Appendix C

London Borough of Camden CPG4 screening Flow Charts

Subterranean (ground water) flow screening chart

The Developer should consider each of the following questions in turn, answering either "yes", "unknown" or "no" in each instance

Consideration should be given to both the temporary and permanent works, along with the proposed surrounding landscaping and drainage associated with a proposed basement development.

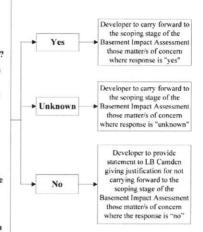
Question Ia: Is the site located directly above an aquifer? Question 1b: Will the proposed basement extend beneath

Question 2: Is the site within 100m of a watercourse, well (used/disused) or potential spring line? Ouestion 3: Is the site within the catchment of the pond chains on Hampstead Heath?

Question 4: Will the proposed basement development result in a change in the proportion of hard surfaced / paved areas?

Question 5: As part of the site drainage, will more surface water (e.g. rainfall and run-off) than at present be discharged to the ground (e.g. via soakaways and/or SUDS)?

Question 6: Is the lowest point of the proposed excavation (allowing for any drainage and foundation space under the basement floor) close to, or lower than, the mean water level in any local pond (not just the pond chains on Hampstead Heath) or spring line.



Notes / sources of information

the water table surface?

Question 1: In LB Canden, all areas where the London Clay does not outcrop at the surface are considered to be an aquifer. This includes the River Terrace Deposits, the Claygate Member and the Bagshot Formation. The location of the geological strata can be established from British Geological Survey maps (e.g. 1:50,000 and 1:10,000 scale). Note that the boundaries are indicative and should be considered to be accurate to ±50m at best.

Additionally, the Environment Agency (EA) "Aquifer Designation Maps" can be used to identify aquifers. These can be found

Additionally, the Environment Agency (EA) "Addited Designation Maps" can be used to identify additers. I ness can be found on the "Groundwater maps" available on the EA website (www.environment-agency.gov.uk) follow "At home & leisure"> "What's in Your Backyard"> "Interactive Maps" > "Groundwater". Knowledge of the thickness of the geological strata present and the level of the groundwater table is required. This may be known from existing information (for example nearby site investigations), however, it may not be known in the early stages of a project. Determination of the water table level may form part of the site investigation phase of a BIA.

Question 2: Watercourses, wells or spring lines may be identified from the following sources:

- Local knowledge and/or site walkovers
- Ordnance Survey maps (e.g. 1:25,000 or 1:10,000 scale). If features are marked (they are not always) the following symbols may be present: W; Spr; water is indicated by blue colouration. (check the key on the map being used)
- British Geological Survey maps (e.g. 1:10,000 scale, current and earlier editions). Current maps will show indicative points Georogical survey maps (e.g. 110,000 scale, current and cartier editions). Current maps will show indicative geological strata boundaries which are where springs may form at the ground surface; of relevance are the boundary between the Bagshot Formation with the Claygate Member and the Claygate Member with the London Clay. Note that the boundaries are indicative should be considered to be accurate to ±50m. Earlier geological maps (e.g. the 1920's 1:10560 scale) maps show the location of some wells.
- Aerial photographs
- "Lost Rivers of London" by Nicolas Barton, 1962. Shows the alignment of rivers in London and their tributaries
- The British Geological Survey (BGS) Geolndex includes "Water Well" records. See www.bgs.ac.uk and follow "Online > "GeoIndex" > "Onshore GeoIndex".
- The location of older wells can be found in well inventory/catalogue publications such as "Records of London Wells" by G. Barrow and L. J. Wills (1913) and "The Water Supply of the County of London from Underground Sources" by S Buchan (1938).
- The Environment Agency (EA) "Source Protection Zone Maps" can be used to identify aquifers. These can be found on the "Groundwater maps" available on the EA website (www.environment-agency.gov.uk) follow "At home & leisure" > "What's in Your Backyard" > "Interactive Maps" > "Groundwater".

 The EA hold records of licensed groundwater abstraction boreholes. LB Camden is within the North East Area of the
- Thames Region. Details can be found on the EA website
- LB Camden Environmental Health department may hold records of groundwater wells in the Borough.
 Where a groundwater well or borehole is identified, it will be necessary to determine if it is extending into the Lower Aquifer

where a groundwater went or corroller is identified, it will be necessary to determine it it is extending into the Lower Aquifer (Chalk) or the Upper Aquifer (River Terrace Deposits, Bagshot Formation, Claygate Member etc). It is water wells extending into the Upper Aquifer which are of concern with regard to basement development.

Question 3: Figure 14 in the attached study, (prepared using data supplied by the City of London Corporation's hydrology consultant. Haycocks Associates) shows the catchment areas of the pond chains on Hampstead Heath.

Question 4: This will be specific to the proposed development and will be a result of the proposed landscaping of areas above

and surrounding a proposed basement.

Question 5: This will be specific to the proposed development and will be a result of the chosen drainage scheme adopted for

the property

Question 6: The lowest point will be specific to the proposed development. Knowledge of local ponds may be taken from

- Local knowledge and/or site walkovers
- Ordnance Survey maps (e.g. 1:25,000 or 1:10,000 scale). If features are marked (they are not always) the following symbols may be present: W; Spr; water is indicated by blue colouration. (check the key on the map being used)
- Aerial photographs

Slope stability screening flowchart Figure 2.

The Developer should consider each of the following questions in turn, answering either "yes", "unknown" or "no" in each instance.

Consideration should be given to both the temporary and permanent works, along with the proposed surrounding landscaping and drainage associated with a proposed basement development.

Question 1: Does the existing site include slopes, natural or manmade, greater than 7°? (approximately 1 in 8)

Question 2: Will the proposed re-profiling of landscaping at site change slopes at the property boundary to more than 7° ? (approximately 1 in 8)

Question 3: Does the development neighbour land, including railway cuttings and the like, with a slope greater than 7°? (approximately 1 in 8)

Question 4: Is the site within a wider hillside setting in which the general slope is greater than 7°? (approximately 1 in 8)

Ouestion 5: Is the London Clay the shallowest strata at the site?

Question 6: Will any tree/s be felled as part of the proposed development and/or are any works proposed within any tree protection zones where trees are to be retained? (Note that consent is required from LB Canadea to undertake work to any trees protected by a Tree Protection Order to the rees in a Conservation Area if the tree is over certain

Question 7: Is there a history of seasonal shrink-swell subsidence in the local area, and/or evidence of such effects at the site?

Question 8: Is the site within 100m of a watercourse or a potential spring

Question 9: Is the site within an area of previously worked ground?

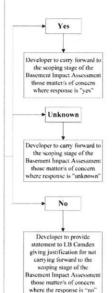
Question 10: Is the site within an aquifer? If so, will the proposed basement extend beneath the water table such that dewatering may be required during construction?

Question 11: Is the site within 50m of the Hampstead Heath ponds?

Question 12: Is the site within 5m of a highway or pedestrian right of way?

Question 13: Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties?

Question 14: Is the site over (or within the exclusion zone of) any tunnels, e.g. railway lines?



Question 1, 3 & 4: The current surface slope can be determined by a site topographical survey. Slopes may be estimated from 1:25,000 OS maps, however in many urban areas such maps will not show sufficient detail to determine surface slopes on a property-by-property scale, just overall trends. With regard to slopes associated with infrastructure, e.g. cuttings, it should be ensured that any works do not impact on critical infrastructure.

Question 2: This will be specific to the proposed development and will be a result of the proposed landscaping of areas above and surrounding a proposed basement.

Question 5: The plan footprint of the outcropping geological strata can be established from British Geological Survey maps (e.g. 1:50,000 and 1:10,000 scale). Note that the boundaries are indicative and should be considered to be accurate to +50m at best

Destion 6: this is a project specific determination, subject to relevant Tree Preservation Orders etc.

Question 7: this can be assessed from local knowledge and on-site observations of indicative features, such as cracking, Insurance firms may also give guidance, based on post code. Soil maps can be used to identify high-risk soil types. Relevant guidance is presented in IREE Digest 298 "Low-rise building foundations: the influence of trees in clay soils" (1999; BRE Digest 240 "Low-rise buildings on shrinkable clay soils; part 1" (1993); and BRE Digest 251 "Assessment of damage in low-rise buildings on shrinkable clay soils; part 1" (1993); and BRE Digest 251 "Assessment of damage in low-rise buildings" (1995).

Question 8: Watercourses or spring lines may be identified from the following sources:

nestion 8: Watercourses or spring lines may be identified from the following so Local knowledge and/or site walkovers

- Local knowledge and/or site walkowed in 1:10,000 scale). If features are marked (they are not always) the following symbol may be present "Spir": water is indicated by blue colouration, (check the key on the map being used) Geological maps will show indicative geological strata boundaries which are where springs may form at the ground surface; of relevance are the boundary between the Bugshot Formation with the Claygate Member and the Claygate Member and the Claygate Member and the Claygate Michigan Spirit S
- Acrial photographs

• Acrial photographs
• Tost Rivers of London* by Nicolas Barton, 1962. Shows the alignment of rivers in London and their tributaries.
Question 9: Worked ground includes, for example, old pits, brickyards, cuttings etc. Information can be gained from local knowledge and/or site walkovers, and from historical Ordnance Survey maps (at 1:25,000 or 1:10,000 scale, or better) and British Geological Survey maps (at 1:10,000 scale, or better) and British Geological Survey maps (at 1:10,000 scale, or better) and scale series from the 1920s) include annotated descriptions such as 'old pits'. "Tormerly dug". "rorksyard" etc.
Question 10: In LB Camden, all areas where the London Clay does not outcrop at the surface are considered to be an aquifer This includes the River Terrace Deposits, the Claygate Member and the Bagshot Formation. The general footprint of the goological strata can be assessed from British Geological Survey maps (e.g. 1:50,000 and 1:10,000 scale). Note that the boundaries are indicative and should be considered to be accurate to ±50m at best.
The Environment Agency (EA) Aquifer Designation Maps can be used to identify aquifers. These are available from the EA website (www.environment-agency.gov.uk), by clicking on 'At home & Icisure' > 'Wharfs in Your Backyard > 'Interactive Maps' > 'Groundwater'.

Maps' > 'Groundwatter'.

Details are required of the thickness of the geological strata present and the level or depth of the groundwater table. This may be known from existing information (for example nearby site investigations); however, it may not be known in the early stages of a project. Determination of the water table level may form part of the site investigation phase of a BIA and may require specialist advice to answer. Depth of proposed development is project specific.

Question 11: From local knowledge and/or site walkovers, and from Ordnance Survey maps (e.g. 1:25,000 or 1:10,000 scale). In relation to the stability and integrity of the pond structures and dams, the guidance of a Panel Engineer should be sought. (Details of Panel Engineers can be found on the Environment Agency website: http://www.environment-agency.gov.uk/
business/sectors/64253.aspy). Daty of care needs to be undertaken during any site works in the vicinity of the ponds.

Question 12: From local knowledge and/or site walkovers, and from Ordnance Survey maps (e.g. 1:25,000 or 1:10,000 scale). Any works should not impact on critical infrastructure.

Question 13: From local knowledge and/or site walkovers. May find some details on neighbouring properties from searches of 1B Council databases, e.g. planning applications and/or building control records.

Question 14: From local knowledge and/or site walkovers. May find some details on neighbouring properties from searches of 1B Council databases, e.g. planning applications and/or building control records.

Figure 3. Surface flow and flooding screening flowchart

The Developer should consider each of the following questions in turn, answering either "yes", "unknown" or "no" in each instance. Developer to carry forward to the Consideration should be given to both the temporary and permanent works, along scoping stage of the Basement Impact Assessment those matter/s of concern Yes with the proposed surrounding landscaping and drainage associated with a proposed where response is "yes" basement development. Question 1: Is the site within the catchment of the pond chains on Hampstead Developer to carry forward to the coping stage of the Basement Impact Question 2: As part of the proposed site drainage, will surface water flows (e.g. ► Unknown Assessment those matter/s of concern volume of rainfall and peak run-off) be materially changed from the existing where response is "unknown" Question 3: Will the proposed basement development result in a change in the proportion of hard surfaced / paved external areas? Developer to provide statement to LB Question 4: Will the proposed basement result in changes to the profile of the Camden giving justification for not inflows (instantaneous and long-term) of surface water being received by carrying forward to the scoping stage of the Basement Impact Assessment No adjacent properties or downstream watercourses? those matter/s of concern where the Question 5: Will the proposed basement result in changes to the quality of response is "no" surface water being received by adjacent properties or downstream watercourses? Developer to undertake a Flood Risk Assessment in accordance with PP\$25 Question 6: Is the site in an area identified to have surface water flood risk Developer to undertake a Flood Risk according to either the Local Flood Risk Management Strategy or the Strategic ► Unknown Assessment in accordance with Flood Risk Assessment or is it at risk from flooding, for example because the PP\$25 proposed basement is below the static water level of nearby surface water feature? Flood Risk Assessment not required. No

Notes / sources of information

Question 1: Figure 14 in the attached study (prepared using data supplied by the City of London Corporation's hydrology consultant, Haycocks Associates) shows the catchment areas of the pond chains on Hampstead Heath

Question 2: This will be specific to the proposed development and will be a result of the proposed landscaping of areas above and surrounding a proposed basement. The developer should provide documentation of discussion with Thames Water to confirm that the sewers have capacity to receive any increased wastewater flows.

Question 3: This will be specific to the proposed development and will be a result of the chosen drainage scheme adopted for the property

Question 4: This will be specific to the proposed development and will be a result of the proposed landscaping and chosen drainage scheme adopted for the property. SUDS will be required to compensate any increases in peak flow.

Question 5: This will be specific to the proposed development and will be a result of the proposed landscaping and chosen drainage scheme adopted for the property. SUDS will be required to compensate any increases in peak flow.

Question 6: The principles outlined in PPS25 should be followed to ensure that flood risk is not increased.