ATKINS

CITY OF LONDON

Hampstead Heath Ponds Project

OUTLINE SPECIFICATION

July 2014

Project: Hampstead Heath Ponds Project
Document: **Scheme Design Components Outline Specification**
Status: **FOR PLANNING - PRE DETAIL DESIGN**
Date: July 2014

Client: *City of London*
Consultant: *Atkins*

NOT TO BE USED FOR CONSTRUCTION

General Site Works British Standards British Standards

Task:

General

Site Waste Management Plan SWMP - For HHP? Client to confirm.....

Site Clearance

Remove to an authorised tip all scrub, undergrowth, roots, weeds, stones larger than 60mm, concrete, brick, tile, metal, timber and any other unwanted material not shown as retained on the drawings or specified for retention or appropriate for reuse in the Works in accordance with the SWMP (Site Waste Management Plan). Segregate materials for recycling whenever appropriate and comply with specification. Advise Consultant before removal or disposal of anything unforeseen discovered. Removal of existing shrubs and any other trees to be agreed first with client and/or landscape designer / arboriculture team before any work to be carried out. All works to be carried out with due attention to tree protection zones. Retention of selected brushwood, logs and trunks on site to be relocated at part of the works for habitat creation (See Section 5 Site Features of the Outline Specification).

Groundworks

Comply with BS 4428 Code of Practice for General Landscape Operations and The Highways Agency Specification for Highway Works will be used for earthworks.

Soil Conditions

Undertake operations involving topsoil, subsoil in soft landscape areas and subsoil for reuse, when the soil is reasonably dry and workable and non-plastic in consistency, with a soil moisture content at or below the lower plastic limit; not when the soil is wet.

Existing Top Soil

Topsoil removed from work areas and borrow pits shall be in handled in accordance with BS 3882:2007 and kept free of contamination. Temporary topsoil heaps shall generally be less than 1m high to retain the soil structure but can be upto 2m high for shorter periods. Top soil heaps shall be seeded with a temporary grass seed mix. Topsoil heaps shall be kept free from trafficking and shall not be used for storing materials. Sub soils and dewatered silt are to be stored in separate heaps for re-use.

Compaction / Damage by Plant

Do not allow plant to run over topsoil heaps or areas to be reinstated to soft landscape. Minimise compaction by controlling access routes. All compacted ground or pans in soft landscape areas to be broken up by subsoiling using a heavy tine ripper appropriate to the type of soil before proceeding with the filling/construction works in the area or before reinstatement.

Tree Protection

Tree protection fencing will be erected before any works commence on site and shall be in accordance with BS 5837 : 2012. All excavations and/or construction work within the root protection areas identified in the Arboricultural Report shall follow the recommendations set out in the Arboricultural Method Statement for protecting tree roots during construction and minimising damage to trees.

Subsoils

Generally:Excavate soft landscape areas to accommodate topsoil depths required at detailed design as necessary. Break up subsoil to a minimum depth of 300mm using 500mm long fixed tines set 300mm apart, in 2 directions at right-angles prior to topsoiling. Use hand operated machinery or hand tools where necessary. Soil in excess of requirements or deemed unsuitable for back-filling, to be removed from site. Subsoil fill to landscape areas shall be lightly consoloidated and not compacted. Spread and consolidate appropriate agreed fill in layers not exceeding 200mm deep. General levels to be within 50mm of design levels. Contours to be free flowing to reflect the surface contours and different soil depths for different types of area. Finished surface to be loose before topsoiling, if necessary by subsoil cultivation.Land drainage to be reviewed on site once excavations carried out. Keep excavations free of water.

Topsoils

Existing topsoil will be stripped from working areas including the borrow pits and stockpiled in accordance with series 600 of The Highways Agency Specification for Highway Works Spread of topsoil; from topsoil storage heap / imported to provide the following requirements and minimum depths:

- Grassed areas 150mm;
- Shrub areas 450mm;
- Tree pits 700mm deep x 1500mm x 1500mm;
- Topsoil backfill in tree pits to 300mm below ground, sandy loam with low organic matter content;
- Graded slopes to be of even gradient;
- Graded to avoid ponding hollows;
- Graded to even flowing contours with no sharp angles in any direction (unless shown on drawings);
- Topsoil edges 50mm above bordering hard surfaces to allow for settlement.

Gradients and Levels

Conform to the spot heights or contours on drawings and ensure that falls are even without humps or hollows. Unless otherwise specified final levels after settlement are to be 20mm above any adjacent paving.

Sub- Base

Fill to hard landscape areas. Ensure starting surface is of appropriate material and compaction. Add appropriate material and compact in layers maximum 200mm thick to achieve adequate bearing for foundation of proposed finish material and allowing for depth of construction. Remove inadequate materials and fill with appropriate material and compact. Granular Sub-Base to be Type 1 or Type 2 material to clause 803 of The Highways Agency Specification for Highway Works. Lay and compact in layers to specification. Apply a blinding if necessary to achieve a smooth, closed surface. Blinding to be sand, PFA or similar appropriate fine material.

Tree Pits

Individual tree pits in existing topsoil areas: Excavate 750mm deep by 2100mm square; Set aside topsoil for backfill and store subsoil or dispose if not required in the works; Thoroughly break up bottom of excavation to 300mm depthand install a drainage layer 50mm deep of 10-20mm clean washed gravel. Backfill with topsoil/subsoil mix with a lower nutrient content to 300mm below ground as excavated or from stored material on site. Final top 300mm deep layer to be stored or excavated topsoil.

HAMPSTEAD HEATH PONDS PROJECT

Outline Specification
MATERIALS MATRIX

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Materials Matrix

	ENGINEERING													LANDSCAPE																					
	1.0 Pond Edge				2.0 Dam					3.0 Spillway				4.0 Path Edge			5.0 Path Surface					6.0 Fencing			7.0 Site Features						8.0 Planting				
	Soft Edge : Grass / Turf	Sheet Pile : Timber Capped	Sheet Pile : Timber Capped and Clad	Sheet Pile : Insitu Concrete Capped	Dam Level Raised	Sheet Pile : Timber Capped	Sheet Pile : Timber Cladding (One Side)	Sheet Pile : Timber Cladding (Both Sides)	Inlets and Outlets	Open Channel : Grass (Seeded)	Open Channel : Reinforced Turf	Open Channel : Concrete Mat Grass (Seeded)	Culvert : Box or Pipe	Earth / Grass Edge	Timber Edge	Concrete Edge	Grass	Compacted Earth	Self Binding Gravel	Tar and Gravel Chip	Asphalt	Timber Fencing	Low Rail	Railings	Fishing Pegs(to be confirmed)	Signage	Buoyancy Aids	Furniture (seats)	Felled Timber	Lighting	Aquatic	Grass (reinstatement)	Wild Flower Meadow	Shrubs	Trees
Highgate Pond Chain																																			
1. Stock Pond					●				●		●		●	●	●			●		●	●			●			●	●	●		●	●			
2. Kenwood Ladies' Bathing					●				●			●	●	●	●		●	●	●			●		●		●	●	●			●	●		●	●
3. Bird Sanctuary Pond					●				●				●	●	●			●			●			●			●		●		●				●
4. Model Boating Pond	●	●			●				●	●				●			●	●		●	●	●			●		●	●	●		●	●	●	●	●
5. Men's Bathing Pond			●					●	●	●				●			●	●			●	●				●	●					●		●	●
6. Highgate No. 1 Pond			●				●		●	●				●						●	●	●					●	●			●	●		●	●
Hampstead Pond Chain																																			
7. Vale of Health Pond									●	●			●	●		●		●		●	●		●				●			●	●				●
8. Viaduct Pond			●						●	●			●	●	●			●	●								●				●				
9. Catchpit									●			●	●	●			●	●						●			●								●
10. Mixed Bathing Pond			●		●				●			●	●	●	●			●	●	●	●	●	●			●	●				●	●		●	
11. Hampstead No. 2 Pond		●			●				●				●	●	●		●	●	●	●	●	●	●		●		●	●			●	●	●		●
12. Hampstead No. 1 Pond									●				●	●			●	●			●	●					●	●			●			●	●

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1.0 Pond Edge

British Standards

1.1 Pond Edging

Material:	Size:	Finish:	Unit :	Comment :	Image:
Sheet Pile: Typical Construction	Varies (min 500mm)	Steel	Lm		
Sheet Pile: Timber Capped Plato Wood (Heat treated timber)	Varies standard cladding sizes for Plato are 18 x 140mm	Steel, Plato Timber and Galvanised Steel Fixings	Lm		
Sheet Pile: Half Round Timber Capped Plato Wood (Heat treated timber)	Varies (min 250mm)	Plato Timber and Galvanised Steel Fixings	Lm		

Material:	Size:	Finish:	Unit:	Comment :	Image:
Sheet Pile: Natural Round Timber Clad For logs and half round logs European larch, spruce, oak or chestnut	Varies (min 500mm)	Plato Timber and Galvanised Steel Fixings	Lm		
Sheet Pile: Sawn Timber Clad Plato Wood (Heat treated timber)	Varies standard cladding sizes for Plato are 18 x 140mm	Plato Timber and Galvanised Steel Fixings	Lm		

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2.0 Dam

British Standards

	Material:	Size:	Finish:	Unit :	Comments :	Image:
2.0 Dam						
	Sheet Pile: Typical Construction	Width Varies	Steel	Lm		
	Sheet Pile: Timber Cladding (Horizontal) Plato Wood (Heat treated timber)	Varies (min 150mm)	Steel, Hardwood Timber and Galvanised Steel Fixings	Lm		
	Sheet Pile: Timber Cladding (Vertical) Plato Wood (Heat treated timber)	Varies (min 150mm)	Steel, Hardwood Timber and Galvanised Steel Fixings	Lm		

Material:	Size:	Finish:	Unit:		Image:
Sheet Pile: Brick Cladding Location and spec tbc	Varies (min 150mm)	Brick or Brick slips	Lm		
Training Wall:	Varies (min 600mm)	Hardwood Timber and Steel supports	Lm	To ensure flow of water over is retained onto spillway.	
Inlets and Outlets: Includes headwall and screen	TBC	TBC	N/A	The Civil Engineering specification for the Water Industry will be used with supplementary clauses and details to be developed at detail design stage.	

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3.0 Spillway

British Standards

	Material:	Size:	Finish:	Unit :	Comment :	Image:
3.0	**Spillway**					
	Spillway : Grass - Pre-established turf with specified grass and wildflower mix.	Varies	Turf is maintained to a height appropriate to a finalised location.	m2		
	Spillway : Reinforced Turf Supplied by specialist grower. Reinforcement material to be North American Green C350 anti-erosion mat, or similar approved. Blinded by top soil and established in a specialist nursery with specified grass and wildflower seed mix.einforced turf:To be used as bioengineered spillway solution and potentially on Model Boating Pond island.	2m wide by typically 15m, varies by spillway and location.	Turf is maintained to a height appropriate to a finalised location.Reinforced turf pre-established with a grass and wildflower species mix.	m^2	To provide scour protection and ecological value.	
	Spillway : ArmorFlex Armorflex is a flexible, interlocking matrix of concrete blocks of uniform size and weight connected by a series of cables which pass longitudinally through preformed ducts in each unit. To be laid on a geotextile base layer on 30mm regulating sand layer. To be covered with 75mm topsoil and seeded with grass and wildflower seed mix, designs to be confirmed		Grass is maintained to a height appropriate to a finalised location.	m^2		
	Culvert Box or Pipe :	TBC	TBC		CESWI will be used for culvert and bedding material with supplementary clauses and details to be developed at detail design stage.	

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4.0 Path Edging

British Standards

Material:	Size:	Finish:	Unit :	Comment :	Image:
4.1 Path Edging					
Earth' Edging: Formed by excavation of 'tray' to a depth of 250-400mm depending on adjacent surface build up. Verges built up level with finished path surface. Note: path surface to be minimum 75mm above existing ground levels. This treatment may be used in areas where a low wear 'informal edge is required.	Varies	Defined edge to follow path as set out / to follow alignmnent of existing path.	Lm	To reflect the existing character where a surfaced footpath meets the adjacent grass areas.	
Treated Softwood Timber Edging: Restraint : 50x200 Treated softwood edging. Fixed to 75x75x600mm treated softwood timber stakes at 1000mm centres. (500mm around curves) Timber to be treated to BS5589 before installation. Care to be taken to avoid damage to head of stake during driving. Nails to be galvanised.	Varies x 50 x 150mm	Flush finish with adjacent surfaces	Lm	To define new surface treatment.	
Concrete Edging: Conservation Kerb	145 x 255 mm standard size	Concrete with granite aggregate appearance	Lm	To define new surface treatment, to restore level of dams where there has been settlement.	

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5.0 Path Surfaces

British Standards

Material:	Size:	Finish:	Unit:	Comment	Image:
3.0 Path Surfaces					
Grass Informal: Natural Ground Where areas will require re-instatement they will be seeded and maintained to match the existing context.	N / A	Seeded to match existing context.		Infrequent pedestrians and vehicle loads;	
Grass Informal: Reinforced Excavate : Maximum tray depth 300mm. Path surface at edge level with ground if required. Geotextile Sheet ; (Install geogrid on top of geotextile sheet if formation level is soft, depending on type of enforcement mat: e.g. Enkamat (standard) - to be pre-grown with grass in a nursery then laid over prepared topsoil surface. Path base: Minimum 150mm depth Type 3 granular sub base (surface regularity – maximum 10mm). Path surface: hand laid proprietary / optional geotextile overlain with clean friable topsoil, 60:40 root zone or blended loam and seeded with grass mixture on top of 100mm depth 60:40 root zone bedding layer.	N / A	Seeded to match existing context.		Infrequent pedestrians and vehicle loads;	
Earth Informal: Bare open ground is a characteristic of Hamstead Heath that is to be retained where appropriate. Desires line may shift after the works are complete - bare ground paths will naturally occur through wear by users where required.	N / A	Bare earth desire line to match existing context.		Infrequent pedestrians and vehicle loads;	
Compact Earth and Gravel: 100mm type-2 sub-base and soil layer; 100mm (no fines) flint drainage layer; terram geo-textile beneath the sub-base and along the sides.	10 - 20mm Aggregate	Colour: Natural (Buff - Reddish Brown)		Pedestrians and vehicle loads;	

Material:	Size:	Finish:	Unit:	Comment :	Image:
Compact Aggregate and Hoggin: See outline spec for compact aggregate / hoggin. The % mix of the treatments will be adjusted according to the context. Detailed design package will define the % and the locations where this treatment will be used.	10 - 20mm Aggregate	Colour: Natural (Buff - Reddish Brown)	m^2	Pedestrians and vehicle loads;	
Compact Aggregate: Compacted type 2 aggregate	10 - 20mm Aggregate	Colour: Natural (Buff - Reddish Brown)	m^2	Pedestrians and vehicle loads;	
Fine Hoggin: Subgrade improvement layer of 150mm depth HA Type 1 unbound mixture is required if the CBR< 3%. Granular sub-base shall be a coarse graded aggregate for suitable for permeable paving consisting of hard crushed rock to BS EN 13242, 4/20mm grading laid in 150mm layers to a maximum depth of 250mm for pedestrian and vehicular use.Surface course: Naturally occurring fine hoggin consisting of sand and gravel, with minimum clay content required to bind the material together, and with no large lumps of clay. Material size: minimum of 85% by weight passing a 10 mm BS sieve. Maximum particle size to be 14mm. Compacted thickness of surface to be 75mm. Verges flushl with finished path surface so grass establishes over edge.	<10mm Aggregate	Colour: Natural	m^2	Pedestrians and vehicle loads;	
Self-Binding Gravel Surface (Coxwell / Breedon / Cedec): **Typically** 50-80mm self binding gravel wearing course over a 150mm type-1 or type 2 sub-base. Self binding gravel to be laid in accordance with each manufacturer's specification, method varies for each.	5mm Aggregate	Colour: Natural	m^2	Pedestrians and occasional vehicle loads;	

Material:	Size:	Finish:	Unit:	Use:	Image:
Tar Spray and Chip: Path Base: 150mm depth Highways Agency Specification for Highway Works clause 801 and 803,Type 1 granular sub base on geotextile. Binder couse shall be 60mm layer of AC20 Dense bin (HMB) 30/45 and surface course shall be 25mm layer of AC6 Dense surf to BS EN 13108. Surface course shall consist of two layers of sprayed bitumen emulsion, with 6mm gravel chippings rolled in.	Varies	Colour: Black/Grey with Aggregate surface dressing to be specified at detailed design stage.	m^2	Pedestrians and vehicle loads;	
Asphaltic Concrete: In accordance with BS EN 13108	Varies	Colour: TBC	m^2	Limited use in site works areas. Preference for Tar and Chip finish. Pedestrians and vehicle loads;	

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6.0 Fencing

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Material:	Size:	Finish:	Unit:	Comment:	Image:
6.0 Fencing					
Cleft Chestnut Pale Fencing and Gates: All timber used to be guaranteed for 25 years. Galvanized 2mm wire strands used to assemble chestnut fencing. Four strands per row for extra strength. Cleft wood is divided or split and pointed at one end. Support posts used at min 2.7m intervals.	Varies (min1000mm)	Defined edge to follow path as set out / to follow alignment of existing path.	Lm	Tree Protection, Temporary site fencing and Replacement of existing.	
Half Round Wood Fencing and Gates: All timber to be guaranteed for 25 years. Galvanized Steel fixings. Support posts used at min 2.7m intervals.	Varies (min1000mm)	Defined edge to follow path as set out / to follow alignment of existing path.	Lm	Replacement of existing where required.	
Timber Picket Fencing and Gates: All timber to be guaranteed for 25 years. Galvanized Steel fixings. Support posts used at min 2.7m intervals.	Varies (min1000mm)	Defined edge to follow path as set out / to follow alignment of existing path.	Lm	Replacement of existing where required.	

Material:	Size:	Finish:	Unit:	Use:	Image:
6.1 Railings					
Low Rail: Concrete Stanchions Stanchions with CHS Mild Steel 50-60mm diameter. All steel surfaces to be fully galvanised after manufacture. Dog proof mesh to be an integral part of the design. .	Varies (min 500mm)	To match existing on site.	Lm	To define transition between path edge and pond / level change.	
Low Rail: Hardwood Timber Stanchions with CHS Mild Steel 50-60mm diameter. All steel surfaces to be fully galvanised after manufacture .	Varies (min 500mm)	To match existing on site.	Lm	To define transition between path edge and pond / level change.	
Railings: Mild Steel Painted / Powder Coated Railings. Uprights, bars and rails to be of mild steel grade 43. All bars and uprights to be fully welded to rails MIINI FW 3mm or FW Butt Weld. Bolts 10mm dia in mild steel grade 4.6 spun galvanised to BS 729. Stanchion at max 2000mm intervals. All surfaces to be fully galvanised after manufacture and polyester powder coated (colour tba).	Varies (min 1000mm)	To match existing on site.	Lm	To define transition between path edge and pond / level change.	
Estate Railings: Mild Steel Painted / Powder Coated Fence height: 1.2m above finished ground level. End posts / uprights: 50 x 25mm RHS (end posts are drilled with 3 holes for bolting to the next panel) Rails: 19mm CHS. Posts are set @ 970mm centres.	Varies (min 1000mm)	To match existing on site.	Lm	To define transition between path edge and pond / level change.	

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7.0 Site Furniture and Site Features

British Standards British Standards

Material:	Size:	Finish:	Quantity:	Unit:	Comments:	Image:
5.1 SITE FEATURES						
Timber Log Piles: Selected brushwood and trees removed as part of the works will be reused. Wood piles have been located reasonably close to ponds as they are aimed at amphibians, reptiles etc which live in/around the waterbodies.	Varies	Random size log and brushwood piles.		No.	To enhance and create ecological habitats near waterbodies.	
Timber Tree Trunks: Selected tree trunks removed as part of the works will be reused.	Varies	Random size logs and trunks of suitable wood.		No.	To create informal seats, obstacles and habitats.	
Fishing Pegs: Timber platforms to be secured to pond edge.	Varies			No.	To provide designated fishing platforms in key areas.	
Lighting: To be reconditioned / retained / refurbished / relocated along dam at Vale of Health only.	Varies			No.	Repositioning of the light columns to tie in with new edge detail of dam.	

NBS reference:	Material:	Size:	Finish:	Quantity:	Unit:	Use:	Image:
	5.2 SITE FURNITURE						
	Timber Bench: (City of London spec.)				No.	To provide replacements in key areas within works zone only.	
	Litter Bin: (City of London Spec.)				No	To provide replacements in key areas within works zone only.	
	Dog Bin: (City of London Spec.)				No	To provide replacements in key areas within works zone only.	
	Life Buoy: (City of London Spec.)				No	To provide replacements in key areas within works zone only.	
	Signage: (City of London Spec.)	Varies			No	To provide replacements in key areas within works zone only.	

Material:	Size:	Finish:	Quantity:	Unit:	Comment:	Image:
5.3 WATERCOURSE FEATURES						
Bioengineered marginal planting shelves: Planting shelves filled with pond silt (generated through either dredging works or local excavations) retained behind a geotextile membrane (e.g. Nicospan) and/or delineated by either a double row of stakes fronted by either coir rolls, rock rolls or deadwood faggots. Shelf to be finish at nominally 100mm below top water level and planted with pre-established coir pallets, rolls and/or plug plants.	Dimensions of planting shelf varies between and within pond. Maximum width of planting shelf to be no more than 3m.	Variable, depending on location and wetland plant selection. But in general the finish will provide emergent fringing vegetation cover to the pond margins. Vegetation will include reeds, grasses and wetland flowering species.		m^2	To enhance pond margin species diversity and complexity and provide bio-remediation to treat poor water quality. Photographs show before and after views.	 
Details to be added for Type 1, 2, 4 and 5 edges						
Scrapes/pools and associated channels: Formed through mechanical excavation of existing ground within the immediate corridor of an existing or new, pond inflow stream and drainage channels. May or may not incorporate check-dam and wetland planting.	Size and number of scrapes/pools varies depending on location. Maximum width not to exceed 8.0m and maximum depth not to exceed 1.0m. Where new channels are required between features they are to be nominally 1m wide by up to 0.3m deep.	Shallow vegetated wetland depressions connected by drainage/stream channels.		m^3	To provide area for control of fine sediment ingress to the ponds, treat poor water quality and provide their own intrinsic wildlife value as complex wetland habitats.	
Bioengineered marginal planting shelves (specific to Model Boating Pond): Planting shelves created through excavation of pond margin or placement of material to increase existing dam dimensions. Shelf to be finish at nominally 100mm below top water level and planted with pre-established coir pallets.	Dimensions of planting shelf varies between within pond. Maximum width of planting shelf to be no more than 3m.	Length of planting shelf varies between and within pond. Maximum width of planting shelf to be no more than 3m.		Item	To enhance pond margin species diversity and complexity and provide bio-remediation to treat poor water quality. Photograph show example of single species mix.	

NBS reference:	Material:	Size:	Finish:	Quantity:	Unit:	Comment:	Image:
	Reed bed (extension through material placement, Type 3 Edge): Extension of existing reed bed habitat through placement of gravel reject on pond bed to shallow depth (nominally by 0.5m) and encourage reed encroachment (over pond bed area nominally $8m^2$).	$8m^2$ by 0.5m depth	Single species reed bed extension	8	m^3	To increase extent of existing reed bed area and edge extent to provide additional ecological value.	
	Reed bed (extension through pond margin retreat): Extension of existing reed bed habitat through excavation and retreat of pond margin. Area allowed to colonise naturally through spread of plants from existing reed fringe.	TBC	Single species reed bed extension	1	m^3	To increase extent of existing reed bed area and edge extent to provide additional ecological value.	
	Check-dams: To be constructed from locally sourced large woody debris generated from required tree works. Woody debris to be secured by wooden stakes within the channel of inflow drainage channels/stream to create an obstruction to flow.	Specific to channel dimension. Large woody debris nominally 300 to 400mm diameter.	Natural looking woody accumulation in stream channel.		Item	To trap sediment by slowing flow velocity and for inundating swale features to maintain wetland plants.	
	Wetland channel (specific to Bird Sanctuary Pond): To be constructed through excavation of existing ground to form new wetland channel.	Channel bed to be approximately 0.75m below top water level with a width of nominally 0.6m. Banks to have 1:2 slope with a top width of between 2.3-3.6m.	Wetland channel with marginal vegetation (to be allowed to colonise naturally).		m^3	To increase habitat complexity and provided increase in extent of wetland habitat.	

NBS reference:	Material:	Size:	Finish:	Quantity:	Unit:	Use:	Image:
	Rock rolls: Rock rolls of 0.3m diameter by 1m or 2m length, to be composed of: Netting: 5mm diameter high strength polypropylene yarn netting with a square mess size of 70mm, with nominal weight of 0.5kg/m2. Filled with: 100mm nominal diameter washed crushed concrete from site, or 100mm nominal diameter washed crushed limestone (reno mattress stone) to BS EN 13242, or similar approved.	0.3m diameter, 1 or 2m long	Rock roll		Item	To provide stable revetment to retain existing fine sediment accumulations at the site of planting shelves.	
	Hazel deadwood faggots/fascines: Manufactured from sustainable coppice in the UK and securely tied by polypropylene twine. 6 to 8kg per linear m.	0.3m diameter by 2m long	Faggot		Item	To provide shield/protection for geotextile and define edge of planting shelves. Also to provide additional habitat and refuge for aquatic biota.	

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8.0 Planting

British Standards

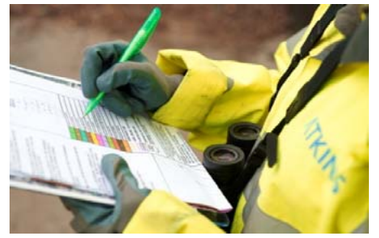
British Standards

Operation:

Image:

8.1 Planting General

Materials, goods and workmanship shall be the best quality of their respective kinds, and those for which there is a British Standard or Code of Practice shall comply therewith. In regard to the timing of Horticultural Works, planting shall be carried out between November and March subject to suitable weather conditions. Suitable weather conditions shall mean when the ground is moist but not wet and workable. Planting shall be suspended during periods of drought, when soil is frost-bound or waterlogged, during persistent drying cold winds or during any other conditions unfavourable to successful establishment. Trees, Shrubs & Hedges: BS 5236 – for Extra Heavy Standard, Heavy Standard Trees 3.6m high and over. BS 3936 - Part 1 for Feathered trees, Whips and Shrubs - All plants shall comply with this specification and the relevant parts of BS 3936 and shall be to the height and/or spread as detailed. They shall be well grown, bushy, healthy and well established nursery stock of good form, hardy, free from defects, furnished with a fibrous root system exactly true to name as specified. Hedge plants will be planted in two staggered rows and kept regularly clipped at the required height.



8.2 Water Supply Restrictions

If the water supply is, or is likely to be restricted, advise Consultant and do not carry out planting or seeding until instructed. If planting or seeding has been carried out, obtain instructions on watering.

8.3 Supply and Handling

Supply and handling of Trees and Plants ; shall comply with the National Plant Specification and the Code of Practice for Plant Handling (CPSE) which is incorporated in the National Plant Specification (available free at www.gohelios.co.uk).

8.4 Origin of Plants, Certification and Labelling

All plants shall have been obtained from a reputable nursery and grown within the British Isles for at least one growing season if stock of local provenance is not available. The contractor shall provide a Certificate of Local Provenance and confirmation that all plants supplied comply with the specification. Plant samples shall be approved on site by the Landscape Architect prior to planting. In all grass/perennial planting the collection will be tagged with waterproof durable labels as specified by the Landscape Architect.

8.5 Seeding

Seed mixes shall have been produced for the current growing season, be Blue Label certified and in accordance with EU purity and germination regulations.Native wildflower seeds to be of British Provenance.

8.6 Turf

Preparation for turf. Remove all weeds, rubbish and stones over 30mm in any dimension. Cultivate topsoil to a minimum depth of 100mm. Reduce top 30mm to a fine tilth and on clay or heavy loam soils work in 50% of coarse sharp sand to produce a 60mm layer. Turf for all grassed areas specified as turf; to BS 3969 with herbicide applied 1 to 3 months before lifting; 900 x 300 minimum size x 25mm minimum even thickness. Supply a representative sample to site for inspection by Consultant before delivery. Delivery to be phased to ensure laying within 48 hours of lifting. Stacks not to exceed 1.4m high. Fertiliser; Dress areas to be turfed with N7:P7:K7 fertiliser at a rate of 50g/m². Work into the top 30mm of tilth 7 days before turfing and water in well. Laying Turf ; Lay turf from timber planks protecting previously laid turf. Lay turf close butted breaking the joint in alternate rows. Use only whole turves at margins. Consolidate lightly with wooden beaters. Brush in finely sieved topsoil to fill all joints. Peg turfs with wooden pegs on slopes exceeding 30º. Ensure final surface is 20mm above any adjacent hard surface. Turfing adjacent to obstructions ; Leave a neat 500mm radius of soil round all newly planted trees. Maintenance of new turf ; Spread and brush in a top dressing of fine sieved topsoil and sand 50:50 to fill cracks and depressions.

8.7 Herbaceous and Ground-Cover Plants

Preparation for Planting; Rotovate ground to a minimum of 250mm deep and remove stones over 50mm in any dimension. Remove existing unwanted plants including their roots. Organic matter; apply and lightly dig into the surface of planting well rotted farmyard manure at a rate of 5kg/m². In previously prepared pits and planting areas, position shown on the drawings or in the absence of drawings space evenly; at the rate specified, avoiding regimented rows unless specifically shown; in holes large enough to allow adequate root spread and tease out congested root; balls of container grown plants; excavate holes at least 75mm below the root system; set plants so that their original soil level matches the new surrounding ground and with their best side displayed. Immediately after planting: Lightly prune back any damaged or malformed growth. Rake soil to an even, fine tilth to the required levels. Water thoroughly immediately after planting and at intervals as necessary in accordance with specification until the Consultant certifies the work is finished / practical completion. Mulch to 75mm depth only on areas according to specification.

Operation: Image:

8.8 Bare Root Shrubs

8.9 Trees

Tree Quality, Size and Type; in accordance with the plant list and as specified in the National Plant Specification (available free at www.gohelios.co.uk). Tree stakes, ties, spacers, supports as specified in detailed design phase. Staking for barerroot and bagged trees, drive stake upright 600mm into bottom of excavated planting pit before planting, close to the tree stem on the windward side. Cut off at 600mm above ground and secure tree with ties and spacers at the top of the stake. Staking for rootballed and container trees; drive 2 stakes upright 600mm into bottom of excavated planting pit 600mm apart, before planting, either side of the rootball in line with the prevailing wind. Cut off at 600mm high above ground level and after planting secure tree with loops of webbing secured at the top of the stake to hold the tree vertical. Tree pit preparation; topsoil to speciation in detailed design phase; shortly before planting: incorporate organic matter in accordance with specification a maximum depth of 250mm; Plant Tree : plant in previously prepared tree pits, upright and in exact positions shown on the drawings or in agreed positions; in holes large enough to allow adequate root spread or 150mm wider all round rootball; break up bottom of hole; cut back any damaged roots to sound growth; so that their original soil level matches the new surrounding ground; so that the original orientation is maintained. Backfill : to be the excavated (pre-prepared) soil. The backfill is to be evenly worked round the roots and well heeled in leaving the top slightly proud of the existing level to allow for settlement. Pruning; Immediately after planting carry out light formative pruning according to species. Remove damaged or weak growth. Watering ; Saturate the root ball of container grown and rootballed plants before planting. Water thoroughly immediately after planting and at intervals as necessary, until the Consultant certifies the work is finished / practical completion. Fork soil to a medium tilth in the areas to be mulched. After the first watering, mulch with 100 mm mulch, including soil areas around trees in grass. Trees shall be staked by the underground guying method.

Species: Size: Finish: Unit: Image:

9.10 Trees: Typical Species Palette

Quercus robur	Semi Mature 20-25cm Girth (200L pot), 12-14cm girth and 16-18cm girth (rootballed)	Eventual Height: 35m Eventual Spread: 15m	No	
Salix alba	Semi Mature 20-25cm Girth (200L pot)	Eventual Height: 10-30m Eventual Spread: 15m	No	

Platanus x hispanica	Semi Mature 20-25cm Girth	Eventual Height: 25-30m Eventual Spread: 15m	No	

Species:	Size:	Finish:	Unit:	Image:
Tilia cordata	Semi Mature 20-25cm Girth (200L pot), 12-14cm girth and 16-18cm girth (rootballed)	Eventual Height: 20-40m Eventual Spread: 15m	No	
Sorbus torminalis	10-12 cm girth and 12-14cm girth (bare root)	Eventual Height: 15-25m Eventual Spread: 8m	No	
Ilex aquifoloium	Feathered 1000-1500mm (5L pot)	Eventual Height: 10-25m Eventual Spread: 8m		
Crataegus monogyna	8-10cm girth and 12-14cm girth (bare root)	Eventual Height: 5-15m Eventual Spread: 7m		

Species:	Size:	Finish:	Unit:	Image:
6.9 Shrubs				
Prunus spinosa	Featherd 1500-1750mm	Eventual Height: 5m Eventual Spread: 5m		
6.10 Grass				
Wildflower Turf Mix: Supplied by .....; product reference: WFT-Landscape-34;; 1.25 sqm rolls consisting of 50% grasses & 50% wildflowers;	0.77 x 1.62m (1.25 sqm)	50% grasses & 50% wildflowers is maintained to a height appropriate to a finalised location.	m^2	
Wildflower Plant Mix: Supplied by British Wild Flower Plants; product reference MT01 - Sunny & Seeds; 13 plant species; plugs (6cm deep) pot sizes; full tray consists of 104 plugs - 8 of each species.	5 plugs per sqm; full tray consists of 104 plugs	Mix is maintained to a height appropriate to a finalised location.	m^2	
Reinforced turf mix: Supplied by specialist grower. Reinforcement material to be North American Green C350 anti-erosion mat, or similar approved. Blinded by top soil and established in a specialist nursery with specified grass and wildflower seed mix.	2m wide by typically 15m	Turf is maintained to a height appropriate to a finalised location.	m^2	

6.11 Wetland plants

Pre-established coir pallets:
Supplied by specialist wetland nursery grower for use in pond marginal planting shelves.

Manufacture:
Pre-established coir pallets shall be pre-grown in the UK using virgin mattress type coir fibre and native wetland plants grown from locally provenance seed stock. Only 100% coir fibres will be acceptable as other fibres lack suitable tensile strength and longevity. All coir pallets shall be 2m long by 1m wide by 50mm thick. It is recognised that the coir pallets are a natural product and may not adhere to this dimension. Minor stretching and manipulation of the pallets on site shall be permitted to allow full coverage.

Netting:
Coir pallet netting shall be manufactured from a 3mm coir twine yarn in a square mesh pattern, with a nominal mesh opening of 25mm. The outer net shall have a minimal tensile strength of 10kN/m.

Stuffing:
Coir pallets shall be stuffed with coir fibre which shall be virgin mattress fibre with dust content removed at manufacture stage. Each fibre shall be of no less than 50mm long and be typically 100mm to 150mm long and at a rate of approximately 2.5kg of coir fibre per m2 dry weight.

Pre-Establishment of coir pallet vegetation:
Coir pallets shall be established at a specialist UK nursery with proven track record of growing high quality coir pallets on a large scale. Pallets are to be planted at a rate of 20 plants per m^2 using either root trainer sized plug plants or bare root stock depending on species. Plug plants shall be grown from seed stock previously collected from the Hampstead Heath area, where possible. Plants shall be fully rooted through and free from any invasive sub species, alien species or fauna. Pallets shall contain mature plants that have been grown for a minimum of 16 weeks in the growing season (March to September) prior to transport to site. Pallets shall be grown in a minimum of 200mm standing water. Only pallets in which established plugs clearly display additional rooting into the coir net matrix (roots are emerging through the bottom of base coir) shall be acceptable for installation on site, as depicted in the photograph.

Species: Image:

Marginal planting shelves (various locations)

Single species pre-established coir pallet: To be fixed to planting shelf. Depending on shelf type pallets may occur in combination with coir rolls and/or plug plants.	2 x 1m pallets (planted at a rate of 20 plant per m^2)	Single species pallets composed of *Phragmites australis* (common reed) to form stock plant material from which vegetated margin will establish.	TBC	m^2	TBC
Mixed species pre-established coir pallet: To be fixed to planting shelf. Depending on shelf type pallets may occur in combination with coir rolls and/or plug plants.	2 x 1m pallets (planted at a rate of 20 plant per m^2)	Mixed species pallets composed of, but not limited to, the following species:	TBC	m^2	TBC

Operation:		Image:
Carex acutiformis (Lesser Pond Sedge)	Typically <1000mm	
Juncus effusus (Soft Rush)	Typically <500mm	
Lythrum salicaria (Purple Loosestrife)	Typically 600 to 1200mm	
Iris pseudacorus (Yellow Flag Iris)	Typical 400 to 1500mm	
Caltha palustris (Marsh Marigold)	Typically <500mm	

Operation:		Image:
Myosotis scorpioides (Water Forget Me Not)	Typically 150 to 300mm	
Ranunculus flammula (Lesser Spearwort)	Typically <500mm	
Alisma plantago-aquatica (Water Plantain)	Typically 200 to 1000mm	
Mentha aquatica (Water mint)	Typically <300mm	
Eupatorium cannabinum (Hemp agrimony)	Typically up to 1.2m	

Species: Image:

6.12 Pre-established coir rolls:

Supplied by specialist wetland nursery grower for use in pond marginal planting shelves.

Manufacture:
Pre-established coir rolls are to be pre-grown in the UK using virgin mattress type coir fibre and native wetland plants preferably grown from locally provenance seed stock. All coir rolls shall be 2m long by 0.3m diameter.

Netting:
Coir roll netting is to be manufactured from UV stabilised polypropylene yarn in a diamond mesh pattern, with a nominal mesh opening of 50mm. Each yarn should be 2 2.5mm diameter with a minimum tensile strength of 0.84 0.56kN/mesh. Each end of the roll shall be closed by stitching with a high tensile strength polypropylene yarn.

Stuffing:
Coir rolls are to be machine filled in order to maintain constant density of coir fibre. Coir fibre is to be virgin mattress fibre with dust content removed at manufacture stage. Each fibre is to be of no less than 50mm long and be typically 100mm to 150mm long. Coir fibre shall have a minimum compressed density of 7kg/m of roll (equal to 0.495kg/m3) and shall not compress more that 20% when an 80kg weight (average man) is applied.

Pre-Establishment of Vegetation:
Vegetated Coir rolls shall be established at a specialist UK nursery with proven track record of growing high quality coir rolls on a large scale. Coir rolls shall be planted at a rate of 8 plants per linear metre using 110cc root trainer sized plug plants, or similar approved. Plug plants shall be grown from seed stock previously collected from the Hampstead Heath area, where possible. Plants shall be fully rooted through and free from any invasive sub species or fauna. Rolls shall be grown for a minimum of 16 weeks in the growing season (March to September) prior to transport to site. Rolls shall be grown in standing water. Only rolls in which established plugs clearly display additional rooting into the coir net matrix (roots are emerging from the bottom and sides) shall be acceptable for installation on site as depicted in the photograph.

Single species pre-established coir roll: To be used in defining edge of planting shelf.	2m x 0.3m diameter roll (planted at a rate of 10 plant per linear m)	Single species rolls composed of *Phragmites australis* (common reed) to define planting shelf edge.	TBC	Lin. M	TBC
Mixed species pre-established coir roll: To be used in defining edge of planting shelf.	2m x 0.3m diameter roll (planted at a rate of 10 plant per linear m)	Mixed species pallets composed (see mixed pallet information for typical species mix):	TBC	Lin. M	TBC

Species:				Image:
Plug plants: Supplied by specialist wetland nursery grower for use in pond marginal planting shelves to fill gaps between pallets. See mixed pallet for plug plant species list **Plants:** All plants to be supplied shall comply with BS 3936 Parts 1 to 10, and CPSE Handling & Establishing Landscape Plants Parts 1 to 3.	To be provided as 110 to 250mm root trainers, or bare root stock depending on species.	See mixed pallet for species details.	Item	

Project: Hampstead Heath Ponds Projects
Document: **Scheme Design Components Outline Specification**
Status: **FOR PLANNING - PRE DETAIL DESIGN**
Date: July 2014

Client: *City of London*
Consultant: *Atkins*

NOT TO BE USED FOR CONSTRUCTION

9.0 Maintenance & Management

British Standards

Operations required by specification:

Image:

9.1 Grassland

Grass
The majority of the grass areas in the works area will be maintained as medium / amenity grass. Generally the height of grass will remain between 25mm and 75mm throughout the growing season. Mowing will be undertaken using a ride-on mower. Edges will be trimmed throughout growing season where they are encroaching on paths. Leaf clearance will be undertaken throughout the months of October to January. The level of additional maintenance will depend on the level of use, with increased repairs, fertilising, scarifying etc in those areas subject to heavy wear to ensure good grass coverage is maintained. Grass Spillways maintained to max 150mm. Kept clear of leaf litter, branches and potential obstructions. C45

Meadow Grassland
The meadow grass areas within the works area will be maintained as spring flowering meadow cut once in July to a height of 500 mm using a reciprocating cutting machine. The cuttings will be removed from site within 48 hours but will be left for at least 24 hours to allow any invertebrates to move to other areas and for any seed to drop. The grass will be left to grow on during the rest of the summer, with the option to second cut in late September / October. The effects of this cutting regime will be monitored through survey work and the timing / frequency of cutting adjusted if necessary to maximise the biodiversity benefits. Leaf clearance will be undertaken twice per year between October to January.

9.2 Trees, Shrubs

Trees
Several trees are proposed to be planted within the site works area. Newly planted trees will be inspected regularly to check for damage or disease and weeding carried out to ensure a 1m diameter circle of ground around the stem is maintained in a weed free state for the first 3 years at least to encourage rapid and healthy establishment. Mulch could be used around the base of the trees to help inhibit weed growth. All tree staking will be inspected regularly and adjusted accordingly to prevent damage to the tree. Newly planted trees will need to be watered regularly during establishment i.e. 3 years after planting. Trees will be planted to replace those that fail or die. In addition, where there is space, new trees will be planted in anticipation of significant individual mature trees having to be removed in the future to maintain the tree population.

The planted areas will be maintained to increase biodiversity. Trees particularly along paths and the dams will be inspected annually for health and safety. Arboricultural works will be carried out as required to provide a safe walks for heath users within the works areas. Sensitive pruning works will be required to manage the edge of the clearing where the woodland plants will naturally encroach.

Operations required by specification:

Image:

9.3 Tree accessories

Tree Guys (Underground Guying)
Timing: After strong winds, frost heave and other disturbances. Refirming: Check and adjust guying systems as appropriate with approval from CA. Tread around the base until firmly bedded.

Refirming of Trees and Shrubs
Timing: After strong winds, frost heave and other disturbances. Refirming: Tread around the base until firmly bedded. Collars in soil at base of tree stems, created by tree movement: Break up by fork, avoiding damage to roots. Backfill with topsoil and refirm.

9.4 Control of Invasive Plant Species

Any treatment, removal, or excavation works in the vicinity of Invasive Plant Species must be undertaken in conjunction with a Management Plan for Invasive Plant Species. This will be provided to the contractor by the CA prior to the commencement of works.

The Contractor will be required by the Management Plan to provide a schedule for control and monitoring activities. Relevant information will also need to be provided by the contractor for recording in the Herbicide records and Waste records sections of the Management Plan. The Environmental Protection Act 1990 (EPA 1990) contains a number of provisions concerning "controlled waste", which are set out in Part II.

- Operations: Spot treat in June and September during suitable weather conditions and when plants are growing vigorously to the approval of the CA, or as otherwise identified in the Management Plan. Herbicide: To be approved.

- Application: To manufacturer's recommendations. Arisings: Remove to licensed tip in accordance with current C.O.S.H.H. Regulations and the EPA 1990
- The contractor is reminded that the Control of Pesticides Regulations (CoPR) 1986 requires any person who uses a pesticide to take all reasonable precautions to protect the health of human beings, creatures and plants, safeguard the environment and in particular avoid the pollution of water. For application of pesticides in or near water, approval from the Environment Agency must be sought before use, allowing appropriate time for a licence to be obtained.

9.5 Hard landscape areas

Hard surfaces within the works areas on the heath will be kept clean, with litter collected from surfaces and bins emptied at a frequency, which does not allow for rubbish to lie around the area, be blown into planting, or suggest that the area is neglected. The surfaces will be swept regularly from October to January to ensure it is kept free of leaves and other debris. All hard surfaces will be inspected and repair work identified will be undertaken using surfacing as per the original to patch as required. They will be kept in a weed free state using cultural methods. Drains and gullies will be kept clean and clear to avoid the risk of flooding.

Gravel paths

Weeds should not be allowed to establish in gravel paths and will be removed immediately to avoid the build up of extensive root systems. If the removal of weeds from the gravel breaks up the path surface it must be re-rolled. Paths shall be kept free of leaves and other plant debris with care not to remove large quantities of surface dressing. All arisings will be removed from site. If repairs are required, these will be undertaken carefully following the supplier"s specification. Repairs will involve scarifying and moistening of the path surface, adding a new layer. Lose gravel surfacing will be topped up once per annum using surfacing as per the original specification.

9.6 Site Features

Litter/rubbish removal

The collection of litter is extremely important in defining the appearance of the Heath site works areas. It is important that litter is collected at a rate that is dictated by the rate at which it accumulates so that the areas appear clean. Litter is defined as being inter alia paper, cans, bottles etc, as well as leaves, twigs and other plant detritus.

Litter bins

Bins will be emptied at a rate, which does not allow them to overflow. In addition the bins will be cleaned and disinfected as necessary to avoid an unsightly accumulation of dirt. Where litter bins are sited within the works areas, these will be inspected and replaced if necessary according to the City of London specification.

Dog bins

Dog excrement is potentially a problem in any open space. Dog owners will be expected to keep their dogs under control and to clean up after their dogs. Where dog bins are sited within the works areas, these will be inspected and replaced if necessary according to the City of London specification. Bins will be emptied at a rate, which does not allow them to overflow. In addition the bins will be cleaned and disinfected as necessary to avoid an accumulation of dirt.

Information Boards

Information boards will be maintained in a clean and safe condition to ensure that the information provided is legible. Repairs will be carried out promptly and effectively with reactive removal of graffiti. Repainting and replacements will match the existing colour / furniture so that the style and quality of the set remains consistent.

Walls, Railings, Fences and Knee Rails

Walls, Railings and Fences will be inspected regularly and repairs undertaken as required matching original materials and construction style as per the original specification.

Lifebelts / deep water signs

Lifebelts will be inspected weekly and if damaged or missing will be replaced immediately. All lifebelts will be replaced on a three-year cycle.

9.7 Graffiti removal and vandalism

Graffiti and vandalism will be dealt with on a rapid response basis, with offensive graffiti removed within 48 hours (all other graffiti removed within five days).

9.8 Lighting

Lighting will be inspected as part of the regular park survey and any repairs reported to the appropriate contact and repaired immediately. Vegetation will be maintained to prevent obstruction of the luminaire.

9.9 Protective fencing

Protective fencing will be located on completion of planting for Aquatic and Marginal Plants . Its removal will occur after planting is well established or as otherwise directed.

At each maintenance visit an inspection will be undertaken to ensure that fencing is secure against ingress. Repaired as necessary throughout the defects rectification period. If damage to plants from other pests (voles, geese etc.) becomes apparent the Heath Team will be notified and action taken to avoid damage.

9.10 Wetland areas

The ponds will be managed and conserved as an informal habitat for aquatic flora and fauna. A flexible management approach is needed so as to respond sensitively to the habitat as it naturally develops. Drainage channels, chambers and silt traps will be cleaned out to maintain in safe and free flowing condition.

During the first 12 months maintenance period, carry out maintenance of newly planted pond margin and wetland areas and rectify defects. Visit at approximately monthly intervals during the growing season, and as necessary to fulfil the requirements of the specification. Minimum number of visits shall be six, between March and October. Keep all planted wetland areas free of deleterious weed species (hand removal) and remove any litter which could constrain plant establishment - March, May, July and September. Carry out additional weeding visits if necessary. Cut back any damaged plant material and remove from site.

Check the integrity of all fixing stakes/wires i.e. those associated with coir pallets/rolls and marginal planting shelf structures and temporary fencing. Ensure stakes are securely anchored and in position and fencing is excluding and checks on vegetation establishment. Ensure broken or missing fixings or sections of temporary fencing are replaced. During the monthly maintenance checks inspect all newly created wetland channels, scrapes and check dams for accumulated sediment. Where accumulations of fine sediment are of a magnitude to reduce functionality of features, remove sediment (by hand digging) and spread thinly in the vicinity of the channels. Ensure that sediment placement does not compromise existing habitats through consultation with CoL ecologists. Following the initial 12 month maintenance period it is envisaged that regular maintenance will fall under the Hampstead Heath maintenance plan which will detail, by feature, ongoing maintenance requirements.

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