasive_species/3



T21/BCP & CVP

Tributary of Edgware Brook.MOV

Queensbury Recreation Ground – Kenton Brook



- Identify the problem(s)
- State the vital statistics
- Provide the evidence

- Flooding, social deprivation, anti social behavior, water quality, poor habitat
- Scheme cost, partner contributions, PVD, PVB, BAP habitat created OM6
- Flood modelling, land use, LFRMS, Parks & Open Space Strategy

ST. BERNADETTE'S CATHOLIC PRIMARY SCHOOL

Brent Catchment Partnership

THAMES21

Environment Agency

Thames Water

Harrow COUNCIL LONDON

Queensbury Recreation Ground – Kenton Brook

- Work out the constraints and opportunities
- Engage partners
- Extra local outcomes
- Efficiencies and innovation

- Pollution, existing structures, habitat, community
- Community, Council, EA, Defra, School, Charities, Utilities
- Educational, amenity, healthy lifestyles, exercise
- Material reuse, naturalisation, climate change, planting

ST. BERNADETTE'S CATHOLIC PRIMARY SCHOOL

Brent Catchment Partnership

THAMES21

Environment Agency

Thames Water

Harrow COUNCIL LONDON


09/01/2014


09/01/2014


7. 3. 2002

HARROW & BRENT FLOOD WORKING GROUP

1. Manually survey all public sewer manholes in Harrow sited on both private land and public highway. Capture and document photographs and connection details and share this information with the LLFA.

2. To initiate a rolling program commencing 1st April 2017 of line cleaning and CCTV condition surveys of all surface and foul sewers in the Brent Sewerage Catchment, prioritising those in areas of worst pollution. This will identify dual manhole defects and illegal misconnections on the connecting pipework between manholes that are allowing foul sewage to cross over.

3. To rehabilitate all dual manholes in such a way that they will permanently prevent crossflow between the foul and surface water networks. Where it is not possible to achieve robust separation within existing manholes, they should be replaced by separate foul and surface water manholes. In areas where there is inadequate capacity in the public sewers, these new manholes could be made over-sized, to contribute additional storage capacity within the system.

4. Provide an asset management resource plan for 5 year to undertake points 2 & 3 within the Harrow administrative boundary.

5. We propose a joint Harrow, Brent, Thames Water and Thames21 campaign to clean up our rivers that is also included in the Brent Sewerage Catchment Drainage Strategy.

Combined Fluvial, Pluvial Flooding

Kenmore Avenue.MOV

Check your connection

Help us to reduce river pollution in Harrow.

Most people don't think about the impact the drains beneath their feet can have on the local environment.

When they think of river pollution they think of sources like factories, farms and industry.

Yet in many cases, the pollution comes from a much less obvious source – our homes.

Incorrect plumbing in your home could mean that waste water from your dishwasher, washing machine, sinks, baths and even your toilet is being flushed directly into our rivers.

For further information please contact your Local Lead Flood Authority, Harrow Council on

Tel: 020 8424 1046
Email: infrastructure@harrow.gov.uk

Harrow Council, PO Box 57, Civic Centre, Station Road, Harrow, Middx, HA1 2XF

Harrow COUNCIL
LONDON

Are you polluting Harrow's Rivers?

Most properties on mains drainage have two drains:

- **The foul water drain** carries waste water from toilets, sinks, baths and household appliances to a sewage treatment plant.
- **The surface water drain** (or 'storm' drain) carries rainwater from roofs and open grates in the street direct to the local river. Any discharge into this drain flows into the river untreated.

Thames water estimates that 1:20 houses in London have misconnected drains. This is a major problem for London's environment as it causes serious water pollution. The affect can be seen in local rivers where untreated sewage effluent causes a mat of grey sewage fungus to grow on the river bed. This is damaging to aquatic life and is a health risk for people using the rivers for recreation.

Who is responsible?

The chances are that you were not responsible for plumbing in your own appliances. Unfortunately, you are responsible for putting it right.

Wrong connections are not only harmful to the environment, they are illegal. Failure to take corrective action could lead to ***prosecution*** by the Environment Agency or your local authority.

How to spot a misconnection

Checking whether your house has the right connections is very simple:

Look at the outside of the house to check where any outside waste pipes run. If they connect to a soil waste pipe then you are correctly connected.

If a waste water pipe connects to a rainwater downpipe or directly to a gulley grating then you have the wrong connection.

In most cases it will be a simple matter to reconnect the waste water pipe to your foul water drain.

Actions YOU can take

Harrow are working with The Environment Agency and Thames Water to identify and solve these misconnection problems. You can help us improve your environment in the following ways:

✗ Don't connect waste pipes from toilets, showers, baths, sinks and water-using appliances into roof water downpipes or gullies.

✗ Don't ignore existing wrong connections. Remember you could be prosecuted.

✗ Don't dispose of oil, garden and household chemicals, paint or detergent in drains or gutters in the road. Use your local civic amenity site for the disposal of such waste.

✓ Do check your drains. If you find a wrong connection, put it right by using a qualified plumber.

✓ Do ensure that if you are buying a house there are no wrong connections. Ask your surveyor to include this in the survey report.

✓ Do make the right connection and help to keep rivers clean for us all to enjoy.

Misconnected waste water entering directly into the river from properties

Sewage effluent overflowing from a dual manhole and entering the surface water sewer before draining into the river

Trunk sewers overflowing into new river restoration project 29.09.16


01/01/2007

					RAG STATUS			*Definitions below
Authority Type	Project Manager	Delivery Team	Project Title	Current Project Budget	Allocation claim confidence*	Acceleration availability*	Project delivery confidence*	Comments
LLFA	Lucy Evans , Environment Agency	Area FCRM Manager	Headstone Manor Sedimentation Pond and Reed Bed-Kodak Housing Development	£320,000	Red	Red	Green	The current TRFCC allocation of 320k will be in additon to 175k s.106 contibutions Harrow LPA has received from the former Kodak Sports Ground 300 home development that adjoins the park to construct sedimentation pond and reed bed which is designed and ready for construction. Harrow LLFA has been successful in a bid for 1st round HLF Parks for People and received 230k to compile the necessary plans, reports and designs that will go forward with the 2nd round bid to release 1.4m capital that will provide projects for deculverting a section of the Yeading Brook, 2 new bridges, channel realignment, river restoration, wetland creation, water environment educational features/equipment/storage, ancient woodland restoration including footbridges, new footpaths and overflow car park. Additionally a draft SOC has been completed by the EA for a FAS to be constructed within the park, but further dicsussions with EA & LLFA will be needed to bring alignment so all 3 elements can be programed and delivered during the 6 year TRFCC plan period up to 2021.
LLFA	Lucy Evans , Environment Agency	Area FCRM Manager	Newton Park River Restoration and Flood Storage Area	£330,000	Red	Amber	Green	This project is designed and ready for construction. The LLFA has held discussions with the EA and consultants and will be providing a brief for the latter to write a successful approval OBC for this project identifying the preferred option which will be delivered by the LLFA Term Contractor which could be delivered 2016/17 subject to early funding release.
LLFA	Lucy Evans , Environment Agency	PSO London West	Wealdstone Brook Flood Alleviation Scheme	£90,000	Amber	Red	Green	2016/17 budget is to undertake final survey work. It is expected that the ICM and Drainage Strategy will be completed by 31st March 2017 and there will be a number of sub projects coming forward from both Harrow and Brent.

	Green	Amber	Red		
Allocation claim confidence	The LLFA will claim/spend their allocation for this year	The LLFA will claim some of their allocation this year, but unlikely to claim all of it.	The LLFA are very unlikely to claim their allocation for this financial year.		
Acceleration availability	The LLFA would like to accelerate this project. They can spend (more) money this financial year.	The LLFA would be interested in accelerating this project and requesting (more) money this financial year - but need to discuss/think about it further.	There is no way for this project to be accelerated.		
Project delivery confidence*	The LLFA are confident this project will be delivered, as currently planned.	The LLFA think the project will be delivered, but there are risks that mean delay. Or they are unsure of potential solutions at this stage.	The LLFA think there are significant risks to the project being delivered.		*This is delivery confidence for the whole project. Not just for 2016/17.

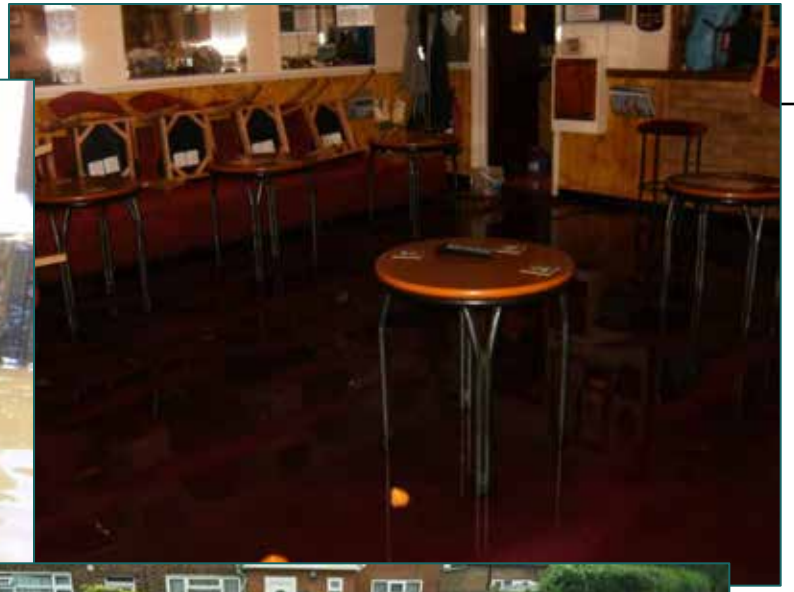
Green

Amber

Red

Video.MOV

North Harrow Bridge-Station Road Flooding 08.06.16.mp4



DO NOT SCALE

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following:

CONSTRUCTION

- SAFE SYSTEM OF WORK FOR ACCESS/EGRESS TO BE DEVELOPED.
- CONSTRUCTION OF EARTHEN EMBANKMENTS WHICH MAY BECOME WATERLOGGED.
- SAFE SYSTEM FOR WORKING ADJACENT PUBLISHED PROW (PUBLIC RIGHT OF WAY) TO BE DEVELOPED AND ENFORCED.
- SEPARATION OF THE SITE FROM PUBLIC AREAS, CONTRACTOR TO TEMPORARILY FENCE SITE TO PREVENT PUBLIC ACCESS DURING WORKS AND ENSURE SAFE APPROPRIATE ACCESS GREEN FOR EXISTING SITE AREA (ON FOOT).
- RISK OF SEDIMENT POLLUTION WITHIN WATERCOURSE. APPROPRIATE SEDIMENT MANAGEMENT PLAN TO BE DEVELOPED AND ENFORCED TO PREVENT SILT SEDIMENT INTO THE CHANNELS. THIS SHOULD BE IN ACCORDANCE WITH PPG5 AND PPG6.
- THE RIVER SHOULD BE CONSTRUCTED IN THE DRY AND THEN CONNECTED AT THE DOWNSTREAM END TO THE WATERCOURSE.
- SAFE SYSTEM FOR EXCAVATING AND CONSTRUCTING AROUND EXPOSED POWER LINES AND BURIED SERVICES WITHIN THE VICINITY OF THE WORKS TO BE DEVELOPED (SEE ITEM 10).
- ARRANGEMENTS FOR THE INSTALLATION AND MAINTENANCE OF ANY TEMPORARY PLANTING DETAILS TO BE DEVELOPED AND ENFORCED UNTIL PRIOR TO WORKS TAKING PLACE.
- A FEW LONG, OF FACIAL, CUTTINGS WERE FOUND IN THE TRIAL PITS AND TRUE APPROPRIATE PITS NOTED TO BE WORN BY ALL STAFF WORKING IN PITS, INCLUDING [WORDS ILLEGIBLE].
- SAFE WORKING PRACTICES REQUIRED TO WORKING ADJACENT TO ANTICIPATED MUD TO APPROX.
- CONFINED SPACE RISKS OF DEEPER CHANNEL STRUCTURES - AVOID LOADING THE GROUND ADJACENT TO THE SIDES OF THE STRUCTURE [ILLEGIBLE].
- SOFT GROUND BETWEEN THE CONCRETE FLOOD BUND AND ADJACENT CHANNEL - EXCAVATE LOOSE / SOFT MATERIAL PRIOR TO CONSTRUCTION OF CONCRETE WALL AND PROVIDE A CONCRETE SURFACE AND ADEQUATE SUPPORT OF THE WALL WITH GRANULAR FILL AND ASSESSED [ILLEGIBLE].

MAINTENANCE/CLEANING

- BANK CHANNEL ADJUSTMENT IS EXPECTED POST-CONSTRUCTION. THIS IS NOT EXPECTED AND SHOULD NOT BE A CAUSE OF CONCERN. THE LEVEL OF ADJUSTMENT (EROSION OR DEPOSITION) UPSTREAM OF THE FLOOD BUND WILL NEED TO BE ASSESSED AND ADAPTIVE MANAGEMENT MEASURES PUT IN PLACE IF NECESSARY.
- PREVENTION AND ERADICATION OF ANY INVASIVE PLANTS THAT ESTABLISH WITHIN THE REMEDIAL CONSTRUCTION WORKS.
- STRIP AND REMOVE CHANNEL BEDS, BANKS, FLOOD CHANNEL BEDS
- WATER QUALITY IN RELATION TO RELEASE FROM BEDS WITHIN THE PARK AND APPROPRIATE CHANNELS TO BE UNDERTAKEN TO AVOID EROSION.
- OVER-TOPPING OF NON-ARMOURED FLOOD BUND RESULT IN EROSION OR BREACH. INSPECTION AND REPAIRS SHOULD BE IMPLEMENTED.
- CONDITIONS OF CRITICAL FOOTPRINTS AND LIMITATION.
- REGULAR INSPECTION AND CLEARING OF FLAP VALVES (GATES) AND [illegible] WITH TO MECHANICAL OR OTHER EQUIPMENT.

DECOMMISSIONING/DEMOLITION

N/A

It is assumed that all works will be carried out by a competent contractor working, where reasonable, to an approved method statement.

KEY

1. PROPOSED FLOOD BUND
2. EXISTING RIVER CHANNEL
3. RESTORED RIVER CHANNEL
4. PROPOSED PLANTING TO BOUNDARY
5. DISUSED TENNIS COURTS - SCRUB
6. PROPOSED IMPROVEMENTS AND RELOCATION OF ENTRANCE AT MALVERN AVENUE
7. PROPOSED TIMBER FOOTBRIDGE
8. PROPOSED HARD SURFACE FOOTPATH
9. EXISTING ENTRANCE FROM ALEXANDRA AVENUE WITH PATH REALIGNED
10. SECTION OF CHANNEL TO BE BACKFILLED

PROJECT BOUNDARY

Notes:

1. For Landscape General Arrangement Plans, refer to drawings 5138061-ATK-ZZ-ZZ-DR-L-1001 and 1002.
2. For Planting Proposals, refer to drawings 5138061-ATK-ZZ-ZZ-DR-L-2001 and 2002.
3. For Soil Grading, refer to drawing 5138061-ATK-ZZ-ZZ-DR-L-3001.
4. Refer to Tree Survey Schedule, Tree Survey and Tree Works drawings 5138061-ATK-ZZ-ZZ-DR-L-0001 and 5138061-ATK-ZZ-ZZ-DR-L-0002 for existing tree information. This drawing does not show locations of existing and proposed services and should be reviewed in reference to this information prior to construction.
5. For typical levels, flood bund and proposed river channel, refer to CIVIL Engineering drawings 5138061-ATK-ZZ-ZZ-DR-C-0001 to 0003.
6. Existing vegetation to be cleared in all areas of proposed seeding, planting, cutting areas unless shown otherwise. Clearance to be carried out in accordance with the specification.

SHEET 1
REFER TO DRAWING
5138061-ATK-ZZ-ZZ-DR-L-1001

SHEET 2
REFER TO DRAWING
5138061-ATK-ZZ-ZZ-DR-L-1002

Rev.	Date	Description	By	Check	Appd
C1	26/03/19	ISSUE FOR CONSTRUCTION	LG	GH	KS
P1	15/03/19	ISSUE FOR REVIEW	LG	GH	KS

Drawing Status: FOR CONSTRUCTION — Revision: A

ATKINS
Epsom Gateway
2 Ashley Avenue
Epsom
KT18 5AL
Tel: +44 (0)1372 726140
Fax: +44 (0)1372 740033
www.atkinsglobal.com

Client: Harrow Council LONDON

Project Title: NEWTON PARK

Drawing Title: LANDSCAPE OVERVIEW PLAN

Scale	Designed	Drawn	Checked	Authorised
1:1000	LG	LG	NH	KS
Original Size	Date	Date	Date	Date
A1	20/07/18	20/07/18	11/08/18	21/08/18

Drawing Number: 5138061-ATK-ZZ-ZZ-DR-L-1000 — Revision: C1

Description:

1. New ancient woodland trail footpath with signs and interpretation boards.

2. Improved entrances, signsboards and park feature signs.

3.Green reinforced permeable grass overflow car park.

4.Sedimentation pond to prevent silt deposition entering the ancient scheduled monument moat.

5. Reed beds to filter and improve the water quality entering the ancient schedule monument moat.

6. De-culverting 120m of river to improve flood risk in and around ancient schedule monument, barn.

7. New shed to store wet equipment used for pond dipping and nature/woodland walk activities.

8. Bridges to provide access for maintenance vehicles and access linking footpaths and woodland/river walks.

9. Pond dipping and access to water environment activities.

10. Additional theme playground equipment to align all of the new activities within the park.

11. Additional cocwell gravel circular footpath to improve and engage new power walkers.

12.Create swales at the edges directing run off into the river and/or wetland areas that can be included with earth bund flood defences around the river corridor where it might be possible to create some flood storage.

Harrow COUNCIL
LONDON

ENGINEERING SERVICES
ENVIRONMENT SERVICES

P.O. Box 56, Civic Centre, Harrow, Middlesex, HA1 2XA
Tel: 020 8863 5611
Fax: 020 8424 1047

Issued for: CONSTRUCTION

Revision	Details of Revision	Date	Initial
-	Issued for Information	-	NP

Project Title
Concept Plan for Headstone Recreation Park

Drawing Title
GENERAL ARRANGEMENT

Scale	Drawn	Checked
As shown	NP	MS
	Date: October 2015	

Drawing No. C15-002203

Revision -

Plan 1:1250

- END
- QUESTIONS ?

Road Runoff – How it impacts urban rivers – How can we reduce its impact

Olly van Biervliet and Moragh Stirling

South East Rivers Trust

Department for Environment Food & Rural Affairs

This Project was supported by Defra

What's in it?

All Rivers vs TSS	Aggregated Data p value	Aggregated Data Rho	Wandle p value	Wandle Rho	Beverly Brook p value	Beverly Brook rho	Hogsmill p value	Hogsmill rho	Brent p value	Mill Lane rho	p
Anticedent_Weather_Conditions	0.0003	0.5	NS		0.0043	0.76	0.0004	0.85			
Alkalinity_as_CaCO3_mgl	0.39531	-0.25	NS		0.85	-0.06	0.3197	-0.31			
Aluminium_Dissolved_ugl	0.04046	0.27	NS								
Aluminium_Total_ugl	0.000001	0.56	NS								
Ammoniacal_N_as_N_mgl	0.0005	0.32	NS								
Cadmium_Dissolved_ugl	0.1183	-0.1	NS								
Cadmium_Total_ugl	0.5184	0.24	NS								
Chloride_mg.l	0.3466	0.09	NS								
Chromium_Dissolved_µgl	0.0438	0.26	NS								
Chromium_Total_µgl	0.0098	0.47	NS								
Copper_Dissolved_ugl	0.002723	0.38	NS								
Copper_Total_ugl	0.0011	0.61	NS								
DOC_mgl	0.3882	0.18	NS								
E.coli_No.100ml	0.7055	-0.13	NS								
Lead_Dissolved_ugl	0.0131	0.44	NS								
Lead_Total_ugl	0.000001	0.68	<0.05								
Nickel_Dissolved_ugl	0.9531	0.23	NS								
Nickel_Total_ugl	0.9821	0.22	<0.01								
NitriteasN_mg.l	0.1024	0.21									
OrthoPhosphateP_mgl	0.3393	-0.06									
Phosphorus_Dissolved_ugl	0.5531	0.13									
Phosphorus_Total_ugl	0.6851	0.19									
Silicate_SiO2_mgl	0.8098	0.06	<0.01								
SuspendedSolids_mgl	NA	1									
TON_mgl	0.8544	-0.5									
Zinc_Dissolved_ugl	0.02812	0.29									
Zinc_Total_ugl	0.0071	0.51									

Row Labels	Value / mg kg^{-1}	Value / %
PAH		
Acenaphthene : Dry Wt		
Acenaphthylene : Dry Wt		
Anthanthrene : Dry Wt		
Anthracene : Dry Wt		
Antimony : Dry Wt	6.83	
Benzo (b + k) fluoranthene : Dry Wt		
Benzo(a)anthracene : Dry Wt		
Benzo(a)pyrene : Dry Wt		
Benzo(b)fluoranthene : Dry Wt		
Benzo(e)pyrene : Dry Wt		
Benzo(ghi)perylene : Dry Wt		
Benzo(k)fluoranthene : Dry Wt		
Chrysene : Dry Wt		
Coronene : Dry Wt		
Cyclopenta(cd)pyrene : Dry Wt		
Dibenzo(ah)anthracene : Dry Wt		
Fluoranthene : Dry Wt		
Fluorene : Dry Wt		
Indeno(1,2,3-cd)pyrene : Dry Wt		
Naphthalene : Dry Wt		
Perylene : Dry Wt		
Phenanthrene : Dry Wt		
Pyrene : Dry Wt		
Metals		

Why is it important?

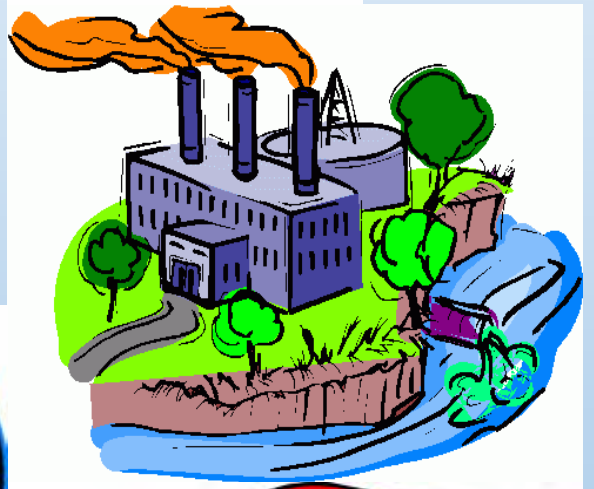
physical effects, cementation, suffocation, poor egg survival

biological effects, metal contamination, high PAH concentrations, genetic defects, poor egg survival, concentration up the food chain

Student Projects: Impacts on the river and their communities

Student	University	Project aim	Key findings
Michael Brierly		Characterising riverbed and road runoff sediments in the River Wandle	Grain size analysis of riverbed and runoff sediments indicated runoff was the likely dominant source of sediments in the Wandle and that fine sediments <63um had the closest relationship with concentrations of both metals and PAHs.
Lilly Chan	KCL	Comparative bioaccumulation of metals in *Gammarus* in urban and rural streams	Accumulation or Cd and Pb in tissues were similar in urban and rural streams . Accumulation Cr and Cu in tissues were approx. double in urban over rural streams. (Butterhill lower in Cu)
Melanie Weston	QMUL	Significance of 'First Flush' on sediment and water quality in the River Wandle	Water: Trace metals (Al, Cd, Cr, Cu, Pb, Ni and Zn) exceed WFD guidelines during first flush events and can be elevated to concentrations 10x the recommended guidelines Sediment: The mean metal concentrations for Cd, Cu, Ni, Pb and Zn all exceed the lowest effect level; Cu and Pb exceeded the severe effect level.

Urban runoff: Where does it come from?



Images courtesy of clipartpanda.com

The problem… Is it really that bad?

Before Rain…

10 minutes later

What about dilution?

Shouldn’t we be doing something?

Three strands involved coordinating citizen scientists and university based Masters Students to address source, pathways, receptors and impacts

How can we start to tackle this problem?

- In these studies, volunteers delivered repeat sampling of 14 outfalls across London at key times during rainfall events.
- Citizen scientists can often respond quickly and sample as rainfall starts.
- These projects can engage and inform a community about the problems linked to road runoff.

Water sampling can be fun!

How can we make a real difference?

HOW

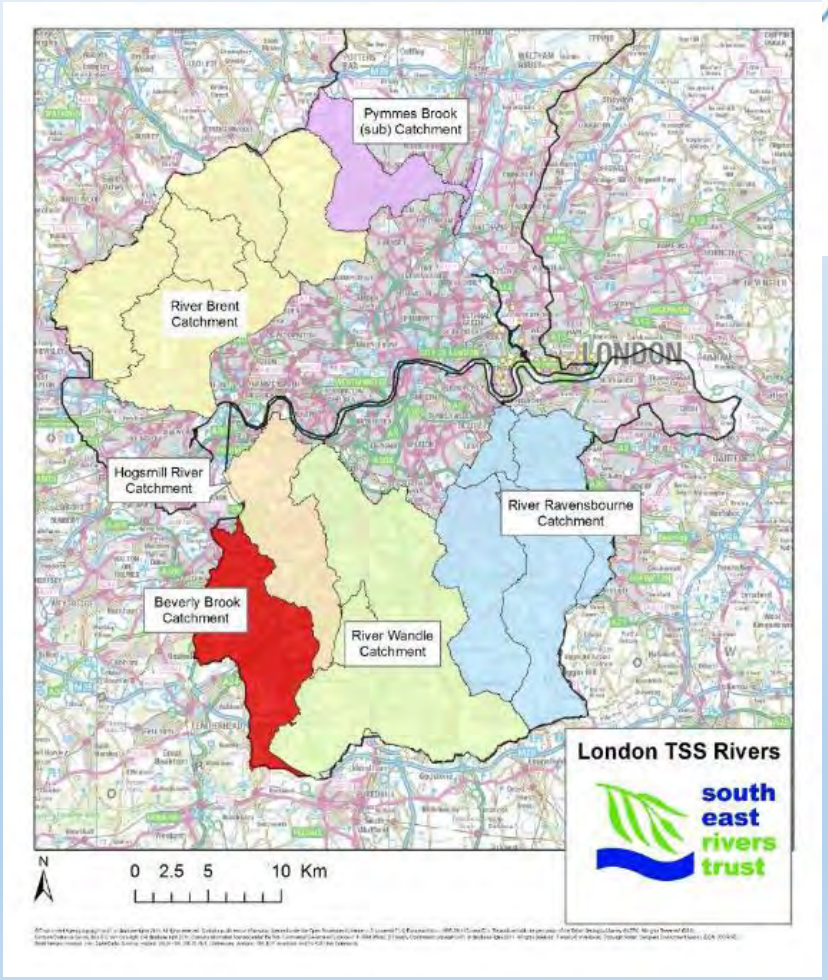
Using data from multiple sample locations distributed across six rivers in London, determine if Total Suspended Solids can be a low-cost proxy for key contaminants in road runoff.
Samples were analysed for a suite of pollutants – expensive!

WHERE

Rank Surface Water Outfalls in terms of their pollution risk.
During this stage, lab analysis only included TSS, representing a significant cost saving.

WHAT

Work with Masters students to assess the impact of urban runoff on rivers and evaluate the available techniques and technology designed to interrupt the 'source ⟹ pathway ⟹ receptor' chain.



Prioritising Outfalls

Site	Grid reference	Anticedent Rain score	Date	Upstream TSS / mg/l	Direct TSS / mg/l	Downstream TSS / mg/l	Priority Outfall
Hogsmill							
SWO A240 Rock Ramp Outfall	TQ 20361 65120	3	15/04/2016	11	59	21	
SWO A240 Rock Ramp Outfall	TQ 20361 65120	4	18/05/2016	< 5.0	320	180	
SWO A240 Rock Ramp Outfall	TQ 20361 65120	Not recorded	08/06/2016	170	71	240	Yes
A3 Rock Ramp Outfalls	TQ 20467 66956	4	18/05/2016	25	21	33	
A3 Rock Ramp Outfalls	TQ 20467 66956	4	08/06/2016	160	180	200	
Beverly Brook							
A3 Crossing Richmond Park	Downstream TQ 21445 72379	4	18/05/2016	11		< 5.0	
A3 Crossing Richmond Park	Upstream TQ 21478 72327	4	31/05/2016	260		240	
Wimbledon Common Ditch either side of A3	Downstream TQ 21383 71250 UpstreamTQ 21314 71225	4	31/05/2016	270		360	Further investigation needed
A3 Crossing Beverley Court	Downstream TQ2180270069 Upstream TQ2185169818	4	31/05/2016	160		140	
A3 Crossing PC World Downstream	Downstream TQ2180270069	4	23/05/2016	110		160	
A3 Crossing PC World Downstream	Upstream TQ2221667664		31/05/2016	47		64	
Outfall near Roehampton Gate	TQ 21108 74006	4		< 5.0	< 5.0	31	
Wandle							
Beddington Bridge Outfall	TQ 29250 65284	4	10/05/2016	12	96	55	
Beddington Bridge Outfall	TQ 29250 65285	4	23/05/2016	9	210	32	Yes
Beddington Park Dogleg Outfall	TQ 29250 65284	3	10/05/2016	6	25	32	
Beddington Park Dogleg Outfall	TQ 29250 65284	4	23/05/2016	9.5	< 5.0	< 5.0	
Hackbridge Outfall	TQ 28137 65819	3	10/05/2016	< 2.0	41	24	
Hackbridge Outfall	TQ 28137 65819	4	18/05/2016	5	280	49	
Hackbridge Outfall	TQ 28137 65819	4	31/05/2016	72	74	88	Yes
Brent							
Tokyngton Recreation Ground	TQ 20287 85510	4	07/06/2016	17	130		
Tokyngton Recreation Ground	TQ 20287 85510	3	12/06/2016		120	15	Yes
Priestly Way	TQ 22518 87369	4	07/06/2016	2.5	5		Further investigation needed
Priestly Way	TQ 22518 87369	3	12/06/2016	12	16	38	Yes
Stonebridge	TQ 19903 84324	3	12/06/2016	41	22	6.5	Further investigation needed
Brent Street	TQ23932 88446	3	12/06/2016	2.5	7.5		Further investigation needed
Brent Cross	TQ23090 87691	3	12/06/2016	5.5	50	2.5	

So – What can we do? : Habitat Enhancements

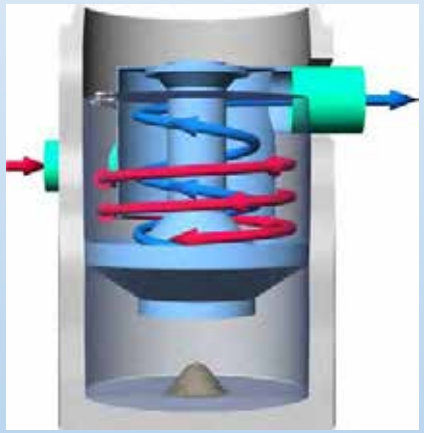
Sustainable urban drainage

silt pond &constructed wetland

Restoration re-meandering

So – What can we do? : Commercial technology

Mycofiltration bags



Downstream Defenders

Siltex

Smart Sponges

What works, when and how?

Mycofiltration bags

Smart Sponges

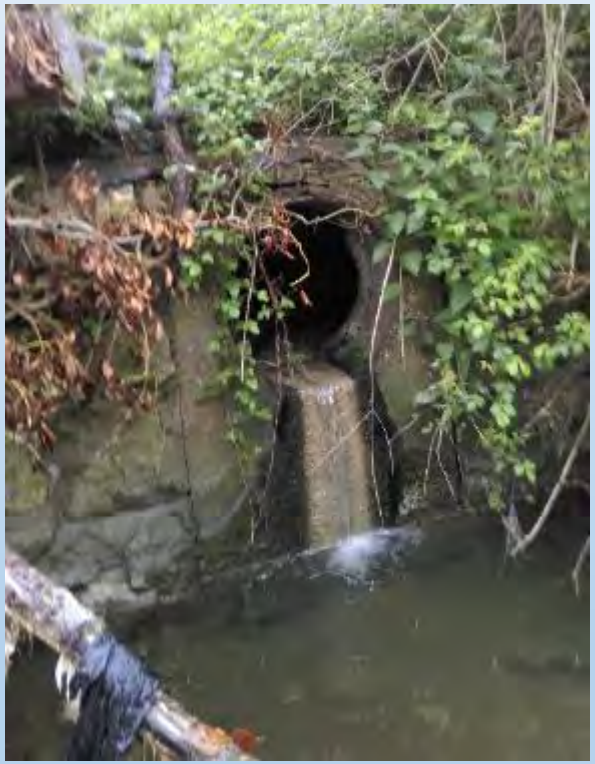
Downstream Defenders

Siltex

Student Projects: Evaluating methods

Student	University	Project aim	Key findings
Greg Corcoran	QMUL	Pre and post restoration sediment contamination, gravel colmation and spawning habitat in the River Wandle .	Ni, Sr & Zn lower but Cd higher post restoration. Redds all located U/S of outfalls where restoration works have increased the flow resulting in better gravels, less infiltrated with fines and sand. Increased connectivity giving access to U/S restored reaches will improve spawning success.
Neville Harris	Brunel	Efficiency of Smart Sponges for the removal of PAH from storm water runoff	Careful installation is essential to maintain any effect. Limited evidence of removal of PAH overall.
Layla Mutta Al-Mousili,	QMUL	Effectiveness of a Constructed wetland in mitigating against the effects of urban runoff	
Rebecca Jennifer Anne Demetriou	QMUL	Effects on sediment characteristics, and geomorphology of Richmond Park river restoration	

Questions ? or maybe - Lunch !



Before Rain…

10 minutes later…

Baseline Proposal for 2017 Onwards

All base data and plots available for CC teams and others to review

Monthly sampling funded to April 2017 (3 years total) and RMI to 2019

Year 3 report in summer 2017

Proposal for sampling to continue to 2020 (end of AMP6)? Quarterly?

This will need funding – approx. £6k/annum + TW lab costs

TW and EA reviewing 2016 Outfall Safari data – next safari in 2019?

Steering group meetings at regular intervals

Potential Additional Work Areas

CC teams liaise with TW re: SWOP outfalls – esp. upper reaches

Improvement of the middle reaches as a key objective for CVP

Team to liaise with Colne VP and TW/EA re: Colne STWs and P

Diurnal DO investigation – a possible University led project?

Ammonia Peaks – EA and TW?

Road run-off investigation – pilot study possible subject to funding

Public engagement – Yellow Fish? Art and Outfalls project by SWLEN?

These and/or Others? CC Team Projects? Discussion