

GLA 73 Greenwich Park

Grid Reference: TQ 390 774

Parkland with escarpment, springs, conduit system, former quarries, viewpoints, dry valley, tumuli, well.

Site Area: 74 hectares

Current use: Public park, home of Royal Observatory. National Maritime Museum lies just to north

Site ownership: The Royal Parks

Borough: Royal Borough of Greenwich

Field surveyors: Ann Davidson / Theresa Ball

Date: 27-03-2017 and 19-04-2017

Current geological designations:

Other designations: Royal Park, one of eight in London, is within UNESCO World Heritage Site; Historic England list Park as Grade I

Site Map OS Topography © Crown Copyright



Stratigraphy and Rock Types

Time Unit: Recent	Rock Unit: Head
Rock Type: pebbles sand and clay	Details: Mix of pebbles sand and clay eroded from the slope above, deposited since the end of the last ice age about 10,000 years ago, mostly as the periglacial surface melted.
Time Unit: Eocene	Rock Unit: Harwich Formation, Thames Group, Blackheath Member
Rock Type: pebbles in sand matrix	Details: The Blackheath Member is dominated by black, rounded flint gravel, partly clast-supported, in a matrix of fine- to coarse-grained sand, with lenses of sand and thin clay layers. The gravels are interlayered with pale-coloured fine-grained non-glaucouitic quartz and flint sands.
Time Unit: Palaeocene/Eocene	Rock Unit: Lambeth Group – Upnor, Reading and Woolwich Formations
Rock Type: sands, clays, shell beds	Glaucouitic sands overlain by grey clays and sands with Brackish fauna and interleaved red and variegated clays and sands. Underlying the Blackheath Member on the slope.
Time Unit: Palaeocene	Rock Unit: Thanet Sand Formation
Rock Type: sands, flint nodules at base	Details: Glaucouite coated, nodular flint at base, overlain by pale yellow-brown, fine-grained sand that can be clayey and glaucouitic. Only at the surface at the base of the slope in the extreme northeast of the Park.
Time Unit: Late Cretaceous	Rock Unit: Chalk Group, White Chalk Subgroup, Seaford Formation
Rock Type: chalk with flint layers	Details: white chalk with flint layers, not visible as beneath Head at the base of the slope

Site Description

Greenwich Park is situated on the southern limb of the London Basin syncline, and with the Greenwich Fault adjacent to the north, just outside the Park perimeter. The Greenwich Fault is, one of the three main en echelon faults in the southern part of the Basin. The north-west facing escarpment provides fine views of the city skyline, and beyond. West of Greenwich, the chalk of the London Basin makes a rare appearance near the surface (in the Ravensbourne Valley) and is then overlain by Palaeocene and Eocene strata, the oldest being Thanet Sands which form a relatively narrow band running across the lawns on the lower plain in the north, beneath the Head, and lying just beneath the surface at the northeast tip of the park. Overlying these to the south is the Lambeth Group which outcrops along the lower slopes of the escarpment. These beds are composed of a variable series of impermeable clays, loams, sands and pebble beds. The most extensive deposits capping the whole of the southern plateau of the Park are the Blackheath beds of the Harwich Formation, which are composed of pebble beds and sand which can contain fossils although none are recorded from Greenwich Park. The beds have been worked extensively for gravel both on Blackheath Common and the southern part of Greenwich Park and the workings are manifest in the landscape as small hollows some of which have been utilised as ponds. The permeable Blackheath beds are more resistant to erosion and form the high ground and top of the steep scarp slopes within Greenwich Park. The youngest strata just beyond the northern edge of the park are the flood plain gravels, a Pleistocene drift deposit which sits on the Thames flood plain terrace. The gravels extend from the edge of the River under the Royal Naval College and the Queen's House, and forms a narrow band just outside, and parallel with the northern boundary of the Park. Head (mixed material derived from the slope) covers the artificially levelled former parade ground to the south of the National Maritime Museum. Chalk would have appeared in the valley of the Thames in the northern limits of the park but a fault line that runs northeast/southwest beneath the National Maritime Museum takes the Chalk to greater depths to the north. Within the park it is covered by Head.

On the plateau in the southern part of the park, Blackheath pebbles can be found on eroded paths from the sand and gravel of the Harwich Formation. There are springs between the Harwich and Lambeth Group, which have been used, historically, via a conduit system and reservoir, to supply water to Greenwich Palace and the Royal Military Hospital. (One conduit was used as an air raid shelter during WW2.) The 'Standard Reservoir' storage building still stands in the park (TQ38637727). Several quarries were once excavated for gravel, at least one of which can be identified in the Dell near to the Ranger's House (TQ3905 7672). Another has been used to create the Lake. A dry valley – East Combe - can be identified in the park (TQ3898 7746), a few yards to the north east of the One Tree Hill viewpoint (TQ 3891 7739).

Aspect	Description
Safety of access	Some designated cycle routes within park, and many tarmac paths, Blackheath Avenue often busy with cars and coaches. Several flights of stairs and steeply-sloped paths. Grass slopes may be slippery when wet.
Safety of exposure	Quarry face, currently vegetated
Permission to visit	Access available during park opening hours. Some areas with restricted access. Note re access: The park is open every day from 06.00. Closing times vary from 18.00 Nov-Feb to 21.30 Jun-Jul. Buses 129, 177, 180, 188, 199, 202, 286, 386 all pass close to the park. Nearest rail stations are Greenwich to the west, Maze Hill to the north-east and Blackheath to the south, all a short walk from the park. Access by riverboat to Greenwich Pier from Westminster, Embankment or Tower Piers.
Current condition	Park is well-maintained, but extensive improvements, currently at planning stage, give potential for temporary disruption. They also provide an opportunity to add a geological interpretation element into the improvements
Current conflicting activities	Inability to dig within a public park
Restricting conditions	Only one prospective exposure, the rest is covered by vegetation
Multiple features, prospects for trail	Springs, Standard Reservoir building, conduit entrances, breaks of slope, quarry, dry valley and escarpment with city views and beyond, on the far horizon, (including octagonal chimneys of Greenwich Power Station, which provides power solely to the London Underground system). The points of interest provide the possibility of a geology trail.

Culture, Heritage & Economic		
Aspect		Rating
Historic, archaeological & literary associations	The whole park, neighbouring properties and part of Greenwich town centre was inscribed onto UNESCO's list of World Heritage sites in 1997. The Royal Greenwich Observatory, a Grade I listed building, lies within the park. Croom's Hill Gate is a group of 31 tumuli or barrows dating from the Anglo Saxon period. Remains of possibly a Roman Temple in the East of the Park. Under the Tudors Greenwich was the pre-eminent royal palace.	9
Aesthetic landscape	The park commands a unique position on the only hill flanking London's Thames approaches and offers an unequalled prospect over the river, the docklands, the City of London and the West End. Important views include the protected strategic view to St. Paul's Cathedral from the Wolfe monument and the Grand Axis progression from the River to the Queen's House, Wolfe Statue and along Blackheath Avenue terminating at All Saints Church, Blackheath. Views of the other side of the Thames include the distant hills of Epping Forest (due north) with Hampstead Heath to the northwest and the Stanmore Ridge beyond and further west.	10
History of Earth Sciences	An account of the water supply of Greenwich from 1780 describes eight conduit systems based on springs between the Blackheath Beds and Lambeth Group. The Standard Reservoir Conduit House, The Conduit Head at One Tree Hill within the park and the Hyde Vale Conduit Head immediately outside the park are all listed buildings by Historic England.	4
Economic geology	Many former gravel pits and a possible pre-Tudor quarry, i.e. prior to the development of the conduits. There is also an old quarry on the edge of Flamsteed's Well (shown as Garden on the maps)	3
Geoscientific Merit		
Geomorphology	Plateau, steep escarpment, with drop of up to 30 metres, river terraces	4
Sedimentology	None visible but one prospective site	(2)
Palaeontology	None recorded	0
Igneous/mineral/ Metamorphic Geology		0
Structural Geology	Locally the Greenwich fault and Greenwich anticline although there is little evidence at the surface	2
Lithostratigraphy	Chalk (overlain by Head), Thanet Sands, Lambeth Group, Harwich Formation (Blackheath Member), Head	4
Potential use	School education; geotrail	
Fragility	Natural overgrowth, future development	
Current Site Value		
Community	Attracts local, national and international visitors	6
Education	Geomorphology, and water supply and how water features affect land use.	6
Geodiversity value		
Candidate LIGS: Greenwich fault, escarpment, springs and conduit system, quarries, four distinct strata provide enough interest for a LIGS designation.		4
Notes: Greenwich Park is interesting geologically for having four distinct strata within its boundaries, as well as a variety of features with the potential to create a geotrail, possibly linked to the Thames Path. The Dell quarry, The Standard Reservoir and One Tree Hill have been identified as locations for interpretation.		



Site of possible quarry face exposure at The Dell (also beneficial for bees if cleared) TQ3903 7671



View across London from One Tree Hill



TB indicating one of several springs near to 'Standard Reservoir' building TQ3863 7727



TB indicating break of slope above parade ground

References:

www.royalparks.org.uk/_data/assets/pdf_file/0004/41764/greenwich-park-management-plan.pdf

BGS, Geology of London, ed. R.A. Ellison, 1995

The 1780 Admiralty Conduit Survey – full transcript.

<https://subterraneangreenwich.files.wordpress.com/2015/04/quill.jpg>

Greenwich Park: An Archaeological Survey March 1994” Royal Commission on the Historical Monuments of England.