APPENDIX 1

Hampstead Fleet Stream Management Work Plan

Adrian Brooker

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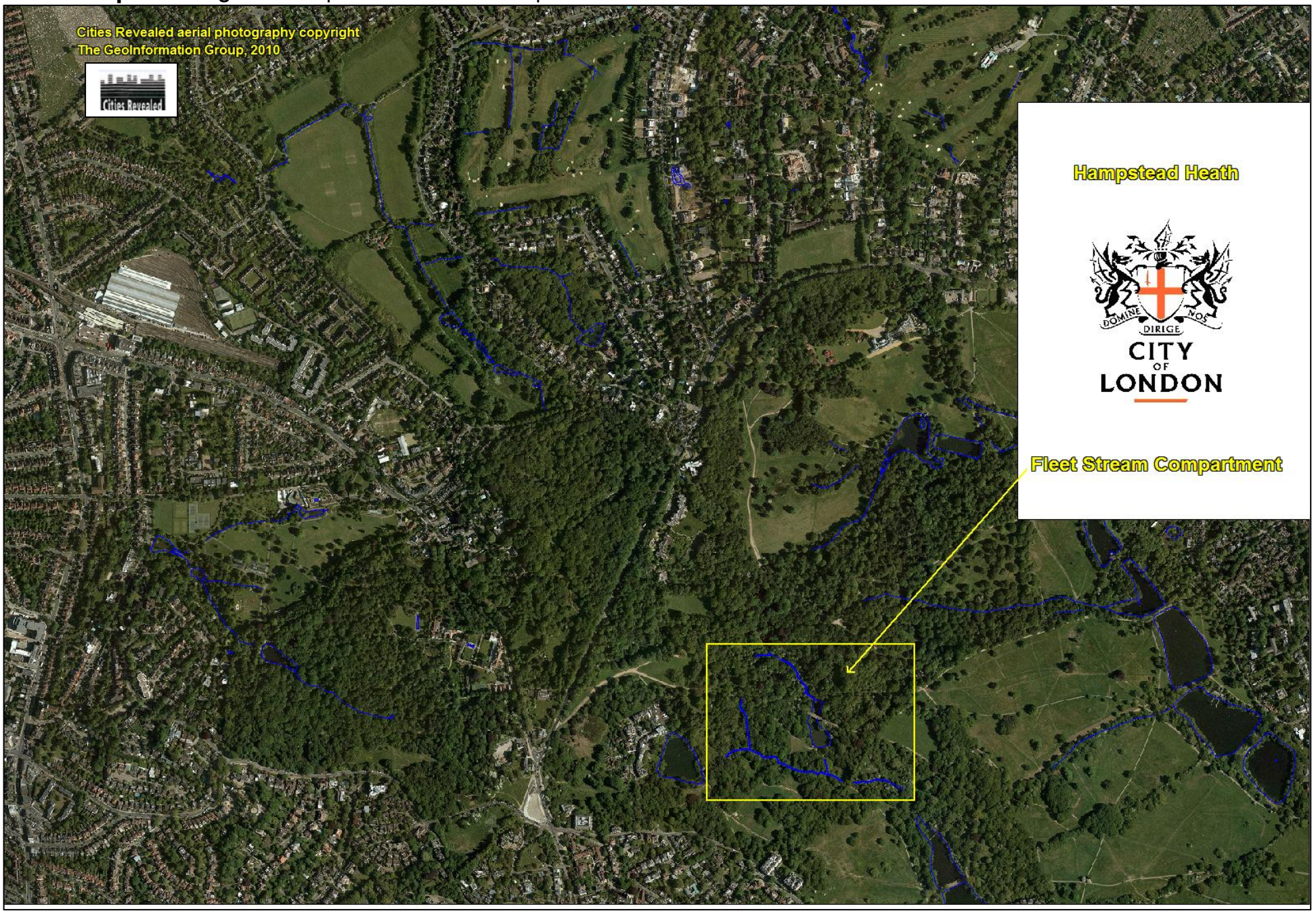
Fleet Stream compartment

1.0. Site description –**Figure 1**- Map of Fleet stream compartment



1.1 Location

The Hampstead Fleet Stream compartment is located towards the west of the main body of Hampstead Heath. The compartment consists of the stream and stream fringes running from the Vale of Health Pond in the west towards the Catchpit area in the east and also the stream and fringes running from roughly north to south passing through the Viaduct Pond. A third smaller tributary running north-south to the west of the compartment is also included. This stream area can be seen highlighted in blue within the yellow box in the above map (Figure 1). All 3 arms of the stream join just beyond the Viaduct Pond. A further map in Figure 16 gives more details of the location and extent of the compartment.

The centre of the Fleet Stream compartment near the Viaduct is at grid reference 526,920; 186,520 and it covers a length of stream of approximately 850m.

Large sections of the Fleet Stream are un-enclosed, but the north-south stream section passing through the Viaduct is for the greater part enclosed, forming two bird sanctuaries referred to in this plan as the Upper and Middle Bird Sanctuaries.

1.2 Geology, Soils, Hydrology

The Hampstead Fleet Stream is located along the Hampstead valley, which is actually comprised of three smaller valleys on an area of Claygate beds. The three tributaries/valleys gradually slope from a height of approximately 105m at the top of the Upper Bird Sanctuary and Vale of Health Pond to 80m at the Catchpit. With approximately 850m of at-surface stream, only the Heath Extension has a comparable length of stream (860m).

The Viaduct Pond is located within the compartment but is subject to a separate management plan. A small pond/pool is also present above the Viaduct adjacent to the Bird Bridge. This pool is also shown on a c.1860's map of the area and is included within the compartment.

Along the Hampstead Fleet stream there are seasonal flows, from low to no flow in the summer but often with continuous flow during the autumn through to the spring. The pace of the stream is also highly variable, from a slow trickle to a rapid cascade during high rainfall events. The flows in each of the three smaller tributaries also vary greatly, with the N-S Hollow Beech section for the majority of the year not visible as running water. The summer flow appears to be greater coming from the Upper Bird Sanctuary tributary, as a flow was still present during summer survey work, as opposed to the largely dry stream coming from the Vale of Health tributary.

The stream is rarely more than 15cm deep (usually <5cm), although pools and dams cause occasional deeper sections. The width of the stream channel also varies, with sections of up to 2 metres wide in shallower sloping locations, but much of the stream flows in channels a mere 30cm wide.

Some sections have very little water running at the surface but have a relatively large catchment area and thus contribute greatly to flows further down the stream. It is difficult to gauge the contribution of under the surface flows to the stream area but in places the stream, although not visible as a surface flow, has been found either to flow under heavy leaf litter or in small subterranean channels.

1.3 Ecology

For the purposes of this Plan, the Fleet Stream compartment has been subdivided into nine distinct sections to allow for easier description of the site and more structured management aims. These sections are shown in Figure 16 and a description of the different sections is given below.

Balsam Poplar Section

This section runs from the Vale of Health Pond eastwards and ends at a small bridge crossing the stream at the base of the N-S Hollow Beech section. The outflow from the Vale of Health Pond arises adjacent to a large coast redwood and meanders down initially through an area of secondary woodland into a wider, more open valley. In this valley grow a number of balsam poplar (*Populus balsamifera*) trees, some of which may actually be a similar hybrid Balm-of-Gilead. These trees are in various states of decline and a couple have fallen across the stream. On the trunks of these trees grows the fern common polypody, which is uncommon on the Heath and has only been recorded recently along the Hampstead length of the Fleet Stream. The majority of the larger poplars are now located towards the valley edges along the woodland and fringes. Many younger poplar suckers are however present in and along the streamline and a fine wild service sapling also grows near the stream edge. A large number of sycamore saplings and young trees are present in the upper woodland area of the stream, and cast a great deal of shade over the stream.

In the shallower valley, some seasonal wet pools have developed (and been further dammed with logs), with water plantain, lesser spearwort, great willowherb, yellow flag iris and brooklime present. Water plantain and lesser spearwort are found at only a few other locations on the Heath.

Figure 2: Balsam poplar shallow valley area showing seasonal pools.

The upper parts of this stream section are densely shaded and form quite a deep eroded channel at points. In these shadier parts liverwort, moss and fern species grow along the stream banks.

Himalayan balsam grows in dense patches in the shallower valley area, along with sycamore, Turkey oak and ash saplings. Many previously coppiced willows are present in this valley. At the fringes of this area, garden yellow archangel also grows in a large patch.

N-S Hollow Beech section.

This section is the most heavily shaded of the Fleet Stream. It rises somewhere to the west of the hollow beech tree and runs almost north-south, joining a larger section of the Fleet Stream to the east of the Balsam Poplar section. The upper reaches and source are difficult to find but a couple of seepage points can be seen at various times of the year.

Only a narrow stream channel exists in this section and much of this appears as merely a damp surface, although in the middle part of this section a small <30cm wide channel is obvious. The lower part of this section is wider and very wet, which leads to very muddy conditions and lack of vegetation over a wide area. A number of large mature oaks grow along the streamline, together with some old hawthorns. A good deal of standing dead wood is also present, with obvious woodpecker nest holes. A few large willows can also be found towards the upper reaches of the stream, amongst scattered yew and holly bushes and sycamore saplings. A large wild service sapling grows at the top. The ground flora throughout the section is largely bramble and ivy with broad buckler ferns.

Figure 3: Upper part of Hollow Beech section showing mature oaks. The streamline is just visible towards the lower left.

Viaduct Glade section

This section covers the area from the small bridge crossing the stream at the base of the N-S Hollow Beech section to the lower Viaduct slopes. It is in large parts a densely wooded valley and the stream is heavily shaded. A variety of trees grow alongside the stream including oak, elder, sycamore and birch, and at least three wild service saplings grow on the banks of the stream. The shaded sections of the stream support abundant mosses and fungi, as well as plentiful broad buckler ferns. At the lower end of this stream is an open glade with a railway sleeper stream crossing point. This section was opened up and log weirs placed across the stream in 2005 to form a marsh area. This open, tree-encircled glade is approximately 200 sq. metres in area and has willow growing in abundance, much of it coppiced. Pendulous sedge and great willowherb are common in the damp parts and the invasive Himalayan balsam is also found here frequently. A small patch of common polypody fern grows on the large willow in this section. A large patch of the variegated yellow archangel occurs in and on the perimeter of this section.

Figure 4: Viaduct glade marsh area to the right, with railway sleeper bridge visible at the left of the picture.

Tormentil slopes section

This section of stream flows from the Viaduct Glade section in an easterly direction and runs through a densely wooded area, until it joins the short stretch of stream running from the Viaduct outflow. It passes by the open grassland known as the Tormentil Slopes, where the plant of the same name grows abundantly. Near the stream edge and towards the bottom of these Tormentil slopes grows a patch of lesser spearwort. The ground is heavily eroded here due to foot traffic, causing damage to some of the spearwort plants. Trees here include deciduous elm, hawthorn, sycamore and willow, and evergreens such as yew and holly. A very large 'Italian' poplar occurs at the edge of the stream. A number of trunks lie in and over the stream, many of which are covered in a variety of fungi and mosses, including the fungus *Leotia lubrica,* commonly known as 'Jelly Babies', which was a new record for the site in 2013 and indeed for the county[1].

Figure 5: Tormentil slopes stream section showing densely wooded area.

Viaduct-Lime Avenue section

This stretch of stream begins where the two main tributaries of the Hampstead Fleet Stream join to the south of the Viaduct Pond. It includes the short section of stream running north to south from the Viaduct outflow and ends where the stream flows under Lime Avenue via an arched culvert. A small partly open glade exists where the two main stream tributaries join but silt deposits largely prevent pooling of water here. The area adjacent to Lime Avenue is also relatively open, but views down the stream from Lime Avenue are partially obscured by a row of young hawthorns along the top. A number of old moss- and lichen-covered hawthorn trunks have fallen over the stream and, due to the more open aspect, patches of bramble grow down to the stream edge. Hart's tongue fern is frequent at the bottom of this section, growing both on the stream edge and on the brickwork of the culvert. It is at this culvert that further water enters the stream via a drainage pipe leading from a channel at the edge of Lime Avenue. The stream joining from the Viaduct area appears to maintain a summer flow for longer than the Vale of Health stream source.

A small amount of yellow flag iris also grows in the stream and the liverworts *Metzgeria friticulosa* and *Lejeunea ulcina* have been found growing directly on the leaves of ivy, which is considered an extremely rare occurrence[2]. (Duckett, 2008).

Figure 6: Viaduct-Lime avenue section looking south towards lime avenue in the background.

Lime Avenue-Catchpit section

This section runs from the eastern edge of Lime Avenue and ends at the point at which the stream enters the Catchpit enclosure. It is currently the most open part of the Fleet Stream compartment, and is relatively wide and flat due to a levelling out of the valley. A couple of seasonal pools can be found at the start and end of this section. Willow grows frequently along the stream and much of it has previously been coppiced to maintain the area as a glade. Hawthorn, elder, birch and sycamore trees also grow frequently along the stream edge. A couple of larger willows have fallen over the stream and form an attractive feature. This more open aspect has allowed yellow flag iris to grow in the stream bed and pendulous sedge to thrive along the edge. Other plants found here include the wetland species brooklime and great willowherb, as well as lesser celandine, red campion and wood avens in drier parts. The ferns hart's tongue, scaly male and broad buckler are also found along the stream here. The alga *trentopohlia* grows on the willows, as do various mosses forming a green coat on the trunks. The culvert from the Viaduct-Lime Avenue section has required clearing due to sediment build-up in the last ten years.

Himalayan balsam grows in patches along the stream fringes but is actively managed.

Works required as part of the pond project will have some influence on the ecology in this area but the mitigation planned along this section of stream is thought to be beneficial as a whole.

Figure 7: Lime avenue-Catchpit section looking south towards the Catchpit from Lime Avenue itself. The pooling of water is evident, as is the patch of yellow iris.

Upper Bird Sanctuary section

The section is the most northerly of the Hampstead Fleet Stream compartment and covers a length of stream running west to east, inside an area enclosed with chestnut palings. The stream is only apparent in the lower part , although a dry channel is visible running through to the westernmost more elevated end.

Beech, sycamore and an old hawthorn grow along the stream edge at the lower end of this section, along with a couple of wild service saplings towards the fringes. Whitebeam, birch, yew and a few pine trees grow at the upper end along with large oaks, sweet chestnuts, field maples and alders. A large fallen sweet chestnut and rowan tree are found here, with the sweet chestnut still alive and sending out numerous large shoots along its length. The large field maple has a number of moss and lichen species on it, and broad buckler ferns grow throughout the section. The ground flora is relatively sparse in many parts, due to the shading from trees, but ivy and bramble occur in small, low patches. A patch of rhododendron along the fenceline appears not to have expanded greatly in the last 5 years. An active rabbit warren is also present.

A short section of stream also converges from the north and runs outside this enclosure. This leads to an area of previously coppiced willow and low-growing bramble, and any obvious sign of the stream peters out 50 meters from the Upper Bird Sanctuary fenceline. It is only partly visible above ground, but short subterranean stretches can be seen through gaps in the soil. The stream where the two short sections converge is orange for most of the year, due to being rich in iron.

Figure 8: The iron rich waters of the Upper Bird Sanctuary section.

Middle Bird Sanctuary

This section of stream runs south-eastwards from the bridge crossing point separating the Upper and Middle Bird Sanctuaries and ends at the Bird Bridge. It is entirely enclosed by metal railings and is densely wooded both inside and on the outside fringes. Young alder, birch, willow, elm, whitebeam, sycamore and elder trees grow throughout the compartment, as well as an ancient oak towards the centre. A dense holly patch is present in the centre, with a patch of laurel in the east and a very large stemmed buddleia towards the upper end of this section.

Mosses, liverworts and lichenes are abundant, growing on the trees as well as on the stream edge, as well as very abundant broad buckler fern. The dead wood present in and around the stream allows for numerous fungi to grow. The ground flora largely consists of bramble and ivy but a small patch of native bluebell exists east of the stream. A fine specimen of royal fern grows towards the south. The ornamental ivy *Hedera colchica* also grows throughout the southern part of this section and is abundant on the ground as well as growing into the tree canopies. Himalayan balsam grows in profusion towards the west.

A small rain-fed pool exists towards the centre but it is unclear whether this holds water for a long enough period for aquatic life to flourish. The slightly shallower slopes of the stream adjacent to the Bird Bridge allow for the pooling of water, and a patch of floating sweet grass grows here.

Two woodcocks were flushed from the Middle Bird Sanctuary during survey work in January 2014, and the remains of numerous sparrowhawk kills to the east shows the importance of the enclosed nature of this section for bird life. An active rabbit warren is also present in the centre.

Figure 9: The stream flowing under the Bird Bridge at the southern end of the Middle Bird Sanctuary. Floating sweet grass can be seen growing in the wide pool here.

Upper Viaduct

This section consists of the area of stream running south from the Bird Bridge and ending at the northern edge of the pond itself. A separate management plan has already been implemented for the remainder of the Viaduct Pond. This section is also enclosed by metal railings and the higher physical barriers of the Bird Bridge to the north and the Viaduct Bridge to the south.

The top of this section consists of a relatively flat area, with two small pools directly adjacent to the Bird Bridge. These were created through the damming of the stream with log barriers and cutting back overhanging vegetation along the valley. A c.1870's map shows the presence of a pool in this area. Floating sweet grass, yellow iris, soft rush and common reed grow in and on the fringes of the pools. Away from the stream on the drier ground, broad buckler fern is common along with pendulous sedge, red campion and foxglove. Brambles and ivy also cover large swathes of the ground and over timber which has fallen across the stream. Away from the pools but still on the flatter ground, fool's water-cress grows.

Away from the flat area, the stream becomes narrower and deeper as it descends more steeply towards the Viaduct Pond. There is little aquatic vegetation in this part but the stream is fringed by soft rush, red campion and a variety of moss and liverwort species. Bramble also grows at the edges and over the stream to varying degrees.

At the bottom part, the stream plateaus out into the pond itself. Yellow iris, water-starwort and cuckoo flower grow well around a couple of small log weirs. At the edge of the Viaduct Pond a relatively large patch of marshy vegetation exists consisting of water mint, yellow iris, reedmace, brooklime and greater spearwort. Red campion also grows in drier parts. A recently fallen large limb now covers part of this vegetation, along with a patch of the garden escape *Aucuba japonica* at the fringes. Willow trees also grow in this pondside marshland and have been coppiced infrequently. A large patch of invasive Himalayan balsam was found growing in the marshy vegetation in 2014 but was scythed during survey work.

A water rail is sometimes seen in winter, feeding in the vegetation towards the pond edge, alongside the ubiquitous moorhens and coots. A kingfisher bank has recently been installed at the edge of the pond adjacent to the lower marshland.

General

In 2006 an invertebrate survey was undertaken in various locations across the Heath, including sections of the Hampstead branch of the Fleet Stream[3]. Due to low water flows, very little aquatic life was observed apart from the non-native 'water shrimp' *Crangonyx pseudogracilis*. This is now widespread throughout the United Kingdom and evidence is conflicting as to whether it may replace native 'water-shrimp' species or co-exist with them[4]. The survey recorded three species of wetland rove beetle, which are associated with the riparian zone (the area between the land and the stream, influenced by flooding and stream water flows/levels).

A survey of fungi[1] across the Heath in 2013 as part of the ponds project indicates that areas adjacent to the Hampstead Fleet Stream are of importance to fungi, due to the variety of trees present. As sycamore is not a mycorrhizal partner for fungi, the report recommends thinning out this species in selected areas, creating more light for native trees to prosper.

Although not recorded in the last few years, grass snakes have previously been seen adjacent to the Viaduct Pond and may well use the streamline as a wildlife corridor to other areas of the Heath

Bats are known to forage in and around open areas adjacent to the Fleet Stream and are likely to be using some of the more mature trees as roosts.

Smooth newts have been found resident in adjacent ponds and thus may be using the site for overwintering.

The long-running Hampstead Heath Butterfly Transect passes through and alongside the Hampstead Fleet Stream in several places and purple hairstreak butterflies have been observed along this route.

1.4 Public and educational uses

Much of the stream is unenclosed, although vegetation and fallen wood make access to it difficult in places. The stretches that pass through the Viaduct and above this in the Upper and Middle Bird Sanctuaries near the northern source are fenced. The stream is much crossed with desire routes but routes are limited which follow the streamline for any length. Where the stream is crossed and in more open areas, dogs use the stream to play in, causing some erosion.

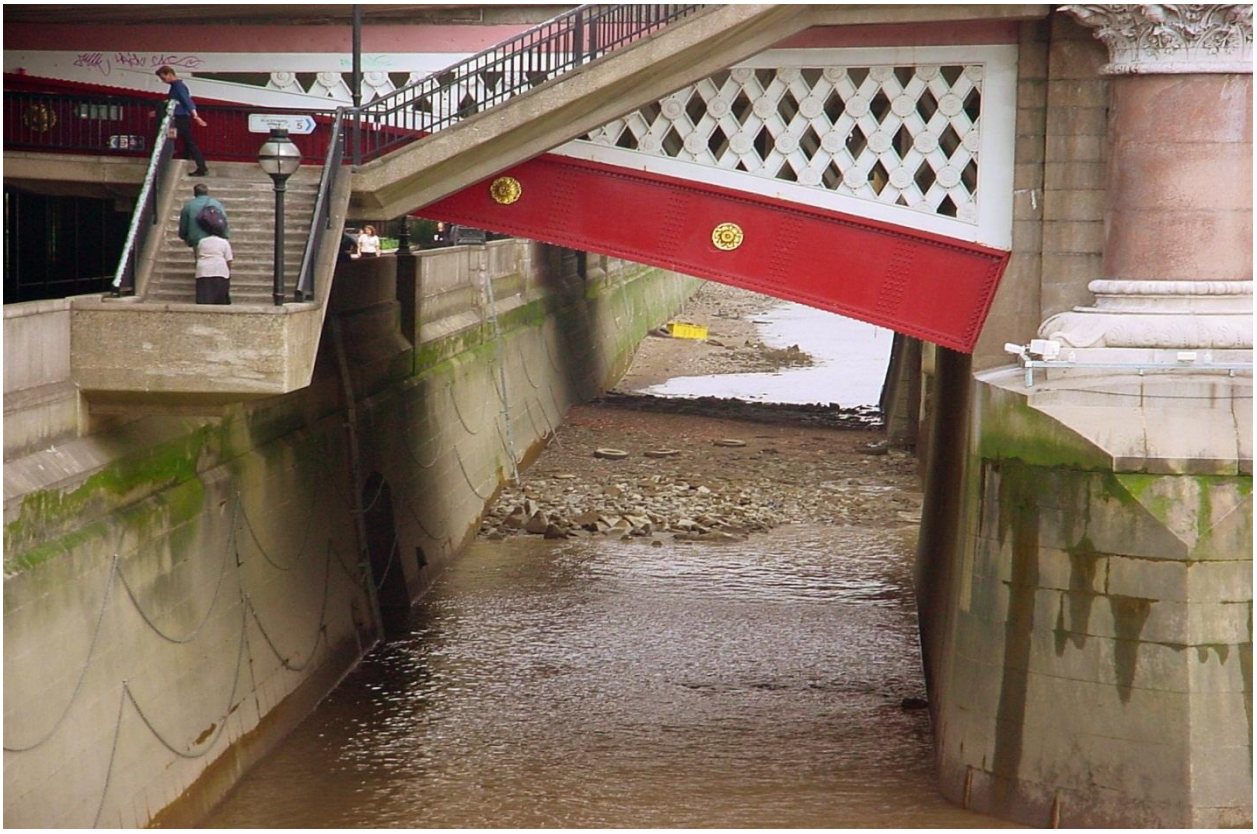
Environmental educational use of the stream is also limited partly due to the variable stream flows.

1.5 History

The Fleet Stream is the upper source of the now mostly subterranean remnants of the Fleet River, which ran from Hampstead Heath through Camden and King's Cross and into a tidal basin of the Thames where Blackfriars Bridge now stands.

Figure 10: The mouth of the River Fleet c.1740 by Samuel Scott (In Guildhall Art Gallery)[5].

Figure 11: The mouth of the River Fleet underneath Blackfriars Bridge 2002 [6]. The culverted stream comes out of the small tunnel visible to the left.



The Fleet arises from springs on the Heath, where rain and ground water percolate through Bagshot Sands and Claygate Beds and seep out of the impermeable London Clay. The Fleet downstream of Hampstead Heath has today dwindled to no more than a storm relief sewer, largely due to urbanisation and a gradual covering over of the river following its increasing use as no more than a sewer in past times. It is believed the river was once 20 metres across in parts towards the lower end, but it is now for the most part only visible at the surface along the two chains of ponds on Hampstead Heath. Both chains are considered separate tributaries. Apart from the Viaduct, each pond chain was formed through the damming of the Fleet Stream by the Hampstead Water Company to supply water for Kentish Town and the West End. Damning of the Hampstead chain began in the 17th Century and the Vale of Health reservoir was created in 1777. The Viaduct Pond was created between 1844

and 1847 by Sir Thomas Maryon Wilson as part of his scheme to build on the Heath. This Management Plan only covers the westernmost tributary, running from the Vale of Health through to the Mixed Pond.

Floods of the Fleet were not uncommon and the following is from the book 'Old and New London: Volume 2 (1878)[7].

'In 1768 the Hampstead Ponds overflowing, after a severe storm, the Fleet channel grew into a torrent, and the roads and fields about Bagnigge Wells were overflowed. In the gardens of Bagnigge Wells the water was four feet deep. A man was nearly drowned, and several thousand pounds' damage was done in Coldbath Fields, Mutton Lane, and Peter Street and vicinity. Three oxen and several hogs were carried off and drowned. A Blackfriars boatman took his boat to Turnmill Street, and there plied, removing the inhabitants, who could not leave their houses for the rising flood.'

Figure 12: 1854 sketch of the Fleet near Hampstead with Christ Church Hampstead in the background

The Hampstead Brook used to flow through the ponds and along the axis of Malden Road, before joining up with the Highgate Brook or tributary just north of Camden Town. However some authors suggest that in the 1950s, due to an outbreak of bronchitis at the then Hampstead general hospital (now Royal Free hospital), it was diverted to join the Highgate Brook near the Parliament Hill lido[8].

Figure 13: The approximate route of the River Fleet. ©Ordnance Survey

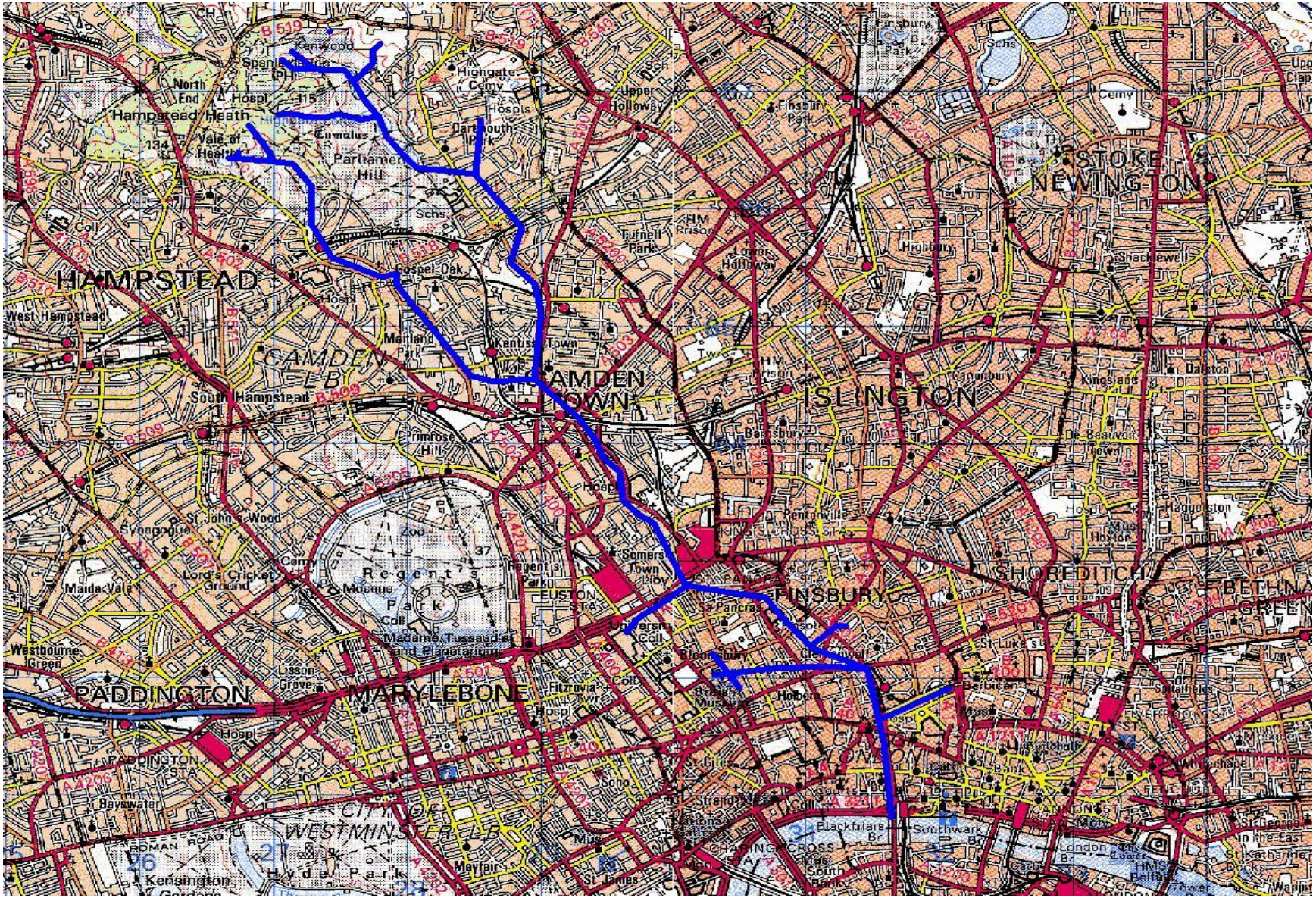
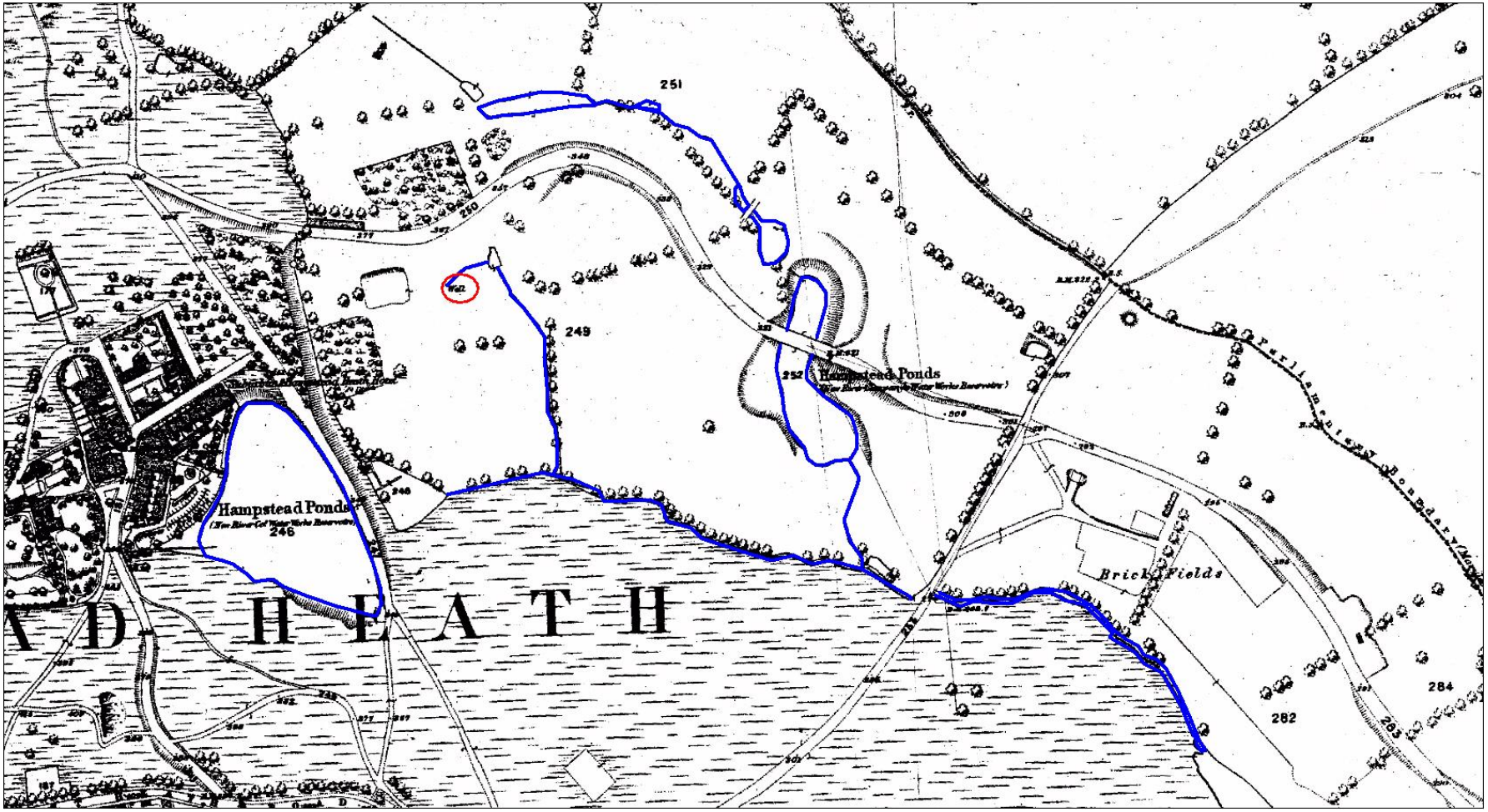


Figure 13 above shows the approximate route of the River Fleet with all but the section on Hampstead Heath now running merely as drains below ground.

Figure 14: Hampstead 1866 map showing Fleet Stream highlighted in blue.



The map in Figure 14 above shows the stream as it appears on the Hampstead Ordnance Survey map of London in 1866. Larger pool sections (wider areas of blue) are obvious along the stream length to the north of the Viaduct Pond. A well is shown on the 1866 map at the top of the North-South Hollow Beech section of the stream. This well is circled red in the map above but this author has no information regarding its precise location or history. Although tree-lined in places, the map shows a more open aspect in general than at present times.

Figure 15: The Vale of Health and Jack Straws Castle. Courtesy of Michael Hammerson. The Fleet Stream valley is visible to the bottom right of the picture and shows a less-wooded stream than today.

A few of the stream sections have had previous management works involving tree coppicing and placing of log weirs to slow down water flow, particularly along the Lime Avenue-Catchpit, Balsam Poplar and Viaduct Glade sections of the stream. Extensive work was undertaken in the Upper Viaduct section in the winter of 2009/2010 involving the creation of two large pools and a number of weirs along the stream line as well as opening up the views from the Bird Bridge to the Viaduct Bridge.

In the Upper Bird Sanctuary section, willows in the area outside the enclosure have been regularly coppiced and pollarded. Himalayan balsam has been regularly removed from all sections of the stream, although some sections still contain large patches. The Ditch and pipe running under Lime Avenue was cleared out in approximately 2004.

1.6 Natural and human-induced trends

Natural trends include variable/seasonal water flows and sediment accumulation in shallower sloping sections. Various naturally occurring dead wood weirs occur along the stream length alongside a number of man-made weir features, either as part of City of London management or public construction.

The stream is crossed by numerous desire routes, some over railway sleeper crossings and others over logs placed by the public to make crossing easier. At many crossing points, eroded and bare ground is evident and some routes become difficult to traverse in wet and muddy conditions. Dogs have caused erosion at these crossing points and in more open areas.

1.7 External influences

Occasional dam building by members of the public occurs along the stream and dogs access the stream at various points

2.0. Evaluation

2.1 Natural landscape

Hampstead Heath has a number of streams flowing through it. Two of them form the Highgate and Hampstead tributaries to the River Fleet. A stream flows through the Seven Sisters Ponds and along the Extension, and a further stream runs from West Heath bog and all the way down through Golders Hill Park to the Swan Pond. All of these streams have been dammed to various degrees and ponds formed.

Small streams including those with ephemeral flow make up a large part of the Heath's waters. They can protect against floods, filter pollutants and recycle nutrients, as well as providing a habitat for a variety of flora and fauna. Streamlines can also provide a corridor for wildlife migration and connect fragmented habitats. The area adjacent to a stream, or the riparian zone, is closely associated with the stream and its flows, and can provide habitat for further species of plant and animal in seasonal wet meadows and 'flood' zones.

Although still waters such as ponds provide an ideal habitat for a variety of species, some such as caddisflies, stoneflies and mayflies have a preference for flowing water such as that provided by streams. Although the Hampstead branch of the Fleet Stream has a variable flow, it may be sufficient to support a freshwater invertebrate community. Three species of rove beetles associated with the riparian zone were recorded during an invertebrate survey in 2006 and are reliant on such habitat to complete their life-cycle. It is recommended that freshwater invertebrate sampling is undertaken when flows are sufficient and in pool areas.

The 2006 invertebrate survey report also recommends impounding water in selected areas, particularly in open areas. Felling or thinning trees could be undertaken to create suitable open areas. The constructing of log weirs would create pools and reduce sedimentation in ponds along the stream. This would increase the variety of wet areas on the Heath, which would in turn suit a greater variety of invertebrates. Silt would occasionally need to be removed from these pools.

It is recommended that structural diversity is maintained along the stream through managing existing glades and openings. These may be managed initially on a short cycle, and this will be reviewed yearly to assess regrowth. The extent of fallen deadwood and the relatively undisturbed nature of large sections along the Hampstead Fleet Stream have allowed an interesting flora of moss, lichen, liverwort and fungi to develop. It is further recommended that a bryophyte survey is undertaken along the stream to identify species and further assess their importance.

Sycamore is not a mycorrhizal partner for fungi, so thinning Sycamores in selected areas would create more light for native trees and would be beneficial to the fungi growing here. This would also provide light for wetland flora along the stream itself.

Further opportunities should be sought to establish stream areas in more sunlight, should a natural opportunity occur.

The enclosed areas of the stream provide valuable habitat for nesting birds and undisturbed areas for feeding and foraging, which should continue.

Invasive plants such as Himalayan balsam along the stream length should be actively managed to prevent dense stands accumulating, which would damage native flora. Species such as the garden variety of yellow archangel will be monitored. The non-native ivy *Hedera colchica* will be actively managed to prevent its further spread into tree canopies.

2.2 Public and educational uses

Access to and across the Fleet Stream should be maintained along currently existing routes, with no further formalisation of this access occurring. Although only short stretches of the stream can be walked, further routes should not be made alongside the stream. This is in part due to the fallen timber along and over the stream, which supports numerous moss, lichen and liverwort species.

No further access to existing enclosed areas is recommended, due to the paucity of such areas on the Heath and thus their importance for cryptic birds such as woodcock and for wetland plants, which may be damaged through public use.

The stream edge towards the lower end of the North-South Hollow Beech section is currently difficult to traverse, due to extremely muddy conditions, especially during the autumn and winter months. This has led to widespread erosion of the ground and trampling of vegetation, as members of the public attempt to avoid the conditions. A narrow single file wooded walkway using logs may be placed to reduce erosion. Similar logs are already present in short sections, placed there by members of the public. A similar construct is possible across the stream adjacent to the Viaduct slopes to prevent trampling of the lesser spearwort in this location. Both walkways should be reviewed to assess the suitability of these proposals.

Views of the Fleet Stream should continue to be provided in suitable areas, such as at the Bird Bridge and Lime Avenue. This will require a combination of coppicing, lifting and removal of some small trees on a cyclical basis.

2.3 History and built environment

As one of the only two remaining places where the Fleet can be seen at the surface, the compartment has some important historic context. Where possible, the stream should be encouraged to flow above ground through the prevention of accumulated debris building up, although sufficient autumnal flows should prevent this from happening.

2.4 Overall vision

Maintain the stream as an above-surface water course

Maintain wet areas through weir placement, even in dry conditions.
Encourage water flow along the stream and prevent water from disappearing into underground channels.
Improve/encourage wetland vegetation along selected sections of the stream.
Spread sediment deposition along the stream course to reduce the amount reaching the Mixed Bathing Pond.
Slow down velocities and the resulting erosion in major rain events.
Maintain existing viewing points and access to the stream.

2.5 Relevance to achieving the 2007-2017 Hampstead Heath Management Plan

Overriding Objectives, Essential Actions and Aspirational Goals from Part I of the Hampstead Heath Management Plan which are particularly relevant to the management of the Fleet Stream Hampstead branch are as follows:

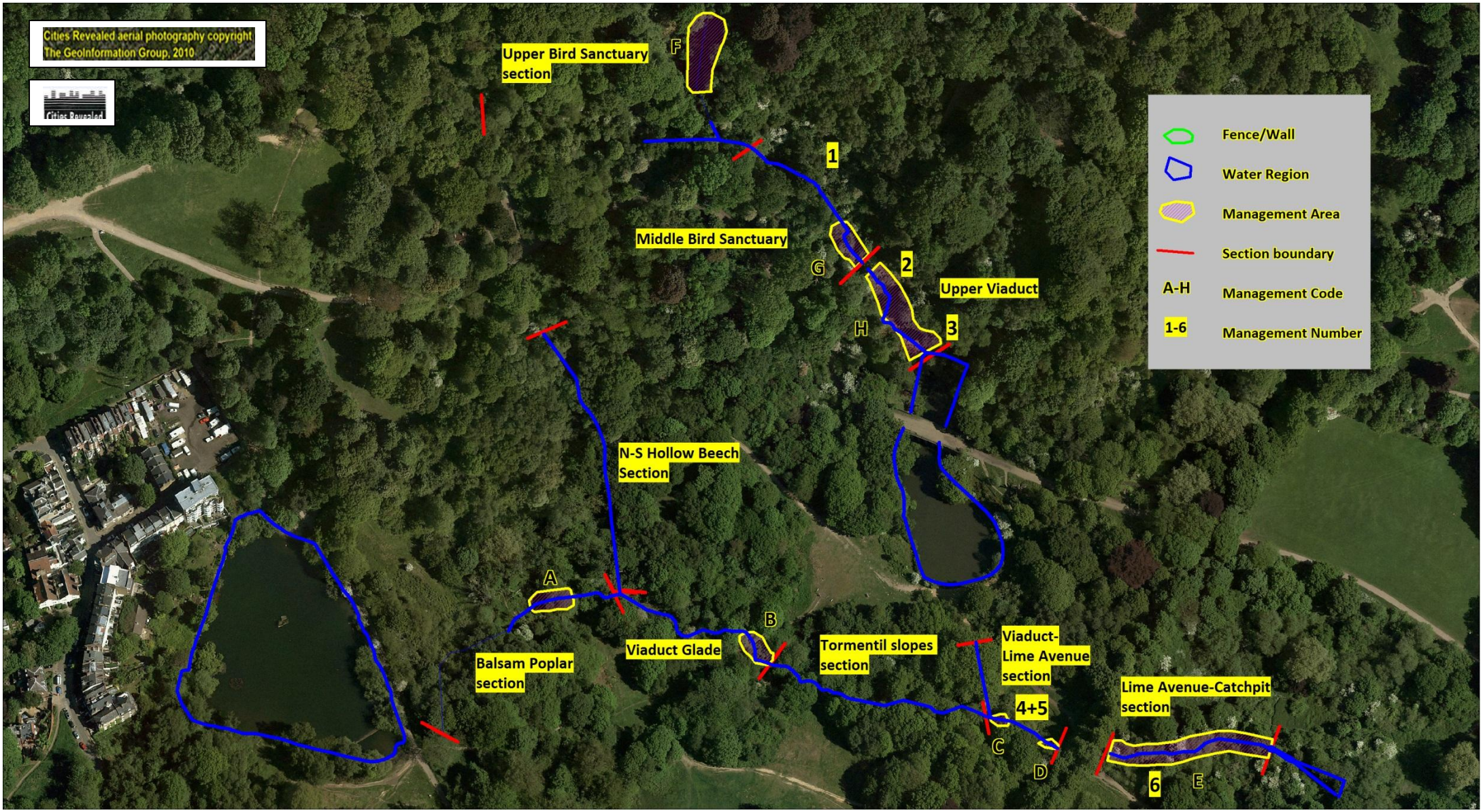
> **NL1:** Retain and enhance the Heath's habitats and natural resources to enable continued quiet enjoyment and appreciation of the natural world by its visitors

The following policies from the Natural Landscape chapter of the Part II Management Plan for the Heath are particularly relevant to the Fleet Stream Management Work Plan

> Policy 9: In general, communities of flora and fauna will be encouraged to evolve naturally subject to appropriate management practices, natural regeneration and the existing seed bank. However, re-seeding with native wildflowers may be used in certain areas
>
> Policy 36: The existing ponds, streams, ditches and wetlands will be managed to protect and enhance their nature conservation importance
>
> Policy 43: Wet or seasonally wet ditches and streams will be maintained and restored where appropriate. No further ditches or streams will be piped unless it is absolutely necessary for safety or access reasons or in order to prevent excessive erosion
>
> Policy 46: Populations of plants and animals protected by law, identified as being Priority Species in national and local Biodiversity Action Plans, or subsequently identified as worthy of protection will be protected and enhanced
>
> Policy 50: Selected invasive and inappropriate species will be controlled

3.0. Prescription and work programme

Figure 16: Fleet Stream



3.1 Regular management tasks

Fleet Stream site objectives

Objective	Prescription	frequency	Month(s)	Years	Who by	Priority : low, medium or high
A- Maintain open pool area	Coppice sapling trees, remove sycamores and cut back bramble up to 4m from the stream edge. Leave sapling wild service tree. Dig out some sediment from the pools.	Every 4 years.	Sept-Feb	2015 + 2019	Cons Team	M
B- Maintain open glade and encourage pooling of water	Remove a minimum of 50% of willows growing in the glade, coppice the remainder. Coppice trees on the periphery of the glade. Place log weirs to encourage pooling of water.	Every 4 years	Sept-Feb	2015 + 2019	Cons Team	M
C- Create and maintain pool area.	Coppice sapling trees at edge of planned pool area. Remove a few small trees from stream edge. Remove any small trees within pool area. Cut back bramble and other scrub.	Every 4 years	Sept-Feb	2017 + 2021	Cons Team	M
D- Maintain views to stream and prevent scrub encroachment.	Open up views upstream from Lime Avenue by coppicing or laying hawthorns at top. Also cut back bramble from stream edge up to 2m. Place 2-3 log weirs along stream unless naturally occurring weirs occur.	Every 4 years	Sept-Feb	2017 + 2021	Cons team	M
E- Maintain open streamline.	Coppice/re-coppice or pollard trees along streamline and on adjacent banks. Pollard above any moss + lichen covered sections if possible. Cut back 50% of large fallen willow at southern end. Cut back bramble and scrub from entire stream fringe and dead hedge at top of valley	Every 4 years	Sept-Feb	2018 + 2022	Cons Team	M
F- Maintain willow coppice area	Coppice/pollard willows throughout the valley.	Every 4 years	Sept-Feb	2018 + 2022	Cons Team	M
G- Maintain views of stream and keep streamline open	Coppice or remove selected young trees from stream edge. Alders nearest the Bird Bridge may be lifted rather than coppiced, which may be sufficient to allow views of the stream. Cut back scrub and bramble from stream	Every 4 years	Sept-Feb	2016 + 2020	Cons Team	M

	edge and around royal fern. Place/maintain log weir in front of Bird Bridge to encourage pooling.					
H- Maintain open streamline	Re-coppice trees and cut back bramble from stream edge and wider 4m area. Place new log weir in central part of streamline. Remove vegetation from upper pool if occupying more than 50% of pool. Remove selected willows from marsh area adjacent to the pond and coppice remainder.	Every 4 years	Sept-Feb	2016 + 2020	Cons Team	M
Remove Himalayan balsam	Hand pull balsam yearly from all sections until eradicated	4-5 times Yearly until eradicated	June-Sept	2015	Cons team/ Volunteers/ Ecologist	High
Remove *Hedera colchica*	Cut ivy towards base to prevent it from spreading into canopies of trees.	Every 2 years	Sept-Feb	2015 + 2017	Cons Team	M
5- Create and maintain pool area	Dig out sediment from stream intersection and place log weir to encourage pooling. Will require repeat sediment removal approximately every 5-10 years	Every 5-10 years	June-August or when dry	2017 + 2022 review	Cons Team	M

3.2 One-off tasks

Objective	Prescription	Month(s)	Year	Who by	Priority	Est. cost
1- Increase light to enclosed area to allow for ground cover to establish	Remove + prevent regrowth of sycamores throughout Middle Bird Sanctuary.	Oct-Feb	2015	Cons Team	Low	Local Budget
2- Maintain pool area	Use mini-digger to remove sediment from logged weir area	Any month	2017	Cons Team	Medium	Local Budget
3- Prevent encroachment onto marsh area	Remove non-native *Aucuba* from the edge of the marsh and cut back fallen tree to the edge of the marsh area	Oct-Feb	2015	Cons Team	Medium	Local Budget
4- Increase light to stream area	Remove sycamore from edge of stream	Oct-Feb	2017	Cons Team	Low	Local Budget
6- Keep culvert under Lime Avenue clear	Maintain open culvert/pipe under Lime Avenue through removal of accumulated sediment. It is estimated this may be required every 10-20 years	June-August or when dry	Review in 2016	Contractor	High	

4.0 Review

Author	Date	Task	Observation, event or alteration to task

5.0 References

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