

Leaside Business Centre, 43-45 Gillender
Street, London E14 6RN
Foul and Surface Water Drainage Strategy

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1. Existing site and ground conditions

The site is an irregular shaped plot to the east of the A12 Blackwall tunnel northern approach. The site includes Bromley Hall and the Old Poplar Library together with other permanent and temporary buildings used for commercial activities around a central parking area in compacted hardcore. Bromley Hall and Old Poplar Library are used as offices. A waste collection depot lies to the north and east of the site and further commercial buildings to the south. The River Lea passes to the east of the waste collection depot.

The site is effectively level along its northern boundary at around 3.97m AOD and with a fall from east to west in the centre and southern portions. The highest levels on the main part of the site in the south east corner at 4.12m AOD and at 4.36m AOD at the rear of the Old Poplar Library building in the southern extension of the site.

The redline application boundary has a total area of approximately 2,220m², of which 1,200m² is building or paved in the current condition with the remainder in packed hardcore.

The British Geological Survey (BGS) geological mapping and borehole records have been consulted. The mapping indicates the site lies on superficial deposits of Alluvium described as clay, silt sand and peat over London Clay. The alluvial deposits are associated with the River Lea which lies some 50m east of the rear of the site. The BGS records include historic boreholes near to the site. These all show several metres of made ground described as ash, brick, timber, clay, gravel and concrete. The made ground is noted as having an oily smell in one bore hole some 50m east of the site. The made ground lies over over alluvium described as muddy gravel, clayey sand or silty clay in various boreholes and then London Clay below. Water levels were noted at 5 feet and 12 feet below ground in nearby unlined boreholes with similar ground levels to the site and are likely to be affected by water levels in the River Lea

The made ground is considered unlikely to be able to support any infiltration drainage due to concerns over potential contamination and the high water levels noted.

Copies of the relevant British Geological Survey historic borehole records are included in the appendices.

The site is entirely in flood zone 3 (higher risk) on the Environment Agency flood mapping from rivers and sea for planning. The Defra long term surface water flood risk mapping has also been consulted. This shows no surface water flooding on the site but with small areas of flood risk in the roadway to the west.

Extracts from the long term flood risk mapping are included in the appendices.

2. Proposed development

The proposed development covered by this application consists of construction of a link office building between the retained Bromley Hall and Old Poplar Library buildings on the west side of the site and construction of a 22 unit residential block to the east side of the site. The centre of the site is to be landscaped as a courtyard with a combination of paving, trees and planting. The road frontage is to be redeveloped with a drop off layby and disabled parking, part within the redline and part within existing highway land.

The proposed residential and link office buildings have a total plan area of 812m² of which 400m² has green roofing proposed. Bromley Hall and Old Poplar library building are retained and have a roof area of 445m². The proposed courtyard had a paved area of 328m² and the paved road frontage area within the redline has an area of 248m². The total building and hard paved area proposed on the site is 1833m² including the two existing retained buildings. This represents an increase of 633m² when compared to the current site roof and hard paved areas.

If the existing parking on compacted hardcore and gravel is considered impermeable as noted in the SUDS manual, the proposals would represent a decrease in impermeable area of approximately 300m²

3. Existing foul and surface water drainage

The Thames Water sewer records indicate that there are combined sewers in the street to the west of the site and a trunk sewer passing under the site.

The local sewer in the street immediately in front of the site is noted as a 305mm diameter sewer running north to chamber reference 1917 at the front of Bromley Hall where it turns west to connect to a 762mm sewer and then to the 1524mm x 1257mm trunk sewer under the A12. The Thames records do not record any cover or invert levels for the sewers.

A further trunk sewer is shown on the plans passing under the site on a curving alignment. The sewer is noted as 2550 diameter but the Thames records supplied show no levels. Thames Water have indicated that the sewer has an invert level of (minus) -10.18m AOD upstream of the site and -10.47m AOD downstream. This indicates a depth to invert of approximately 14m beneath the site.

The topographic survey records existing combined and surface water private drainage on site. The drainage levels are shallow in the vicinity of the existing commercial building to the east side of the site at around 1m depth to invert on a 150mm diameter pipe running toward the west. The existing recorded drainage is deeper at the rear the old library building where invert levels are recorded as 1.8m AOD (approx. 2m below the general site levels).

The route of the pipework connecting the site to the sewers is not recorded. It is assumed to be to the 305mm local sewer running immediately to the west of the site in the road. There is no apparent alternative discharge point available. The levels of the drains at the rear of the Old Poplar library suggest that the 305mm diameter sewer to the west is more than 2m below ground.

There are two existing chambers at the north end of the old library building indicated as taking connections from the building that will be within the footprint of the proposed link building. These chambers and the internal connections will need to be relocated as part of the works.

The proposed residential buildings are close to or over the deep trunk sewer on the site. Thames Water will need to be approached for a building over or building near consent. The exact route of the sewer may need to be surveyed using internal survey methods to confirm its exact location in relation to the proposed buildings. Thames may not grant a building over consent for a trunk sewer and in that case the building footprint may require adjustment following the surveys.

The sewer has some 11.5m cover where it passes near or under the proposed building. The type of foundations proposed will impact on the clearance required to the sewer and the information to be provided to Thames on additional loadings or risks to the asset. Piled foundations taken below the sewer level would not impose additional loads but would have greater risks during installation whereas shallow foundations would impose loads on the ground and hence sewer but with lesser risks during construction. This will need to be addressed as part of the design once the foundation proposals are known.

4. Proposed surface water drainage

The proposed development will increase the overall building and hard paved area within the redline boundary by a small amount.

We have reviewed the options in the SUDS hierarchy in relation to this site

1. Store rainwater for later use.

The new dwellings and offices will have a relatively low use of non-potable water and would not be an ideal project for the inclusion of rainwater harvesting for re-use within the buildings. There are communal soft landscape areas proposed and rainwater butts for irrigation of the garden areas should be included. The butts would be fed from roof water downpipes with commercially available diverter devices.

2. Use infiltration techniques, such as porous surfaces in non-clay areas

The sites lie directly on made ground with high ground water levels. Infiltration is considered unlikely to be a practical option for surface water drainage.

Permeable paving is suggested for the drop off layby and paved areas at the front of the site but without infiltration to the ground (System C). Under-drainage in the form of porous pipes within the permeable sub-base will collect the water and discharge it to the conventional piped systems. The permeable paving will act as attenuation storage and to remove oils, heavy metals and other contaminants from the water from the vehicular areas before discharge.

3. Attenuate rainwater in ponds or open water features for gradual release.

The limited open space on the site limits the opportunities for an attenuation pond and attenuation is proposed in below ground storage.

Two of the proposed buildings have blue- green roofs proposed and these would be used to provide attenuation benefits in addition to the biodiversity, interception and water quality benefits of green roofs.

4. Attenuate rainwater by storing in tanks or sealed water features for gradual release

Storage is proposed within the sub-base to permeable paved areas and on the blue-green roofs. Further storage is provided within the tree pits and rain gardens. Additional storage is proposed in crate type attenuation tanks below the courtyard. The site discharge control is proposed as a vortex flow control device with a gravity discharge

5. Discharge rainwater direct to a watercourse

The nearest watercourse is some 50m to the east of the site across land in third party ownership and it is not practical to make a new connection across the waste collection depot.

6. Discharge rainwater to a surface water sewer/drain

There are no surface water sewers near the site, all are combined.

7. Discharge rainwater to the combined sewer.

Discharge from the site is proposed from the site to the Thames Water combined sewers at an attenuated rate. The attenuated rate is to be significantly lower than the current site discharge rate to the combined sewers.

Following our initial desk study that suggests the site is not suitable for discharge by infiltration due to unfavourable ground conditions and we are not able to provide a new outfall to a watercourse, we have considered the options for attenuation and discharge to the public sewer system.

Runoff rates and volumes

The proposed new residential and office buildings result in an increase in roof and paved area when compared to the existing situation. The roof and paved area increases by 633m² to a total of 1,833m² including the two retained existing buildings

The existing roof and paved area of 1,200m² would generate a runoff rate of 25.7l/s in the present day 1 in 1 year 10-minute storm event rising to 80.9l/s in the 1:100 year event. This excludes any contribution from the existing compacted hardcore areas and is likely to be conservative.

Thames Water have confirmed that they require a 95% reduction in discharge compared to the existing site flow subject to a lower limit of 2l/s, based on Thames Waters view on a practical lower limit to avoid blockage issues. Based on the 1:1 year current discharge, a 95% reduction would give a peak flow rate of 1.3l/s, and hence 2l/s has been used as the discharge restriction.

The final discharge limit from the site has been set at 2.0l/s for all storms up the 1:100 year event plus 40% climate change allowance. A 10% urban creep allowance is also included to the proposed buildings and paved areas. This discharge rate represents a 92% reduction when compared to the current 1:1 year discharge and a 97% reduction at the 1:30 year return period.

If the outflow from the site is restricted to a total of 2.0l/s from the proposed and existing buildings, and paved areas, in all storms up to the 1:100 year event plus a 40% allowance for climate change and including an 10% urban creep allowance, the preliminary attenuation storage volume calculated as approximately 165m³ of which 22m³ is to be treatment storage. The treatment storage is provided by the green roof and permeable paving layers. The attenuation is a combination of storage in the sub-base below the permeable paving, on the blue-green roof, in tree pits and rain gardens, and in a below ground attenuation tank.

Thames Water have been consulted and confirmed that the combined sewer network can accept the site discharge subject to a restriction of the flows to 2l/s. A copy of their response to the pre-development enquiry has been included in the appendices.

The overall volume discharged during the 1:100 year 6 hour storm event has been calculated for the existing and proposed situations. DEFRA non statutory technical standard S5 for redeveloped sites notes that the volume discharged should be reduced toward the greenfield volume where practicable and be lower than the current discharge or with the excess discharged at a low rate where a reduction is not achievable.

The ground conditions and unsuitability for rainwater reuse do not permit the reduction in discharge volumes to greenfield volumes. Green roofs, use of tree pits and rain gardens, and permeable paving have been included to reduce discharge volumes. Water is retained in the body of the pavement and in the growing medium of the green roof and landscape areas where it is taken up by the plants. The proposed site layout includes a number of tree pits and areas of planting in the courtyard which substantially increase the soft landscaped area when compared to the existing development. Directing the flow from the adjacent paved areas into these planted areas with drainage provided in the tree pits and rain gardens will allow part of the runoff water to be taken up by the planting and soil before discharge of the remainder to the drainage systems. The strategy also recommends the use of water butts which will make a small contribution to reduction in discharged volumes.

The calculated discharge from the proposed site during the 1:100 year 6 hour storm including 40% climate change allowance is 128m³. This is greater than the calculated discharge from the current site at 119m³. The ground conditions do not allow the volume to be reduced from the existing runoff as required by standard S5 when climate change and urban creep are included. The additional volume from the site will be discharged at a low rate and satisfies the requirements of standard S6.

SUDS train and attenuation proposals

The surface water drainage proposals for the site utilise SUDS drainage measures including blue/green roofs, water butts for landscape irrigation, use of tree pits and rain gardens and permeable paving to collect, convey, control, and treat the runoff from the vehicular paved areas. Below ground attenuation tanks are provided to give the additional storage volumes required. Discharge is to the Thames Water combined sewer at an attenuated rate.

The use of permeable paving will act both to slow the flow, retain a proportion of the rain falling on it and treat the runoff from the vehicular areas. The blue/green roofs proposed on two of the blocks will also act to treat and retain flow as well as providing some attenuation benefit. Draining the pedestrian courtyard partly through tree pits and rain gardens will treat the runoff, slow and retain part of the discharge volume.

Rainwater butts for landscape irrigation are recommended, fed from the roof down pipes via commercial diverter devices. These will retain a small part of the flow for use in irrigation of the green spaces on the site.

A vortex flow control is proposed on the outlet from the site to control the surface water discharge to the sewer to the agreed rate.

The estimated attenuation volume required for the site to discharge at a maximum of the 2.0l/s for all storms up to the 1:100 year return period event with 40% climate change allowance and 10% urban creep is approximately 165m³.

This is provided by a combination of storage on the blue/green roofs, storage below the permeable paving, storage in tree pits and rain gardens, and an attenuation tank under the central courtyard.

The blue green roofs to the link office and one of the residential buildings have a combined area of 400m². Assuming attenuation storage of 100mm of water is provided beneath and within the green roof with controlled outlets, the two roof areas can contribute attenuation storage of 40m³ in addition to the water quality and quantity benefits.

The permeably paved drop-off has an area of approximately 248m². For the purposes of this outline stage, we have assumed that 20% of the area will be used for utilities routes and not be available for storage. This leaves a net area of 200m². A permeable sub-base layer of approximately 350mm thick assuming 30% voids in the sub-base will provide a storage volume of 21m³.

Tree pits and raingardens can provide approximately 25% of their volume as storage in the growing medium. If only the tree pits and gardens around the centre courtyard area are used, and a total planting volume of approximately 90m³ is assumed, this can provide a storage volume of 23m³.

The remainder of the attenuation storage, approximately 81m³, is envisaged as crate type attenuation tank with around 95% voids. The area available for the tank in the centre of the courtyard is 100m² and the internal depth would need to be approximately 850mm to provide 81m³ of storage. This together with the roof, landscape and paving contributions demonstrates that the required storage volumes can be provided on the site.

Maintenance

The suds and other drainage elements will be owned and maintained by the site owner, either directly or through a management company. Adoption of the site drainage is not anticipated.

The main suds drainage elements on the site will require periodic maintenance to maintain their effectiveness.

Permeable paving can become silted but the Ciria SUDS Manual notes that the siltation has to be quite serious before the performance is significantly affected. Annual inspection and sweeping of the surface is recommended in the SUDS Manual.

Siltation and clogging is most likely to happen during the construction phase and this will need to be controlled by careful site management and consideration of the timing of laying of the permeable paved surfaces. Permeable pavements can be rehabilitated after clogging by the use of vacuum sweepers with water jets and oscillating brushes to remove silt from the joints.

Tank attenuation structures should be inspected using closed circuit television camera systems (CCTV) to identify issues and siltation problems. The Ciria SUDS Manual recommends inspection every 5 years or more frequently if required. Siltation should be minimised by the inclusion of catch pit manholes upstream of the attenuation structures to capture silts and grit. If siltation of the tanks does occur, clearance using jet washing techniques will be required. Catchpits should be regularly emptied of silts and grits using a conventional 'gully sucker' lorry. The SUDS manual suggests annual inspection and cleaning of gullies and catchpits

Green roofs require limited regular maintenance and inspection after the first year once the roof is established. Routine maintenance consists of inspection of the roof annually and after severe storms, checking and clearing outlets, removing leave litter, trimming vegetation annually if required, replacement of dead or unhealthy plants as needed and removal of any invasive plants and weeds.

The tree pits and planters used for water collection will require regular maintenance to remove debris, litter, weeds and invasive plants carried out as needed, perhaps monthly depending on the amount of litter etc that collects. The outlets should be inspected and cleared if needed. Annual checks should be carried out on the tree and plant health, prune and manage and check for silt build up. The most common cause of failure of this type of bioretention system is for a build-up of silt on the surface of the planter or pit which compacts and seals the surface. Annual inspections should identify silt build up and it should be removed as necessary and the mulch replaced.

The vortex flow control chamber will require periodic inspection to remove any sediment or detritus collected. The chamber should be opened, inspected and any debris removed on an at least annual basis and checked as required if there is any evidence of blockage.

Exceedance events and overland flow routes

In the event of rainfall exceeding the capacity of the drainage systems, overland flows will develop.

The site generally falls from east to west. The northern and eastern boundary is enclosed by an existing brick wall excluding water entering in this direction. The roadway to the east is lower than the general site and water could not be expected to enter from the west. The southern boundary to the existing live/work block is open to each side of the building and overland flows could enter the site here.

These flows would enter the courtyard area and be able to exit through the archway out to the road to the west as they can do through the current site.

Detailed levels on the site should be set to direct any surface flows around the buildings and away from doors or openings toward the archway on the western boundary.

Overland flows generated on the site will also be able to pass through the archway in a similar manner.

The flood map for planning shows the site as within Flood zone 3 (higher risk of flooding) from the River Lea. The long term surface water flood risk mapping from Defra indicates that there is no surface water flooding risk on the site and very limited risk in the roadway to the west.

In the event that the site does flood from the River Lea, the blue-green roof will continue to provide attenuation and volume benefits but the other proposed surface water attenuation measures will become ineffective. It should be noted that the adjacent road is also in flood zone 3 and in the event of inundation, the highway drainage system would collect flood water and discharge it to the sewers in an uncontrolled manner.

5. Proposed foul water drainage

The proposed dwelling and office buildings on the site will require foul water drainage connections discharging to the Thames Water sewer network.

There are existing Thames Water combined sewers in the road to the west of the site. There are 'local sewers' noted as 305mm diameter immediately in front of the site and it is assumed that the existing combined drainage noted on site discharges to this pipe. No existing pumping system is recorded and connections are assumed to be by gravity. The local sewer discharges to a trunk sewer running within the roadway via a connection to the west of Bromley Hall.

There is a further trunk sewer running under the site at a depth of around 14m. Direct connections to trunk sewers from developments are not normally permitted and, in any case, the depth would be prohibitive.

The sewer records do not record any level information on the local sewers but the existing drainage on the site at the rear of the Old Poplar Library is noted as having a depth of around 2m. We have therefore assumed that the sewers are at a lower level than this and that the entire site can drain by gravity.

A pre-development enquiry (PDE) was made to Thames Water to confirm that the foul sewer system has capacity to accept the flow from the proposed dwellings. Thames Water have responded to confirm that the combined sewer system has the capacity to accept the flows from the proposed development.

A copy of the Thames water response is included in the appendices.

An application for Water Acts section 106 connection consents will be required as part of the detailed design.

Appendices

The following appendices are included

Appendix A: Thames Water sewer records

Appendix B: Environment Agency Flood map for planning

Appendix C: Detailed long term surface water flood risk mapping

Appendix D: BGS Historic Boreholes

Appendix E: Existing topographical survey

Appendix F: Proposed site plan

Appendix G: Proposed drainage strategy layout

Appendix H: Preliminary surface water calculations

Appendix J: Thames Water Pre-development enquiry responses

Appendix A: Thames Water sewer records

[illegible]

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

[Thames Water Utilities Ltd](#), Property Searches, PO Box 3189, Slough SL1 4W, DX 151280 Slough 13
T 0845 070 9148 E searches@thameswater.co.uk | www.thameswater-propertysearches.co.uk

NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

Manhole Reference	Manhole Cover Level	Manhole Invert Level
1805	n/a	n/a
1820	n/a	n/a
1804	n/a	n/a
1801B	n/a	n/a
1802	n/a	n/a
1817	n/a	n/a
1818	n/a	n/a
1816	n/a	n/a
1819	n/a	n/a
1803	n/a	n/a
1917	n/a	n/a
1915	n/a	n/a
1914	n/a	n/a
1901	n/a	n/a
1902B	n/a	n/a
1902A	n/a	n/a
1903A	n/a	n/a
1903B	n/a	n/a
1814	n/a	n/a
1705	n/a	n/a
18CI	n/a	n/a
191C	n/a	n/a
191B	n/a	n/a
191A	n/a	n/a
1801A	n/a	n/a
18CH	n/a	n/a
28AC	n/a	n/a
28AB	n/a	n/a
28AE	n/a	n/a
28AD	n/a	n/a
2708	n/a	n/a
2709	n/a	n/a
1704	n/a	n/a
1806	n/a	n/a
The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.		



ALS Sewer Map Key

Public Sewer Types (Operated & Maintained by Thames Water)

	Foul: A sewer designed to convey waste water from domestic and industrial sources to a treatment works.
	Surface Water: A sewer designed to convey surface water (e.g. rain water from roofs, yards and car parks) to rivers or watercourses.
	Combined: A sewer designed to convey both waste water and surface water from domestic and industrial sources to a treatment works.
	Trunk Surface Water
	Trunk Foul
	Storm Relief
	Trunk Combined
	Bio-solids (Sludge)
	Vent Pipe
	Proposed Thames Surface Water Sewer
	Proposed Thames Foul Sewer
	Foul Rising Main
	Surface Water Rising Main
	Combined Rising Main
	Proposed Thames Water Rising Main

Notes:

- 1) All levels associated with the plans are to Ordnance Datum Newlyn.
- 2) All measurements on the plans are metric.
- 3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate direction of flow.
- 4) Most private pipes are not shown on our plans, as in the past, this information has not been recorded.
- 5) 'na' or '0' on a manhole level indicates that data is unavailable.

Sewer Fittings

A feature in a sewer that does not affect the flow in the pipe. Example: a vent is a fitting as the function of a vent is to release excess gas.

	Air Valve
	Dam Chase
	Fitting
	Meter
	Vent Column

Operational Controls

A feature in a sewer that changes or diverts the flow in the sewer. Example: A hydrobrake limits the flow passing downstream.

	Control Valve
	Drop Pipe
	Ancillary
	Weir

End Items

End symbols appear at the start or end of a sewer pipe. Examples: an Undefined End at the start of a sewer indicates that Thames Water has no knowledge of the position of the sewer upstream of that symbol. Outfall on a surface water sewer indicates that the pipe discharges into a stream or river.

	Outfall
	Undefined End
	Inlet

- 6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in millimetres. Text next to a manhole indicates the manhole reference number and should not be taken as a measurement. If you are unsure about any text or symbology present on the plan, please contact a member of Property Insight on 0845 070 9148.

Other Symbols

Symbols used on maps which do not fall under other general categories

	Public/Private Pumping Station
	Change of characteristic indicator (C.O.C.I.)
	Invert Level
	Summit

Areas

Lines denoting areas of underground surveys, etc.

	Agreement
	Operational Site
	Chamber
	Tunnel
	Conduit Bridge

Other Sewer Types (Not Operated or Maintained by Thames Water)

	Foul Sewer
	Combined Sewer
	Culverted Watercourse
	Surface Water Sewer
	Gully
	Proposed
	Abandoned Sewer

Appendix B: Environment Agency Flood map for planning

Flood map for planning

Your reference
Leaside

Location (easting/northing)
538209/181907

Created
16 Apr 2019 12:00

Your selected location is in flood zone 3, an area with a high probability of flooding.

This means:

- you must complete a flood risk assessment for development in this area
- you should follow the Environment Agency's standing advice for carrying out a flood risk assessment (see www.gov.uk/guidance/flood-risk-assessment-standing-advice)

Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

The Open Government Licence sets out the terms and conditions for using government data.
<https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>

Flood map for planning

Your reference

Leaside

Location (easting/northing)

538209/181907

Scale

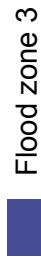
1:2500

Created

16 Apr 2019 12:00



Selected point



Flood zone 3



Flood zone 3: areas
benefitting from flood
defences



Flood zone 2



Flood zone 1



Flood defence



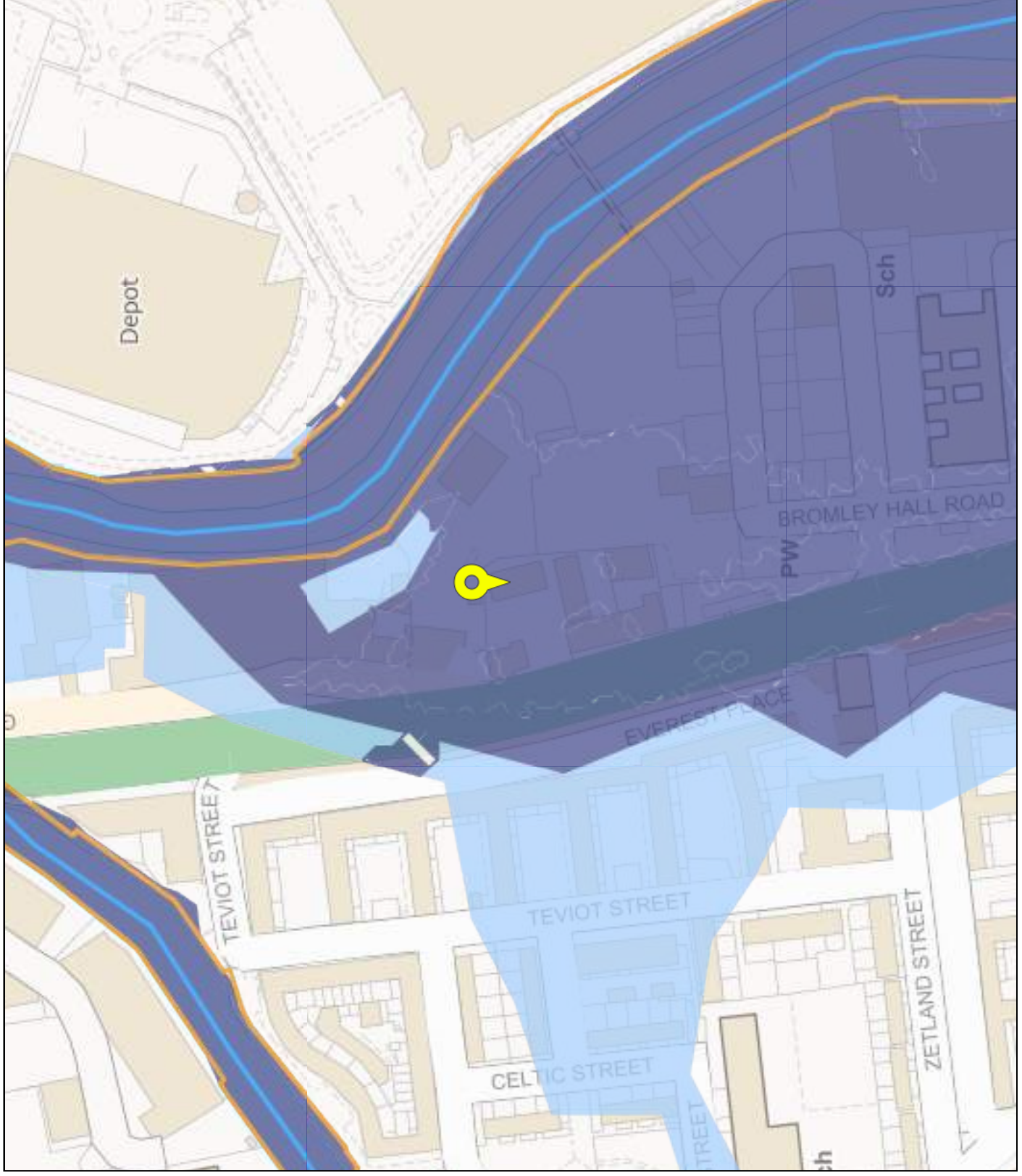
Main river



Flood storage area



Page 2 of 2



Appendix C: Detailed long term surface water flood risk mapping

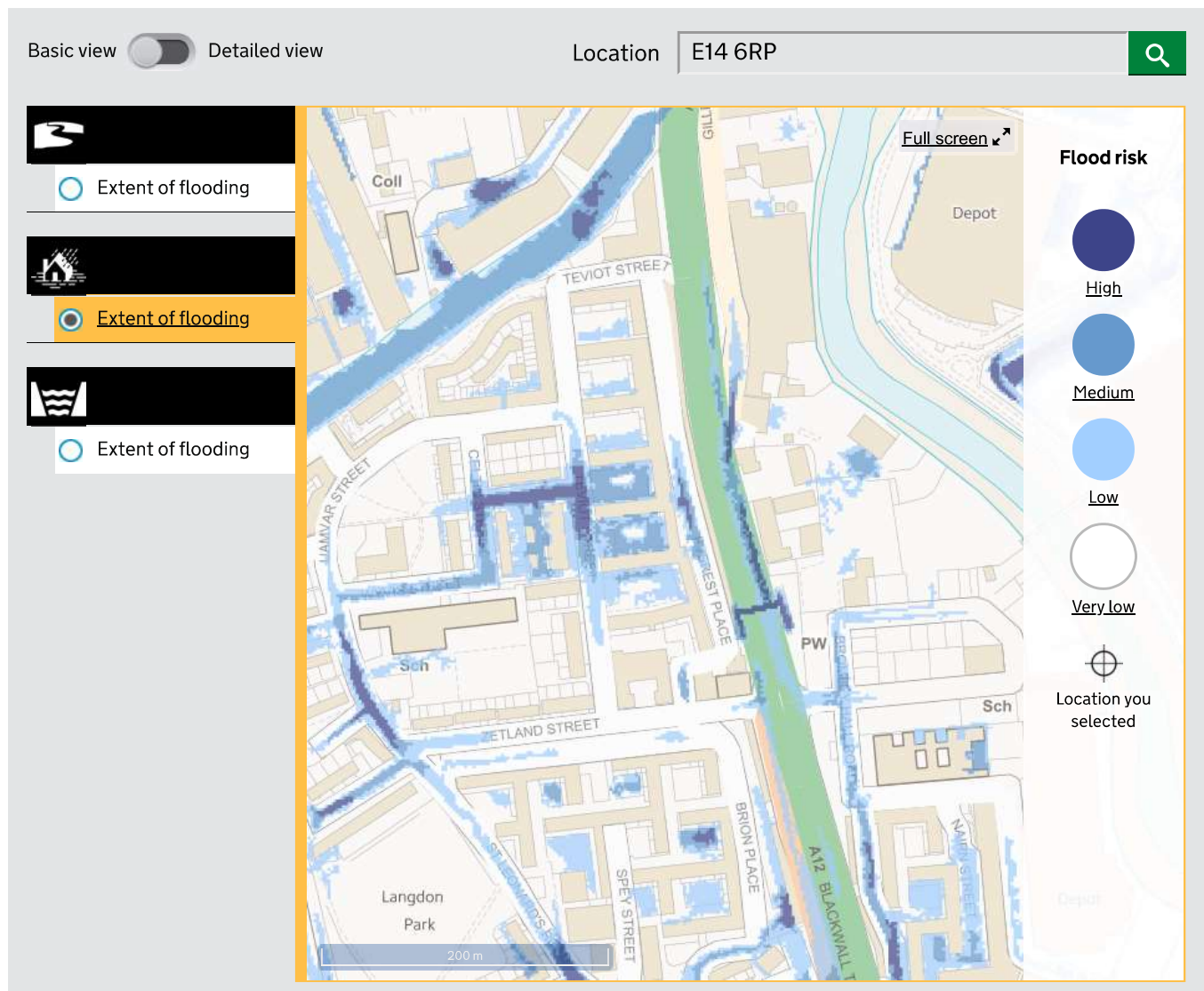
Learn more about this area's flood risk

Select the type of flood risk information you're interested in. The map will then update.

You can [learn more about the ways we describe flood risk](#). Alternatively select a legend item or feature from the map for an explanation of that flood risk.

'Detailed view' shows more technical information.

All information, particularly the likelihood of surface water flooding, is a general indicator of an area's flood risk. As such it is not suitable for identifying whether an individual property will flood. This service uses computer models to assess an area's long term flood risk from rivers, the sea, surface water and some groundwater. It does not include flood risk from sources such as blocked drains and burst pipes.



Appendix D: British Geological Survey historic borehole records

Borehole Log

Shell and Auger

Site POPLAR ABBEY MILLS
 Job No. 80520
 Date 5.9.88.
 Machine Type DANDO
 Vertical Scale 1:50



Borehole No.

10

Sheet 1 of 3

Depth m	Sampling Details	Depth m	Penetration Tests (mm)						Boring Details	Depth m	Thickness m	Legend	Description of Strata	Datum	
			75	75	75	75	75	75						m	O.D.
0														4.27	
0.50	01	0.50													
1.50	c2	1.50	2	3	4	3	3	4	C.P.T. N = 14		3.40		FILL of ash brick gravel and friable clay loose to medium dense state of compaction MADE GROUND		
2.60	c3	2.60	1	2	-	1	2	2	C.P.T. N = 5						
3.50	c4	3.50	5	6	7	7	6	7	C.P.T. N = 27					0.87	
4.00	05	4.00									1.50		Medium dense brown sandy GRAVEL THAMES BALLAST traces of ash fill observed in D5		
4.50	c6	4.50	6	6	7	6	8	8	C.P.T. N = 29		4.90				
4.95	07	4.95													
5.00 - 5.45	08	5.00 - 5.45							* 22 95%						
5.45	09	5.45													
5.80	010	5.80													
6.05 - 6.55	011	6.05 - 6.55							* 23 100%						
6.55	012	6.55													
6.95	013	6.95											Firm to stiff brown fissured very silty CLAY with occasional fine sandy pebbles and partings and with occasional white fine sandy streaks. Occasional plant remains LONDON CLAY		
7.40 - 7.90	014	7.40 - 7.90							* 25 100%						
7.90	015	7.90													
8.60	016	8.60													
9.00 - 9.50	017	9.00 - 9.50							* 27 100%						
9.50	018	9.50													
10															
Client British Geological Survey L.D.D.C.										Water level observations during boring					
										Date	Time	Depth of Hole (m)	Depth of casing (m)	Depth of water (m)	Remarks
Remarks Co-ordinates E538155 - N181975 6 Chemical soil samples taken at 0.50m, 1.00m, 1.50m, 2.10m, 2.60m and 3.20m Chemical water sample taken at 25.00m															

Borehole Log

Shell and Auger

Site POPLAR ABBEY HILLS
 Job No. 80520
 Date 5.9.88.
 Machine Type DANDO
 Vertical Scale 1:50



Borehole No.

10

Sheet 2 of 3

Depth m	Sampling Details	Depth m	Penetration Tests (mm)						Boring Details	Depth m	Thickness m	Legend	Description of Strata	Datum	
			75	75	75	75	75	75						m	O.D.
10	D19	10.10													
	U20	10.45- 10.95							* 30 100%						
11	D21	10.95							* 30						
	D22	11.70													
12	U23	12.10- 12.60							* 28 100%						
	D24	21.60													
	D25	12.90													
13	U26	13.40- 13.90							* 30 100%						
	D27	13.90													
14	W47	14.20													
	D28	14.65								14.50			Firm to stiff brown fissured very silty CLAY with occasional fine sandy pockets and partings and with occasional white fine sandy streaks. Occasional plant remains LONDON CLAY		
15	U29	15.55- 16.05							* 35 100%						
16	D30	16.05													
	D31	16.70													
17	U32	17.10- 17.60							* 32 100%						
	D33	17.60													
	D34	17.85													
18	U35	18.40- 18.90							* 30 100%						
	D36	18.90													
19	D37	19.40								19.40					
	C38	19.55	10	11	11	12	14	13	C.P.T. N = 50				Dense to very dense grey silty SAND with black pebbles and shells LONDON CLAY	-15.13	
20															

Client L.D.O.C.

British Geological Survey

Water level observations during boring

British Geological Survey

Remarks

Falling head permeability tests carried out at 10.50m, 11.50m
and 12.65m

Date	Time	Depth of Hole (m)	Depth of casing (m)	Depth of water (m)	Remarks
15.8.88.		19.40	19.00	19.40	1st STRIKE
	+ 0.05	19.40	19.00	17.20	
	+ 0.10	19.40	19.00	14.30	
	+ 0.15	19.40	19.00	14.20	
	+ 0.20	19.40	19.00	14.20	STANDING

Borehole Log

Shell and Auger

Site										Borehole No.					
Job No.										9					
Date										Sheet 1 of 3					
Machine Type															
Vertical Scale															
Depth	Sampling	Depth	Penetration Tests (mm)						Boring	Depth	Thickness	Legend	Description of Strata	Datum	
m	Details	m	75	75	75	75	75	75	Details	m	m			m	O.D.
0															
	D1	0.45									1.35		Dark brown sandy silty CLAY FILL with fine chalk gravel concrete brickwork charcoal fragments shell fragments etc. MADE GROUND	3.46	
1															
	D2	1.45									1.35			2.11	
	U3	1.50 - 2.00							* 20 100%						
2															
	D4	2.00													
	D5	2.40													
	U6	2.50 - 3.00							* 20 100%						
3															
	D7	3.00													
	c8	3.40							C.P.T. N = 27					0.26	
4															
	D9	4.00													
	c10	4.50							C.P.T. N = 30						
5															
	D11	6.00													
	c12	6.50							C.P.T. N = 29						
7															
	D13	6.95													
	U14	7.00 - 7.50							* 25 100%						
	D15	7.50													
8															
	D16	7.95													
	U17	8.40 - 8.90							* 22 100%						
9															
	D18	8.90													
	D19	9.60													
10															
Client										Water level observations during boring					
L.D.D.C.															
Remarks										Date Time Depth of Hole (m) Depth of casing (m) Depth of water (m) Remarks					
Co-ordinates E538206 - N181823															
5 chemical soil samples taken at 0.45m, 1.00m, 1.35m, 2.10m and 3.20m															
Chemical water sample taken at 25.00m															



1438SE 1742 A RECORD OF BOREHOLE NO. 1

Ground level : 15.6ft above O.D.

Dia. of boring : 8in to 54ft
6in to 80ft

Type of boring : Shell and Auger

Lining tubes : 8in to 54ft
6in to 78ft

Daily Progress	Samples		Change of Strata			Description of Strata
	Depth	Type	Legend	Depth	O.D. Level	
				1'0"	14.6	CONCRETE
	5'0" - 6'0"	C(2)		7'0"	8.6	FILL (Brick, clay, timber, gravel and soil)
	9'6" - 11'0"	U(4) D				
	14'0" - 15'6"	U(4) D				FILL (Dark grey clayey silt with fragments of chalk, gravel, brick and timber and smelling of oil)
	19'0" - 20'6"	U(4) D		25'0"	- 9.4	
	26'6" - 27'6"	C(9)				
	30'6" - 31'6"	C(7)		34'0"	-18.4	Loose medium to coarse SAND with fine to medium gravel
	34'6" - 36'0"	U(4) D				
28.5.68	40'0" - 41'6"	U(4) D				
	45'0" - 46'6"	U(4) D				
	50'6" - 52'0"	U(4) D				Stiff to very stiff fissured grey-brown becoming grey with depth silty CLAY with partings of silt and fine sand (very sandy from 44ft to 45ft)
	55'0" - 56'6"	U(4) D				
	60'0" - 61'6"	U(4) D		65'0"	-49.4 (-15.05m)	
						See next sheet

Key to type of sample :

- U (4) — 4 in. dia. undisturbed sample.
- U (1½) — 1½ in. dia. " "
- D — disturbed sample.
- BD — bulk disturbed sample.
- V — vane test.
- (S) — standard penetration test.
- (C) — dynamic cone penetration test.

Figure in brackets is No. of blows for

Remarks : (Observations on ground-water, etc.)

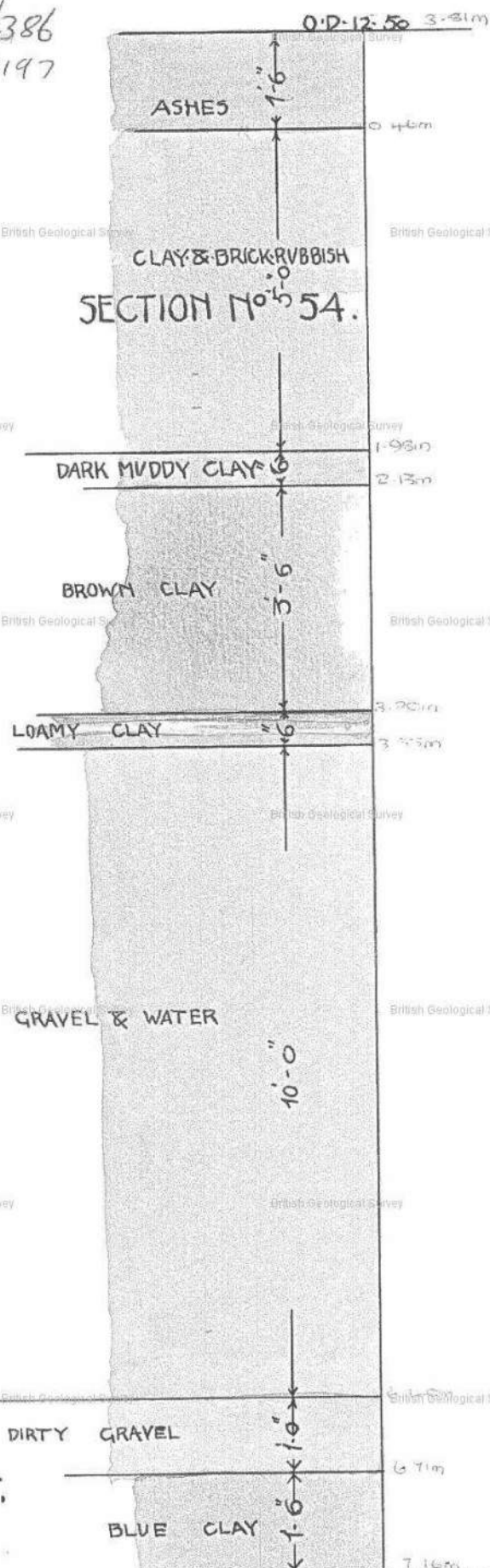
Water was first encountered at 5ft and was sealed off by the lining tubes at 6ft. Water was again encountered at 25ft and rose quickly up the borehole to 11ft. Sand tending to 'boil' between 25ft and 34ft. A seepage of water was encountered between 44ft and 45ft.

continued on next sheet



FIRE BRIGADE STATION
BROMLEY BY BOW · E.

TQ38SE/386
3820 8197
258



SCALE $\frac{1}{2}$ " TO 1 FOOT.

Appendix E: Existing Topographical survey

DATUM NOTES

GRID ORIGIN IS BASED UPON SURVEY STATION 8 FIXED TO THE ORDNANCE SURVEY NATIONAL GRID BY LEICA SMARTNET GPS MEASUREMENT. A SCALE FACTOR OF 1 APPLIES TO THIS DRAWING.

ALL MEASURED DISTANCES ON THE GROUND WITHOUT GPS WILL BE THE SAME AS THOSE MEASURED ON THIS DRAWING.

LEVELS ARE RELATED TO -

ORDNANCE SURVEY GPS ACTIVE NETWORK AND TRANSFORMED USING THE CGSM15 & OSTN15 MODEL

SITE BENCH MARK ESTABLISHED IS LOCATED AT -

STATION 8

VALUE GIVEN AS 3.705m (NEWLYN DATUM)

SURVEY CONTROL STATIONS SHOWN

ABBREVIATIONS (where applicable)

AV	Air Valve	MH	Manhole Cover
BC	Brick	MS	Manhole
BL	Build	MS	Milestone
BS	Bus Stop	MT	Meter
BT	Bluetooth Transceiver	MT	Metric
CB	Control Box	MT	Mercury
CB	Cable Coated	OH	Overhead
CL	Close Level	PAN	Paving
CLK	Chalkline	PE	Pipe
CL	Chain	PM	Parking Meter
CC	Concrete	PT	Pipe
CC	Concrete Pipe	PT	Pipe and Rail
CPS	Concrete Paving Slabs	PW	Powst and Wire
CR	Curb Revision	RE	Reading Eye
CD	Drainage Channel	RET	Retaining
CS	Curb Sign	RS	Road Sign
EC	Electricity Channel	RS	Rollled Steel Joist
ER	Excavation	SC	Scrap
FB	Flow Bed	SK	Skidaway
FE	Face	SP	Signpost
PH	Hydrant	ST	Stall Trip
FL	Floor Level	SV	Stop Valve
GS	Grass	SVC	Security Video Camera
GP	Gate Post	TCB	Telephone Call Box
GG	Gravel	TH	Threshold Level
GY	Gully	TK	Tank
IL	Inspection Cover	TL	Traffic Light
IC	Inspection Cover	TP	Telephone Pole
IN	Interceptor	UG	Underground
IR	Interceptor	UTL	Unable to Trace Further
KO	Kerb Offset	UTL	Unable To Lift
LE	Litter	VF	Vent Pipe
LF	Lift	WL	Water Level
		WM	Water Meter
TH	Threshold Level		
CW	Combined Water		
SW	Storm Water		
WL	Water Level		

NOTES

- * Drainage pipe sizes (where shown) have been gauged from the surface for safety reasons and should be regarded as approximate only.
- * Tree species (where shown) should be treated with caution and expert identification is advised.
- * Although this is a digital survey the accuracy and amount of detail shown is commensurate with the graphical scale of mapping as specified. Care should be exercised when working to larger scales.
- * Visible features in the vicinity of the boundaries as shown above, may not represent the extent of legally conveyed ownership.
- * Whilst every effort has been made to achieve accuracy on this plan, CRUCIA clearance dimensions, levels and invert levels should be checked prior to design and construction.
- * Kerb levels have been taken in the bottom of the channel.
- * Areas of dense undergrowth cannot be surveyed in detail, these areas will be shown in outline only and marked as 'Identified as dense undergrowth'.

SHEET LAYOUT
NOT TO SCALE

SHEET LAYOUT
NOT TO SCALE

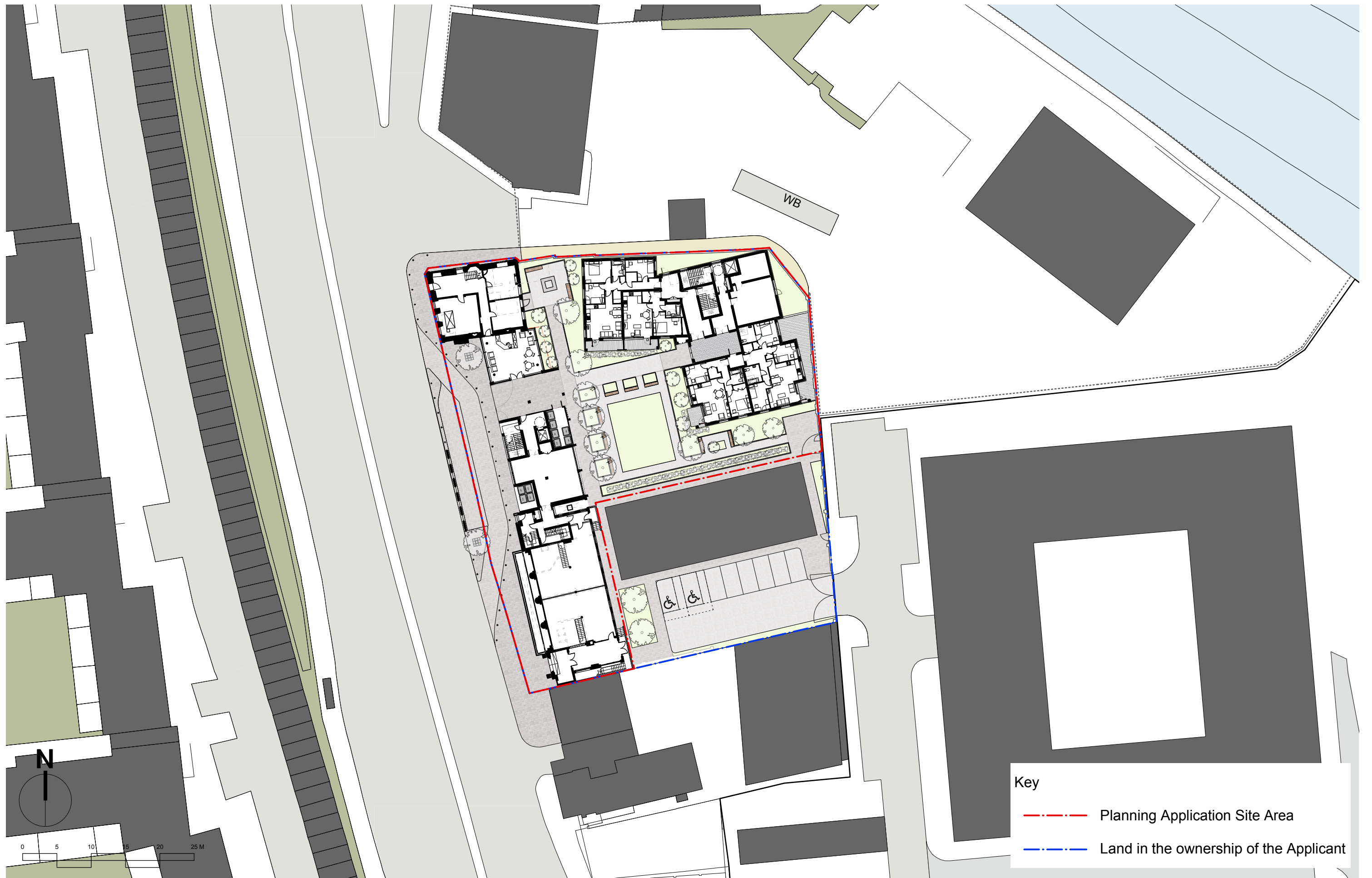
LEASIDE BUSINESS
CENTRE
GILLENDR STREET
LONDON
E14 6RN
TOPOGRAPHICAL SURVEY

SURVEYED FOR POPLAR HARBOUR
2 BELTON WAY
BOW
LONDON
E3 4BB

SURVEYOR J.S.
DATE JANUARY 2018

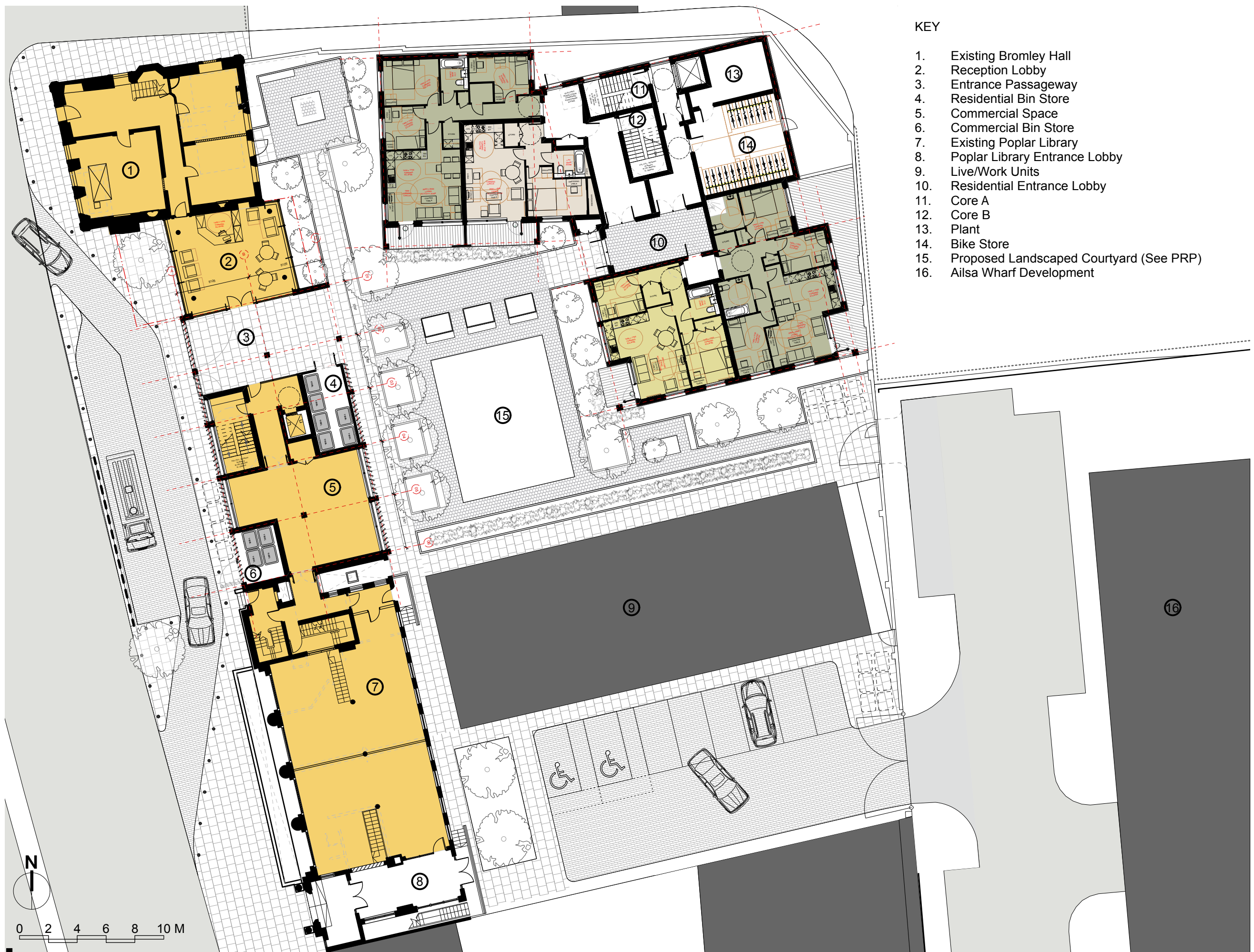
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SCALE		1 : 200 @A0	
SEE ALSO DWG NO		L 8442/ES	
SHEET		1 of 1	
REF NO		L 8442	

Appendix F: Proposed site plan



Key

- - - - - Planning Application Site Area
- - - - - Land in the ownership of the Applicant



KEY

1. Existing Bromley Hall
2. Reception Lobby
3. Entrance Passageway
4. Residential Bin Store
5. Commercial Space
6. Commercial Bin Store
7. Existing Poplar Library
8. Poplar Library Entrance Lobby
9. Live/Work Units
10. Residential Entrance Lobby
11. Core A
12. Core B
13. Plant
14. Bike Store
15. Proposed Landscaped Courtyard (See PRP)
16. Ailsa Wharf Development

KEY

1. Existing Bromley Hall
2. Toilet converted to Hallway
3. Proposed Bridge into Bromley Hall
4. Double Height Space
5. Proposed Commercial Space
6. Old Poplar Library Commercial Space
7. Live/Work Units
8. Core A
9. Core B



LEASIDE BUSINESS CENTRE FEASIBILITY

FLOOR 01