



## River Pinn & Ruislip Woods

# Flooding Issues – Does the Geology have an influence?

Report of a site meeting on  
24 November 2021

# OVERVIEW

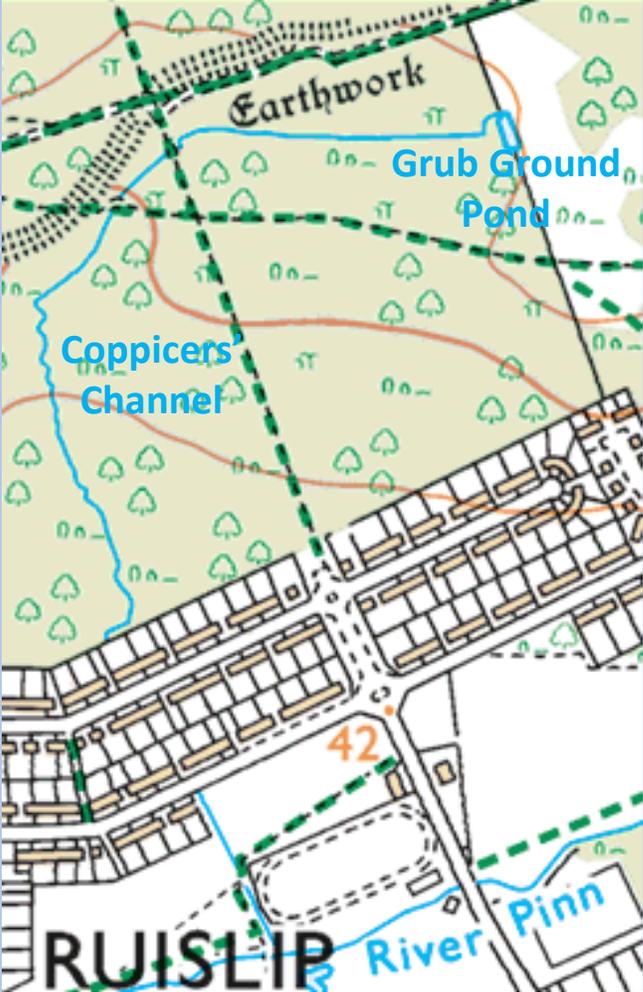
- The Ruislip – Park Wood and Pinn Meadows Flood Partnership, which consists of the groups and organisations shown below, are working together to understand the causes of flooding in the area and to identify effective solutions to reduce the risk in the future.



- Is an organisation cleaning and improving London's waterways and has also been involved.

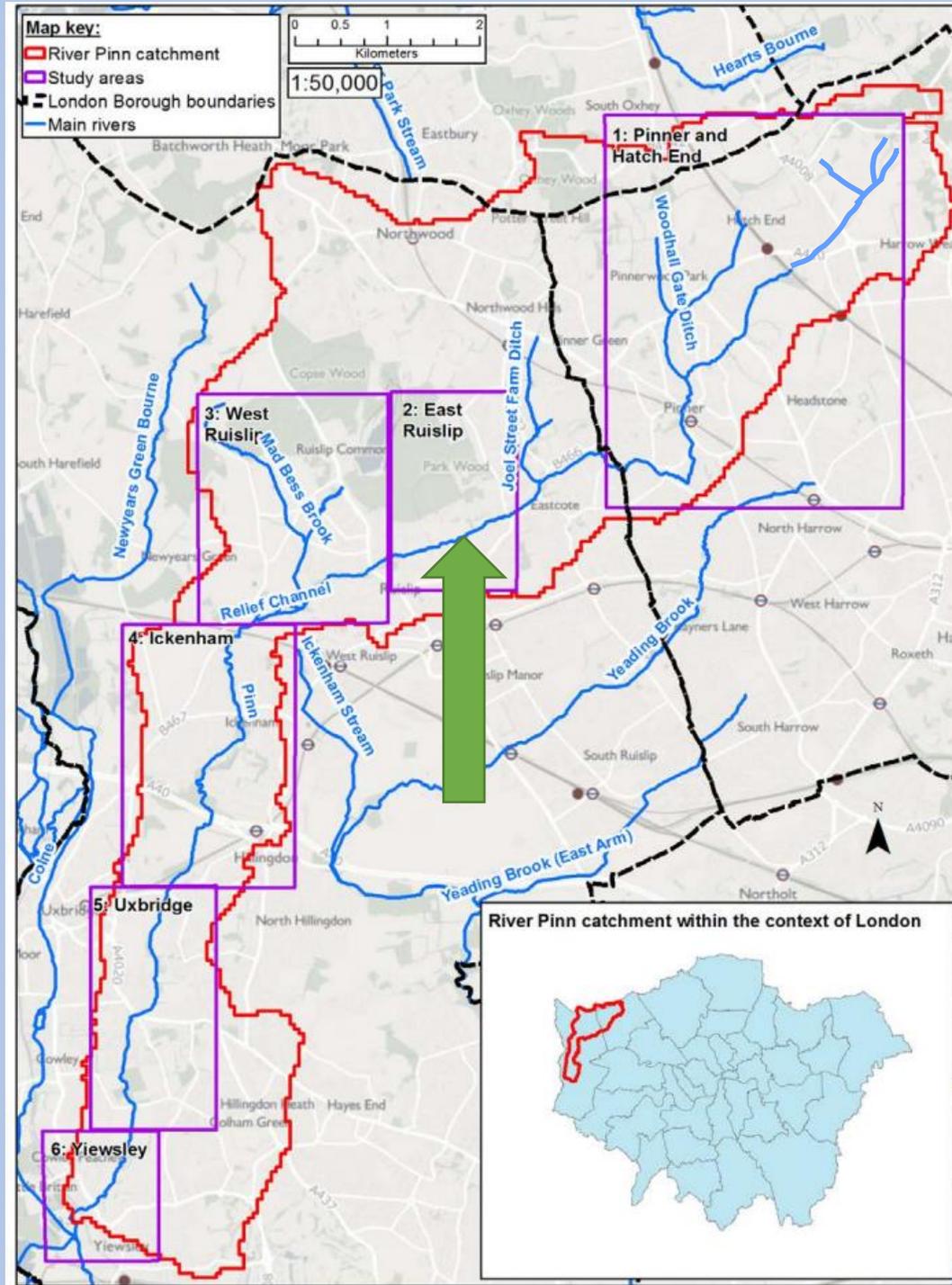
- The geology and hydrology of Park Wood and the River Pinn may influence the occurrence of flooding events on the Pinn Meadows, adjacent roads and properties after prolonged wet spells or very heavy downpours.
- In 2021, a resident involved in the project contacted the Harrow and Hillingdon Geological Society to seek advice on geological factors which might contribute towards the flood risk. Two HHGS members attended a site meeting which took place in November 2021.

# Location Map



# River Pinn Catchment and Flood Study Areas

Park Wood and the Pinn Meadows are within the **East Ruislip** Flood Study Area



Source: River Pinn flood reduction project – Consultation response report (Environment Agency, Spring 2018)

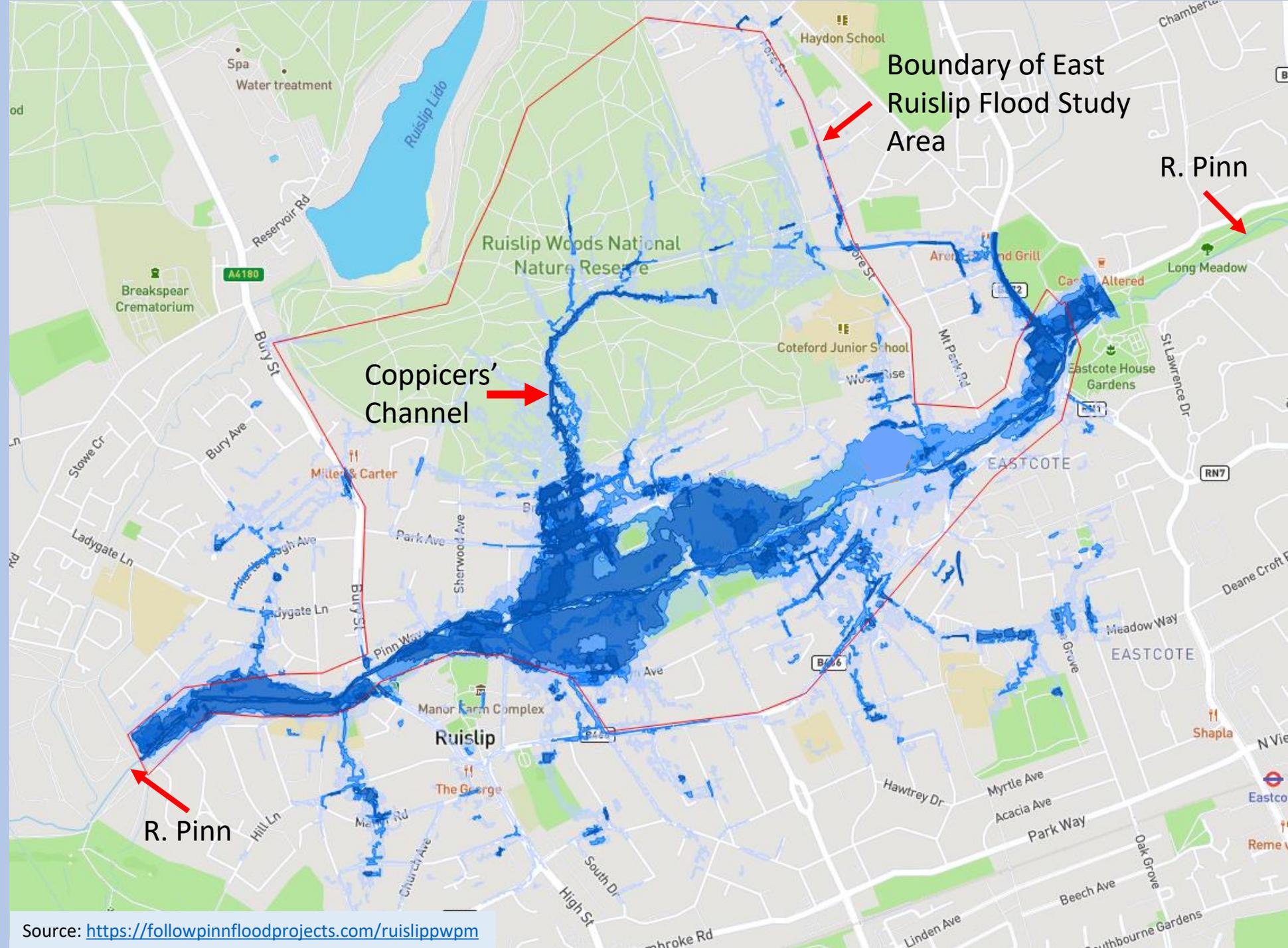
In: [followpinnfloodprojects.com](http://followpinnfloodprojects.com)

# Current flood risk in the East Ruislip F. S. Area

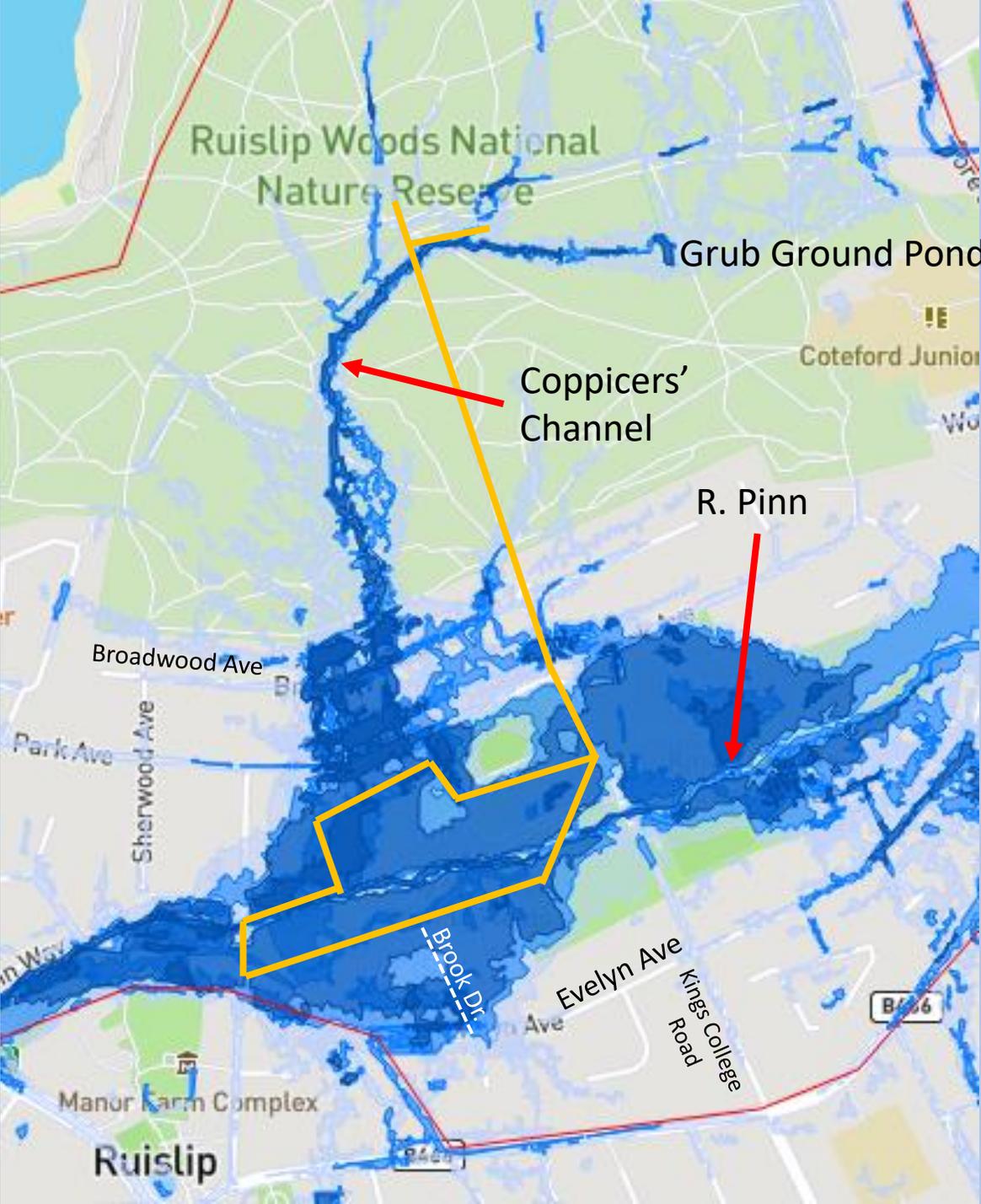
Darker blue = Higher Risk

Channel narrowing and greater run-off in the catchment has increased the flood risk.

Sources:  
Pinn Flood Projects website & Pinn Meadows Mgt Plan (LB Hillingdon)



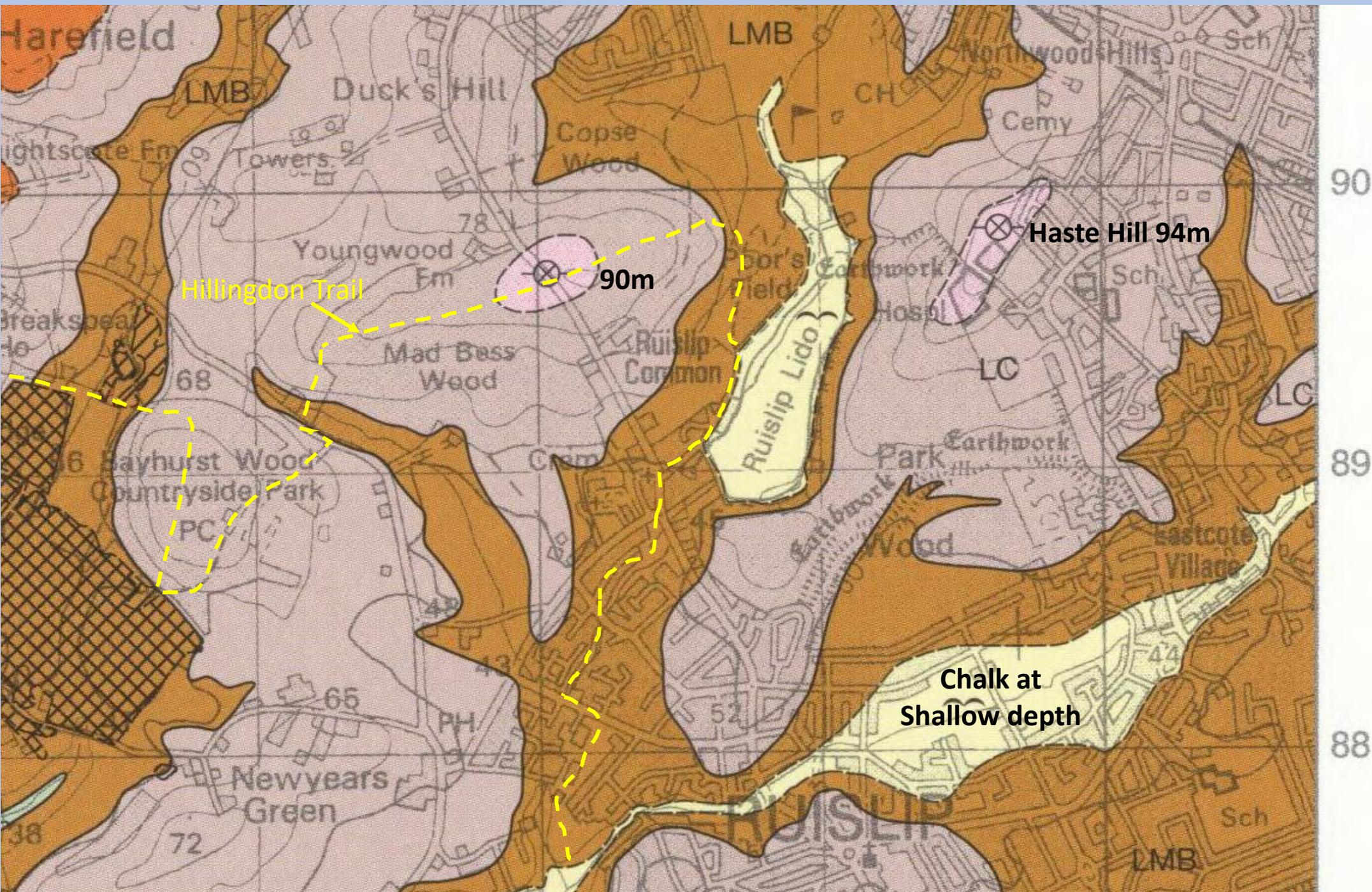
Approximate walking route on  
24 November 2021  
(orange line)



# Local Geological map

(Part of BGS\* 1:50,000 Sheet 255)

- Key:
- LC = London Clay
  - LMB = Lambeth Group
  - Yellow = alluvium
  - Pink = Sand & gravel of unknown age or origin
  - Tile red = Gerrard's Cross Gravel
  - Hatched areas = Disturbed ground
- \*British Geological Survey

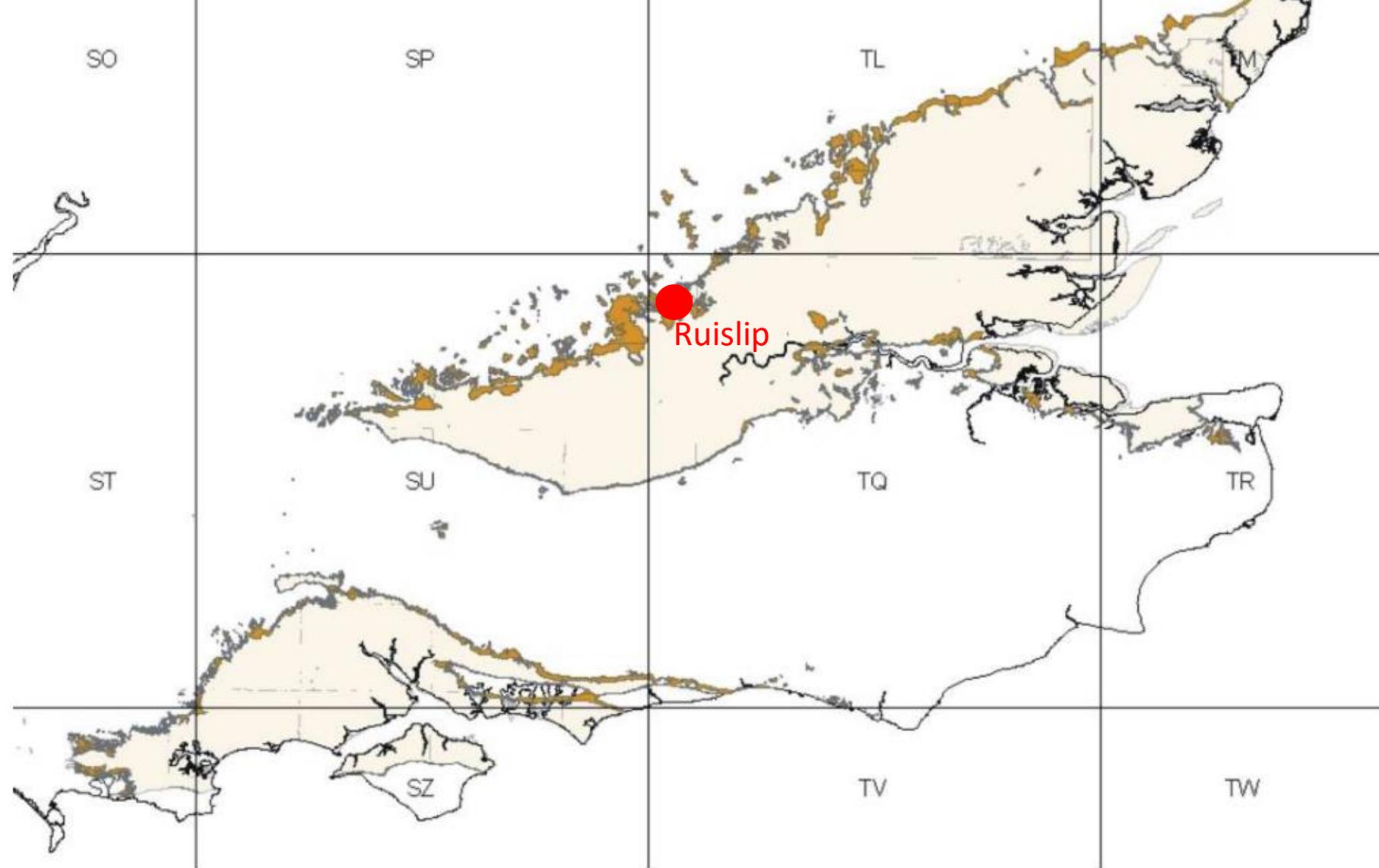


# Distribution of the Lambeth Group

(Formerly 'Reading and Woolwich Beds')

Now has 3 main subdivisions:

Reading Formation  
Woolwich Formation  
&  
Upnor Formation  
(Formerly 'Bottom' or 'Basement Bed')

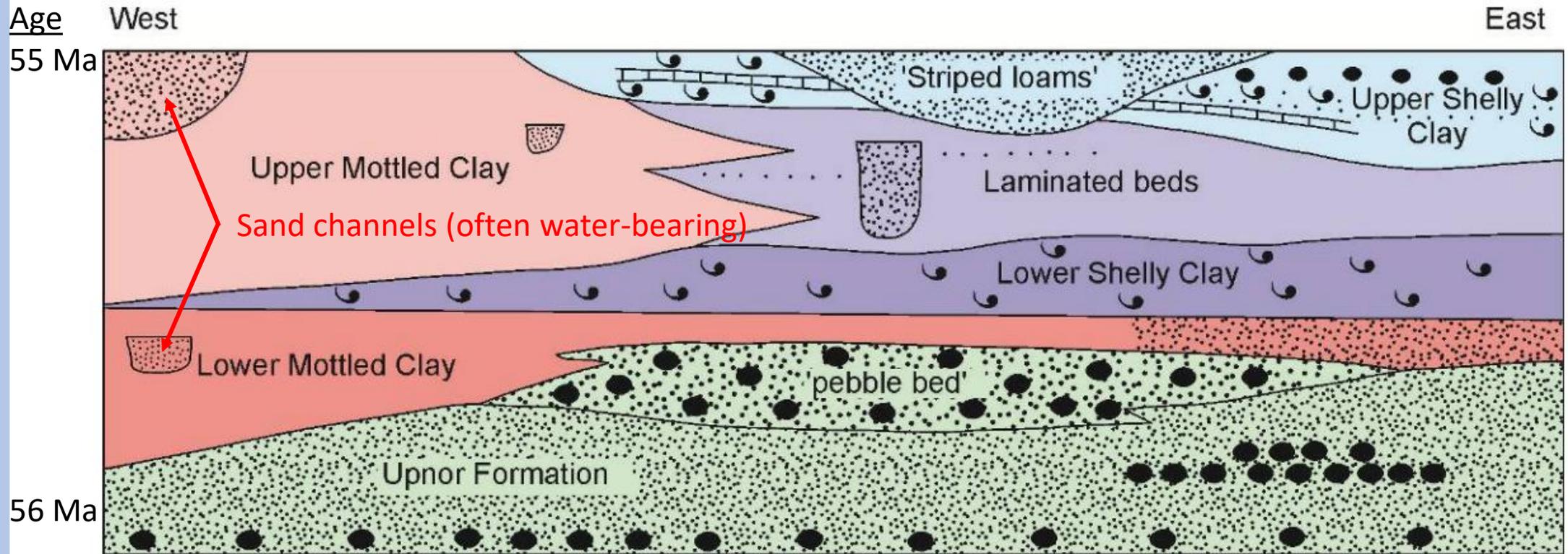


## Key

-  Lambeth Group
-  Lambeth Group sub crop

Source: Entwistle et al. 2013. *The Engineering Geology of British Rocks and Soils – Lambeth Group* (British Geological Survey)

# Schematic diagram of the Lambeth Group in London



Lithostratigraphical units		
Formation	Unit	
Woolwich	Upper Shelly Clay	
	Laminated Beds	
	Lower Shelly Clay	
Reading	Upper Mottled Clay	
	Lower Mottled Clay	
Upnor		

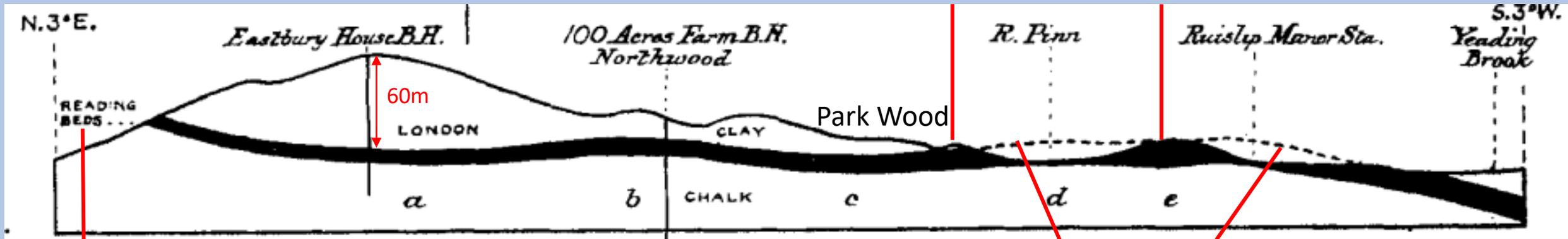
Principal lithologies	
	clay
	sand
	shelly beds
	gravel beds
	limestone

One of its engineering risks is 'complex groundwater issues and pressures' (Skipper J A *et al.*, 2015)

Diagram modified from: Ellison R A (2004). *The Geology of London. Special Memoir for 1:50,000 Geological sheets covering the London area (British Geological Survey).*

# Geological cross-section through the area (Herts boundary-Yeading Brook)

Now Northwood HQ      Now Sovereign Court  
A404, Northwood Hills      Wood Rise      Windmill Hill



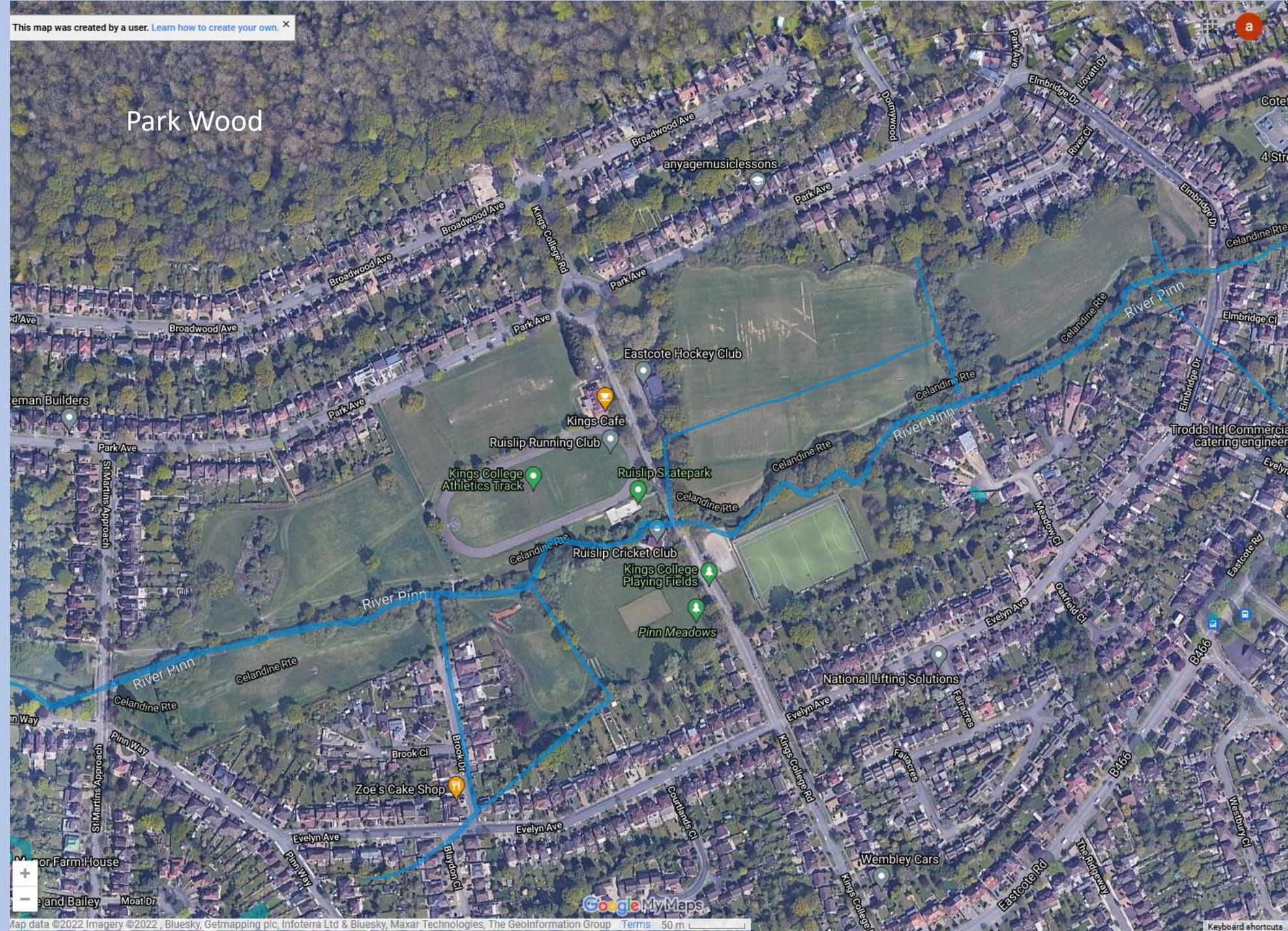
Now Lambeth Group  
(Reading Formation & Upnor Fm  
in the western London Basin)

Former thickness of  
Lambeth Group

The sandy Harwich Formation (formerly the 'London Clay Basement Bed')  
can throw out springs at its junction with the mottled clay of the LMG

Modified from Hester, S W (1941). A contribution to the geology of North-West Middlesex. *Proceedings of the Geologists' Association*

The Pinn and associated watercourses as marked on a 1914 OS superimposed on an aerial view of Pinn Meadows.

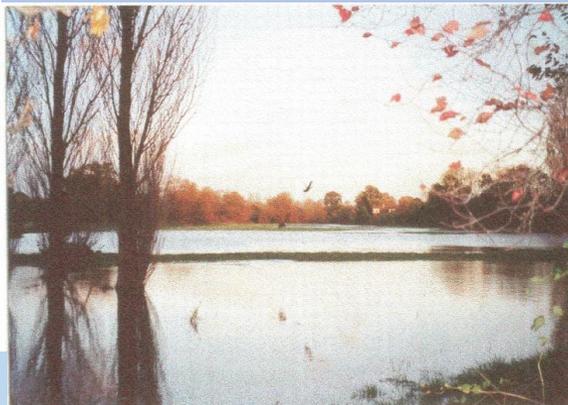


Source:  
<https://baldideas.com/2021/05/19/resurrecting-the-river-pinn/>

# Examples of flooding events



St Martin's App./Pinn Way Jn (8.1977)



King's College Playing Fields  
(Winter 2000/01)



King's College Playing Fields (2.2007)



King's College Road (2.2007)



Pinn Meadows (11.2009)



Park Avenue (23.6.2016)



Brook Drive (23.6.2016)



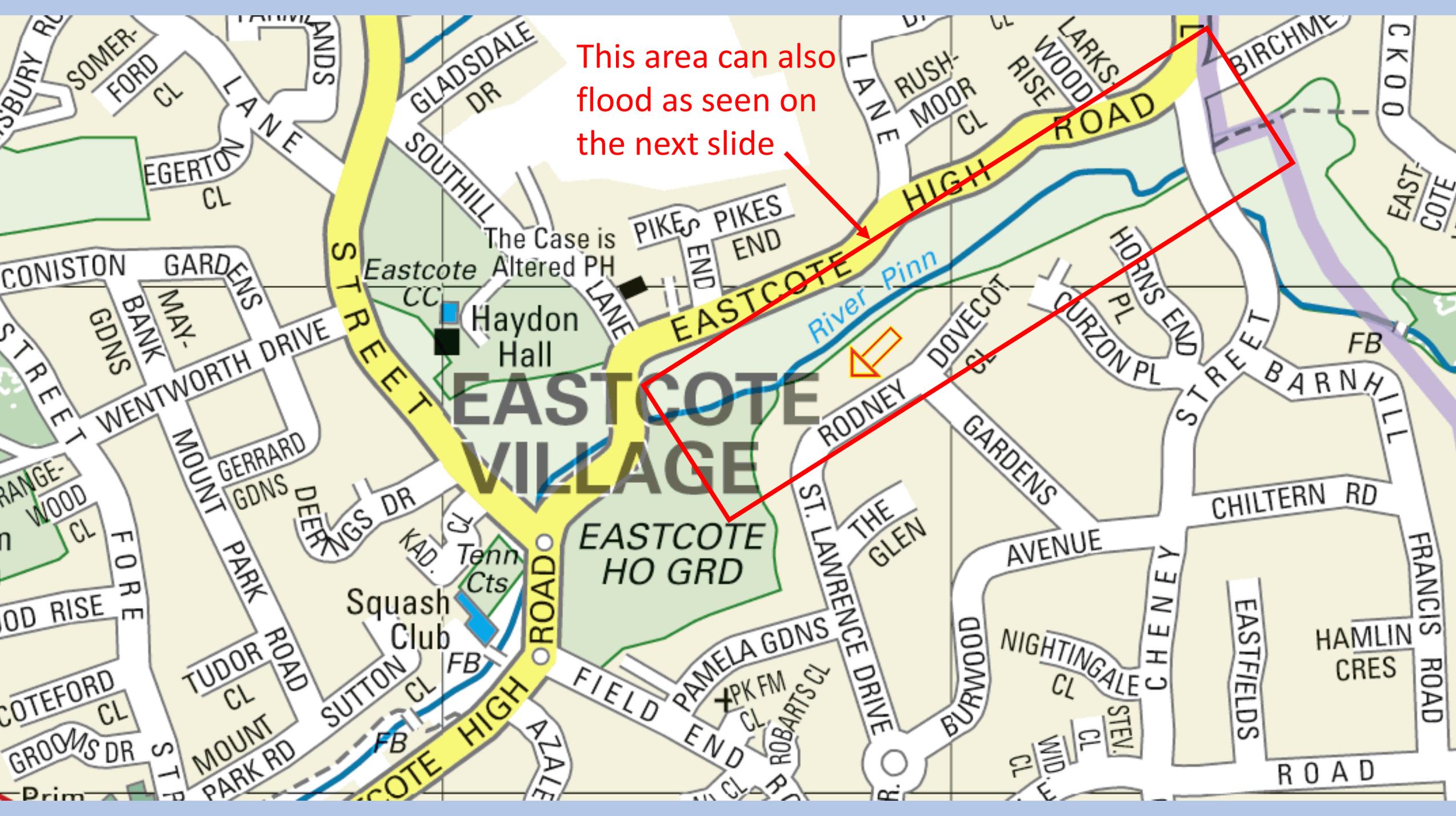
Brook Drive  
(9.2019)



Brook Drive  
(10.2019)

Flooding of Pinn Meadows also occurred in Feb 2014

Source: *Pinn Flood Projects website*



This area can also flood as seen on the next slide

# EASTCOTE VILLAGE

EASTCOTE HO GRD

River Pinn

Squash Club

Haydon Hall

Eastcote CC

The Case is Altered PH

PIKES END

HIGH ROAD

STREET

ROAD

STREET

ROAD

# Further examples: Eastcote, July 1984

Long Meadow  
near Eastcote  
House Gardens



Rodney  
Gardens

Bungalows nearest the  
Pinn have flood cellars

*Photos: Sandi Shallcross*



Bridleway

Public Footpath

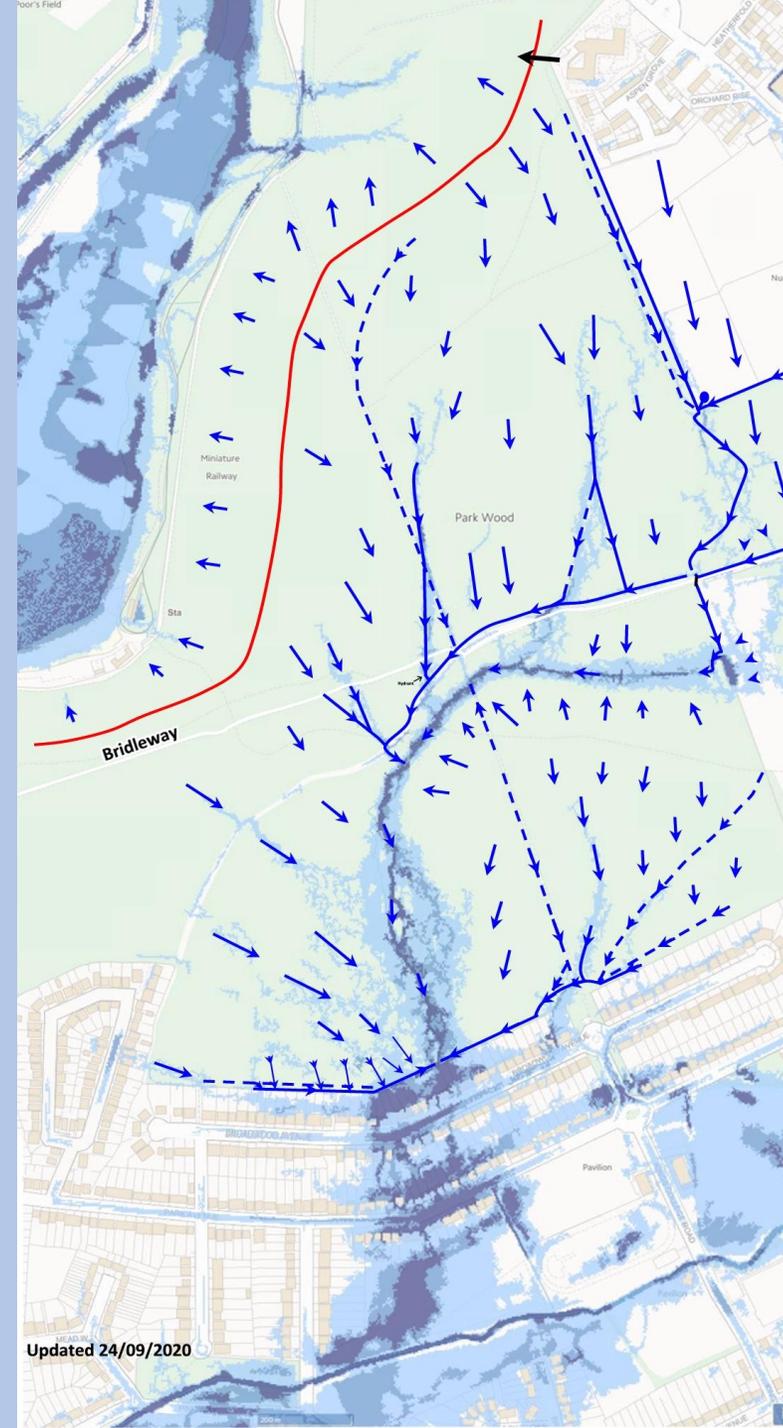
Public Footpath

Park Wood

Photo: Liz Chiu

# Watercourses and surface water flow directions in Park Wood

Several flows follow paths

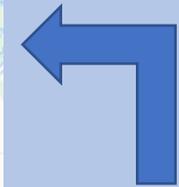
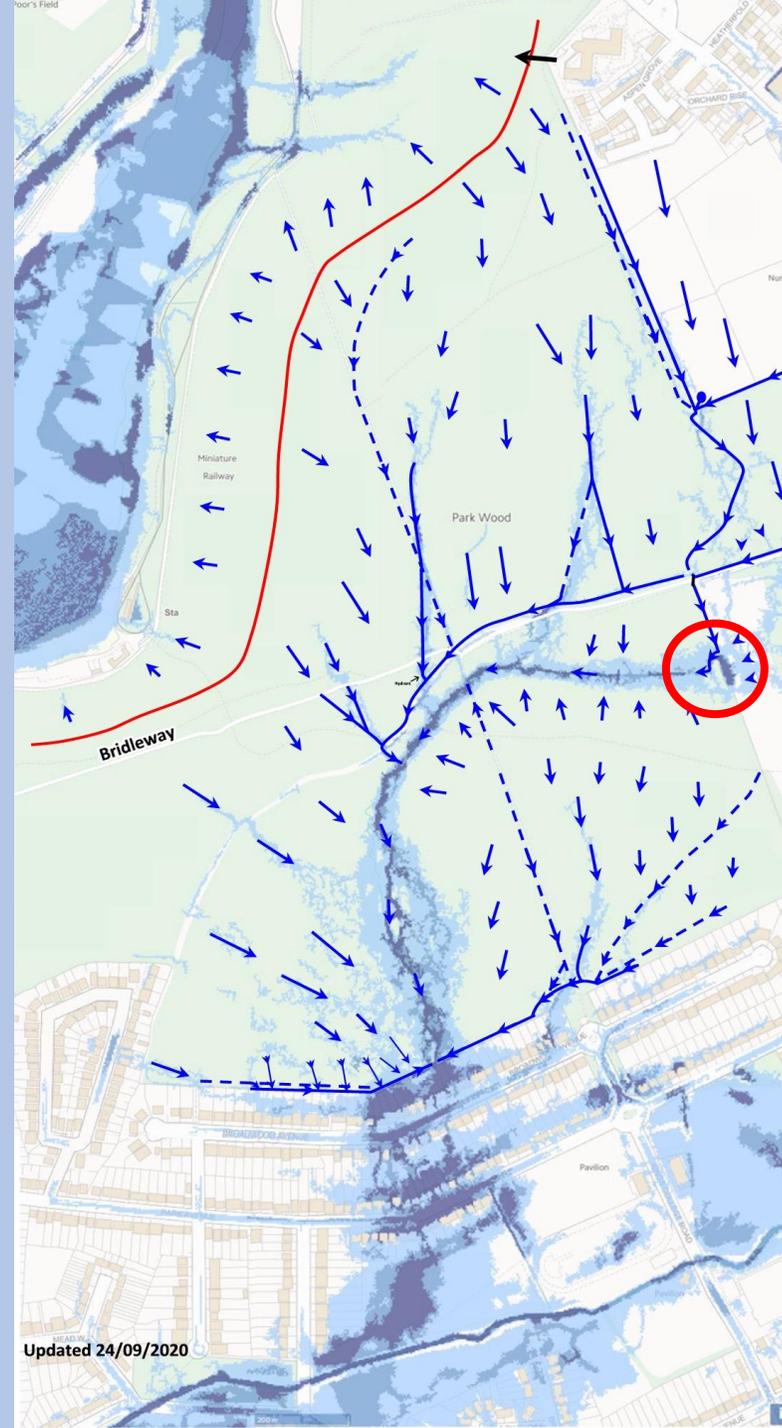


# Watercourses and surface water flow directions in Park Wood



Photo: Liz Chiu, 31.1.22

Grub Ground Pond



Grub Ground Pond

The Coppicers' Channel exits this pond which is probably fed by springs

**Park Wood –  
gravel surface**  
with impermeable  
matrix (sandy clay)

Considered partly  
responsible for  
increased run-off  
from the woodland  
into properties and  
Pinn Meadows.

The extent of the  
gravel is to be  
determined.



# The Park Wood gravel in more detail - 1

The pebbles are in a matrix of firm sandy clay and are mainly of flint.



It is unclear whether the gravel is a superficial deposit or is part of the bedrock.



The trowel is 23.5 cm long

# The Park Wood gravel in more detail - 2

The first geological survey of NW Middlesex was published in 1861 as part of the 'Beaconsfield' map. Several resurveys and revisions have been carried out, most recently in 2002. Hester (1941)\* of the Institute of Geological Sciences (predecessor of BGS) classified the gravel as 'superficial deposits'.

Nearby Haste Hill (94m) is capped by Quaternary gravel of 'unknown age and origin' (BGS). These photos were taken at c. 50m OD about 1 km SW of the summit. The assignment of the gravel in Park Wood is uncertain, with three possibilities:

1. It is indeed a superficial deposit which has migrated downhill by solifluction; this occurred during cold climate conditions by freeze-thaw action
2. It is a local horizon within the Lambeth Group
3. It is within a thin unmapped development of the Harwich Formation (overlies the LMG).

(3) is included because the gravel was seen near the boundary between the Lambeth Group and the younger London Clay Formation – the Harwich Fm used to be known as the 'London Clay Basement Bed'.

Mapping and clast analysis may help establish where the gravel belongs.



This view shows a group of much larger clasts – sarsen?

\*A contribution to the geology of North-West Middlesex by S W Hester (*Proc. Geol. Ass.*).



# Park Wood gravel in flood conditions following a summer storm

*Photos: John Scrivens (23.6.2016)*

The storms affected much of the London area that day.



# Block of cemented gravel found close to the Coppicers' Channel

It's most likely to be **ferricrete** (i.e., cemented by iron oxide)

Found in Park Wood near the main footpath from Broadwood Avenue.

The matrix consists of sharp sand to small gravel.



*Photo: John Scrivens*

# Coppicers' Channel (dry)

Section looking E about 50m E  
of the main footpath from  
Broadwood Avenue.

November 2021 was much  
drier than average with only  
8.5mm of rain at Northolt  
(normally 67mm).

(meteostat.net)



# Leaky dam, Park Wood

This has been built across a tributary of the Coppickers' Channel. It is designed to reduce the downstream flood peak by temporarily storing water by holding it back within the stream's channel or encouraging it to spill onto the banks behind the barrier and thus slow the flow.



# Location of the leaky dam

It is one of 40 within  
Park Wood  
(as of January 2022)





However, as mentioned, water can also flow along footpaths, such as here after the storm of 23 June 2016.

Several paths have been compacted by high footfall, increasing run-off.

# Pinn Meadows

Showing drainage ditches, ponds and former watercourses



Park Wood

Coppicers' Channel

Broadwood Ave

Culvert

Park Ave

Dipping Pond

Pond

Brook Dr

Evelyn Ave

R. Pinn

R. Pinn



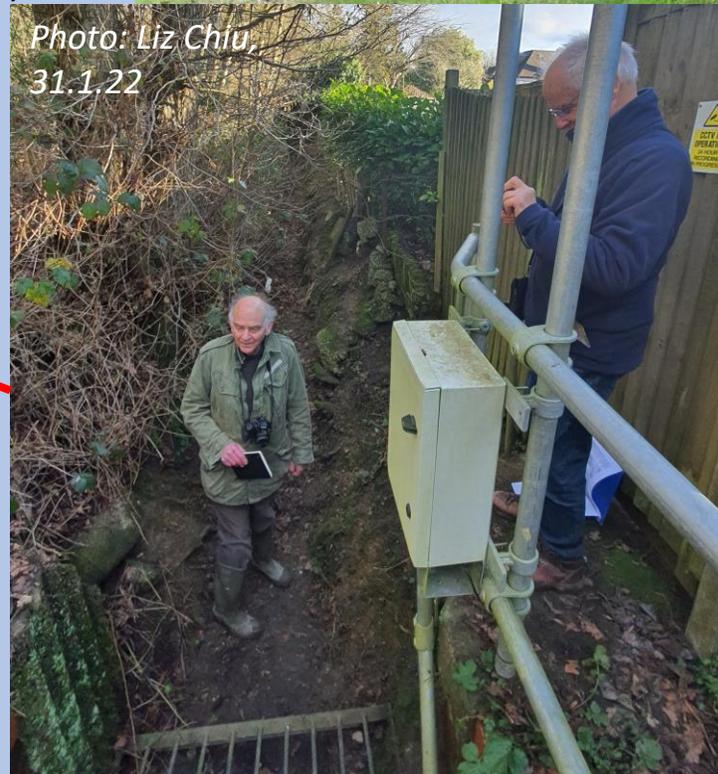
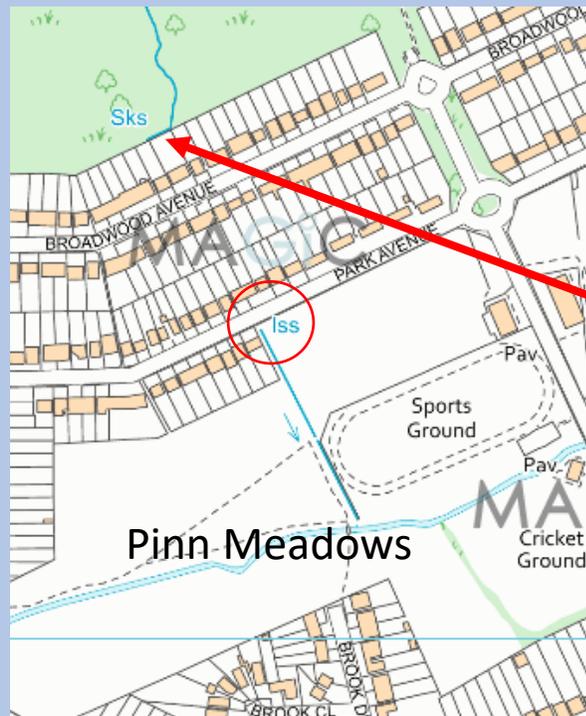
# Drainage ditch ('Elma's Ditch') carrying water from a culvert under Broadwood & Park Avenues

This is water draining from Park Wood and connects with the Coppicers' Channel. The picture location is marked as 'Iss' (issue) on the 1:10,000 OS map ('Sks' = 'Sinks').



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# E-W drainage ditch parallel to Park Avenue

This ditch, alongside back gardens, can overflow after heavy rain. Seen after a dry November.



24.11.2021

Iron oxide ('chalybeate') staining in the ditch, indicating probable seepage from the Lambeth Group. It occurs only in certain places within the ditch, suggesting spring locations.



*Photo: John Scrivens (29.11.2020)*

# Pond and N-S ditch near Park Avenue rear gardens

The pond is widely known as 'The Dipping Pond' and it was built in 2016 to improve drainage and encourage biodiversity

Part of the pond. It is fed by a drainage ditch at right-angles to that in the previous slide.



Iron oxide staining in the ditch feeding the pond.



*Photo: John Scrivens, 11.2020.*

24.11.2021

# Further examples of iron oxide staining

Outflow into the Pinn from the N bank  
c.120m E of St Martin's Approach bridge.



Outflow into the Pinn (N bank) from a tree-lined ditch (Elma's Ditch) in the background.



The ditch connects with the Coppicers' Channel.

# Bacterial film on water surface in drainage ditch

The film is most likely produced by iron-loving bacteria (looking N towards the Pinn).



The same ditch looking S. The houses are on Pinn Way and St Martin's Approach.



Part of 1<sup>st</sup> phase of works by Hillingdon Council to create more space for water on the floodplain

# Recently enlarged drainage ditch

The ditch is on the S bank of the Pinn.  
Bacterial film is again evident.



The same ditch looking N. The banks of  
the Pinn are seen top right.



Both photos taken c. 120m E of St Martin's Approach

Watercourse shown  
on previous two  
slides discharging  
into the Pinn



# Features near Brook Drive

Brook Drive is aligned over a former water channel shown on pre-1930s OS maps. This drainage ditch (looking W) is alongside the northernmost property boundaries of the road, a cul-de-sac.



Recently made pond for excess water storage.





# The End

## Acknowledgements:

Many thanks to all who supplied photographs, illustrations, and local knowledge both online and in the field.