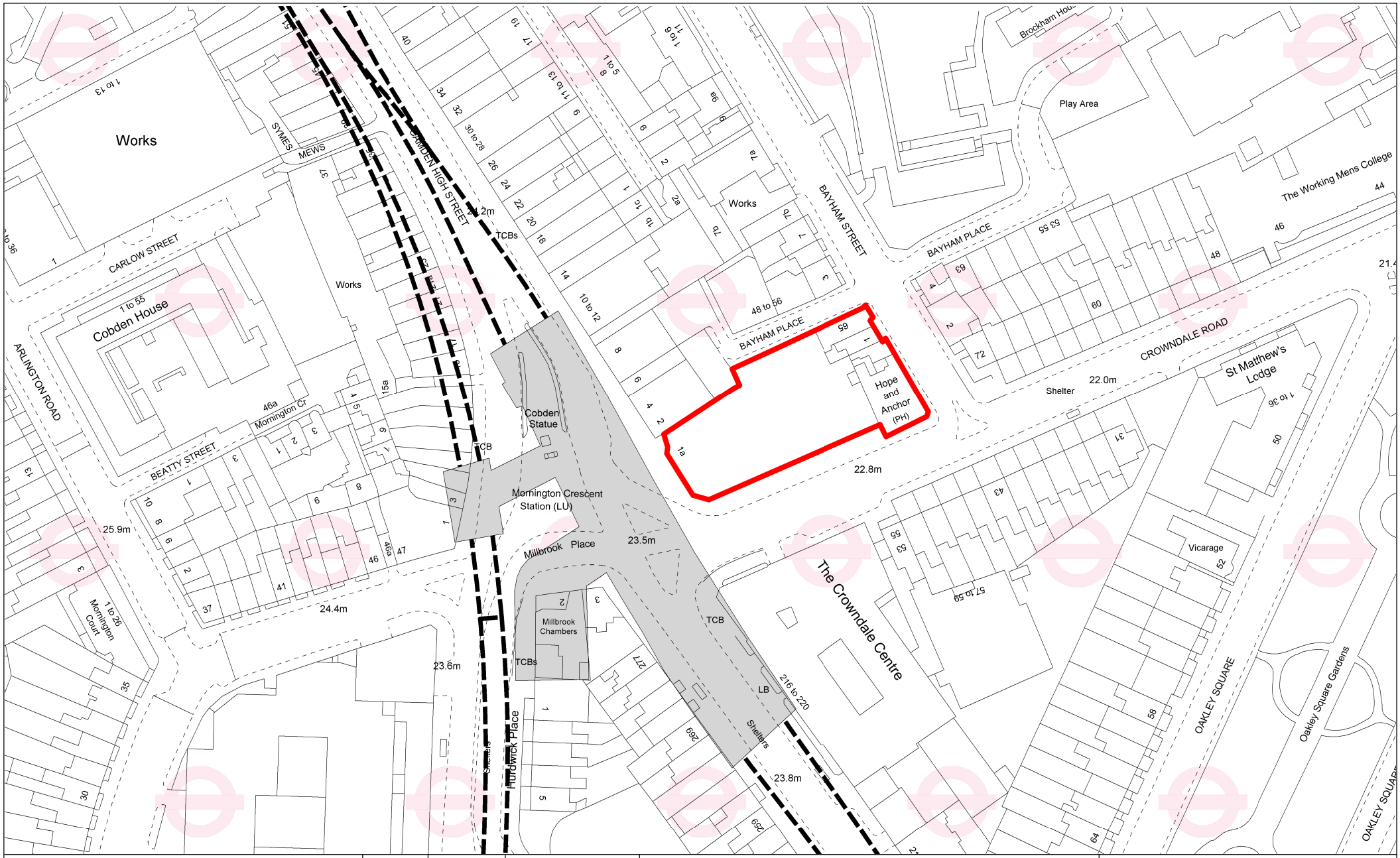
Appendix G

London Underground Correspondence

HEYNE TILLETT STEEL



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Infrastructure Protection
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Date	01 April 2016
LCS Code	N093
Drawn by	S. Inayathusein
Scale	1:1250 at A4

1. All dimensions and LUL asset locations are approximate
2. This drawing must be read in conjunction with the accompanying letter sent by LUL
3. This drawing is for planning purposes only
4. For more accurate tunnel location information a survey will need to be undertaken.

The Hope Project
Crowndale Road
London
NW1 7JE

Appendix H

Drainage Strategy Report

HEYNE TILLETT STEEL

The Hope Project

Appendix H - Drainage Strategy Report

October 2017

4 Pear Tree Court, London EC1R 0DS 020 7870 8050 hts.uk.com

1 Introduction

This Drainage Strategy Report has been prepared by Heyne Tillett Steel Ltd (HTS) to support a detailed planning application for The Hope Project which is in the London Borough of Camden. The proposals include the refurbishment of KOKO, The Hope & Anchor pub and the redevelopment of 1 Bayham Street and 65 Bayham Place.

The report will include analysis of the existing sites foul and surface water infrastructure and how development proposals will impact on the proposed foul and surface water drainage.

The proposed surface water management analysis has been prepared to the requirements of the National Planning Policy Framework, 2012 (NPPF), and the National Planning Practice Guidance (NPPG), which sets out the guidance for reducing flood risk in general by using Sustainable drainage systems (SuDS).

The surface water management strategy will demonstrate a scheme of SuDS which will be achieved as part of the development in accordance with the Defra – Non-statutory technical standards for sustainable drainage, March 2015 which sets out the government policy to SuDS schemes.

The main purpose of this report is to analyse the pre and post development surface water run-off rates and volumes, where post development surface run-off rates are not to exceed the pre development run-off rates, and are to be reduced as much as practical (to adhere to current guidance), in order to reduce the risk of flooding to areas within and in the vicinity of the site.

The London Plan Paragraph 5.13 states that the preferred surface water run-off is to greenfield levels where practical and the PPG, Paragraph 051 states the drainage is to be designed to control surface water run-off close to where it falls and mimic natural drainage as closely as possible, provide opportunities to reduce the causes and impacts of flooding, and remove pollutants from urban run-off at source.

Supplementary Planning Guidance (SPG) produced by the Greater London Authority offers recommendations for developers. Clauses 3.4.2, 3.4.12 and 3.4.14 set out the expectation of SuDS to be incorporated into the design of new developments to prevent increasing volumes of surface water runoff and reduce flood risk. Clauses 3.4.8 -3.4.9 stipulate that:

''Most developments referred to the Mayor have been able to achieve at least 50% attenuation of the site's (prior to re-development) surface water runoff at peak times. This is the minimum expectation from development proposals".

Based on the above guidance, the proposed surface water drainage system will aim to restrict the surface water to greenfield run-off rate if practical, and to reduce the post development run-off rates to 50% of the pre development rates as a minimum.

2 Existing and Proposed Site

Site Location

The existing site is located at Crowndale Road, Camden, NW1 7JE which is in the London Borough of Camden. The proposed site is approximately 1,617 m² (0.162 ha) in area and is irregular in shape.

The Grid Reference for the development is TQ292834.

Existing Site Description

The existing site is currently 100% hard standing and is occupied by the concert venue and former theatre KOKO, where the building footprint takes up the entirety of the site area.

For existing site plans refer to the Appendices of the main document 1444 - The Hope Project – Structural Methodology Statement & Basement Impact Assessment.

Site Areas

The overall development site / site boundary area is 1617 m² / 0.162 ha.

In terms of permeable and impermeable areas of the existing / pre development site, it is deemed that all of the site (1617 m²) is impermeable, as there is no evidence of landscaped / grassed / undeveloped areas.

Ground Conditions

A Ground Investigation was carried out by RSK Environment Ltd on the 7th of September 2016. Evaluation of the sites ground condition was achieved through multiple trial pits located around the site. The ground was identified as being underlain by a variable thickness of made ground over the London Clay, with Lambeth Group at depth.

Thames Water Assets

The Thames Water asset record (refer to the Appendices of the main document 1444 - The Hope Project – Structural Methodology Statement & Basement Impact Assessment) indicates that the local drainage network in the area is a combined water system. Located at the Northern boundary of the site is a 229mm diameter sewer in Bayham Place. Bayham Street to the east of the site also contains a 229 diameter combined water sewer which flows towards Crowndale Road to the south. The combined water sewer at the southern boundary of the site is 1448 x 991 mm and flows towards the east. The Thames Water Asset Plan shows very limited level information. At the junction of Bayham Place and Bayham Street the invert level of the sewer is identified as being 18.27 m. Using level information obtained from the topographical survey the depth of the sewer at this location is approximately 4.3 m.

A pre-development enquiry will be submitted in due course in order to understand the impact of the proposed development on the Thames Water sewerage network.

Existing Site Drainage

A CCTV drainage survey has been carried out for the site. The survey shows that there are existing combined drains throughout the site, both external to the face of the buildings and internal within the ground floor and basement areas. Refer to Appendix H6 for a copy of the CCTV Drainage Survey and Report.

Proposed Development

The proposals include the extension of KOKO nightclub, the rebuild of The Hope & Anchor pub and the redevelopment of 1 Bayham Street and 65 Bayham Place.

The proposal retains the listed KOKO structure and redevelops the surrounding site to provide new entertainment facilities, linking to the existing venue. The existing buildings at 1 Bayham Street, 65 Bayham Place and The Hope & Anchor will be demolished and replaced by a new building with three storeys above ground and a roof terrace, housing a private members club, and dining rooms. A new elevator and stair core is proposed to extend below the ground floor to allow access to the existing KOKO basement and subbasement levels.

Various sections of existing façade are to be retained due to heritage significance, including the ground fl oor of The Hope & Anchor facade, the single storey KOKO façade along Bayham Place and a 4 m long section of façade on Bayham Street.

A new 'Sky Lobby' bar is to be constructed above the main roof of KOKO. The existing dome structure is to be converted to a bar and will be linked to the new 'Sky Lobby' via a glazed stairway.

In the proposed scheme the majority of the existing drainage will be retained with little, if any, alteration to existing roofs and catchment areas. The parts of the redevelopment described above as new construction sit within a new roof catchment area of approximately **312 m²**. It is proposed that only this roof catchment area will be attenuated. This strategy has been initially discussed and agreed with Ana Lopez the LLFA officer at LB Camden. Refer to Appendix H4 for correspondence with LB Camden.

The proposed attenuation is in the form of blue roofs. For proposed location of new blue and green roofs refer to the Appendix H5. The proposals include a blue roof at 1st floor (with approximately 88 m² located at the southeast corner of the building), one blue roof at 3rd floor (with approximately 89 m²) and ne blue roof at 4th floor (with approximately 90 m²). In addition, there will be a green roof (approximate area of 45 m²) located at 4th floor which will drain into the blue roof at 1st floor and hence being also attenuated. The total of this attenuated areas is approximately 312 m².

3 Surface Water Run-Off and Volume Analysis

The post development surface water run-off is to be reduced to as low as possible, in order to reduce the risk of flooding, with the preferred being the greenfield run-off rate, and the minimum requirement being a 50% betterment of the pre development rates (as per London plan and Camden Planning Guidance 3 (CPG3)).

In order to establish the required reduction / restriction for the post development surface water run-off rates, the pre development greenfield run-off rate and pre development positively drained surface water run-off rates are to be calculated.

The post development surface water run-off rates are then to be calculated to establish the impact of the development in terms of flood risk. The pre and post development figures are to be used to analyse the required SuDS methods to control the surface water, and to calculate the attenuation volumes required to prevent flooding for the 1 in 100-year storm including climate change.

Greenfield Runoff Rates

The Greenfield runoff rates are based on the new build site area 312 m² / 0.0312 ha; results are as follows:

Return Period	Run-off Rate
Q_{bar}	0.05 l/s
Q_1	0.15 l/s
Q_{30}	0.31 l/s
Q_{100}	0.35 l/s

Pre-development Surface Water Run-off Rates

The pre development positively drained surface water run-off rates are based on the existing impermeable area of 312 m² / 0.0312 ha, In accordance with the Modified Rational Method, the peak existing run-off from the site is calculated from the formula:

Q = 3.61 x Cv x A x i

where Cv is the volumetric runoff coefficient, A is the catchment area in hectares and i is the peak rainfall intensity in mm/hr.

For the peak 1 in 1 year return period storm event this gives an existing discharge rate from the site of:

Q_1 = 3.61 x 0.75 x 0.0312 x 33.4 = **2.8 litres/sec**

and for the peak 1 in 100 year return period storm event this gives an existing discharge rate from the site of:

Q_{100} = 3.61 x 0.75 x 0.0312 x 106.5 = **9.0 litres/sec.**

Appendix H1 contains detailed run-off calculations, and the results are summarised below.

Return Period	Run-off Rate
Q_{1-15}	2.8 l/s
Q_{30-15}	6.9 l/s
Q_{100-15}	9.0 l/s

Post Development Surface Water Run-Off Rates – No Restrictions

The post development surface water run-off rates are to be calculated to assess the impact of the development in terms of surface water management.

The post development positively drained surface water run-off rates are based on the existing impermeable area of 312 m² / 0.0312 ha. Again, using the Modified Rational Method, for the peak 1 in 1 year return period storm event this gives a proposed discharge rate from the site of:

Q_1 = 3.61 x 0.75 x 0.0312 x 33.4 = **2.8 litres/sec**

and for the peak 1 in 100 year return period storm event this gives a proposed discharge rate from the site of:

Q_{100} = 3.61 x 0.75 x 0.0312 x 106.5 = **9.0 litres/sec.**

A climate change allowance of 40% has been selected for use in the 100 year storm scenario. This in line with the guidance on climate change allowances set out in the Environment Agency's 'Flood risk assessments: climate change allowances'. Making an allowance for climate change of 40 % this would give an unattenuated design discharge of:

Q_1 (+40%) = **3.9 litres/sec** and Q_{100} (+40%) = **12.6 litres/sec**

Return Period	Run-off Rate
Q_{1-15}	2.8 l/s
Q_{30-15}	6.9 l/s
$Q_{100-15+40\% CC}$	12.6 l/s

It is worth emphasizing that these rates are unrestricted and the attenuation provided of this rates will be discussed in chapter 5.

Pre/Post-development Surface Water Volumes

As per the DEFRA Sustainable drainage technical standards the sites runoff volume pre and post – development need to be compared for the 1 in 100 year 6 hour storm event.

	Return Period	Discharge Volume
Pre-Development	$Q_{100-360}$	20.0 m³
Post-Development	$Q_{100-360+40\% CC}$	28.0 m³

Although the impermeable areas remain identical post and pre-development due to the increase in total flow created by the climate change allowances the post-development discharge volume has increased compared to the existing.

4 Surface Water SuDS Analysis

As the results from the calculations shown in chapter 3, the post development surface water run-off rates exceed the greenfield rates, and the positively drained rates for the 1 in 100-year storm event due to climate change. Therefore, in order to reduce the surface water run-off to the preferred rate of greenfield, or to 50% of the pre development rate as a minimum, further SuDS methods are to be introduced to the post development design.

HTS have considered a number of SuDS methods as per the Sustainable Drainage System (SuDS) hierarchy (NPPF Paragraph 080 and Camden Planning Guidance 3 (CPG3)).

The various SuDS methods, their description and feasible use on this development are described below: -

SuDS Methods	Description and Feasibility
Green Roofs	The roof layout of the proposed development includes an area of Green Roof. Green roofs are designed to intercept and retain precipitation, reducing the volume of runoff and attenuating peak flows.
Infiltration Devices	Infiltration devices drain water directly into the ground. They may be used at source or the runoff can be conveyed in a pipe or swale to the infiltration area. They include soakaways, infiltration trenches and infiltration basins as well as swales, filter drains and ponds. Infiltration devices can be integrated into and form part of the landscaped areas of a development site if required to maximise the developable area of a site. Infiltration devices cannot be built in made ground due to instability, and clay is not a porous material. Infiltration structures are also to be 5m from any structure and 2.5m from the development boundary, and won't be able to be built due to the nature of the site. Due to the ground conditions not being viable for infiltration and the nature of site not being suitable, infiltration devices are not a feasible SuDS method.
Basins and Ponds – Above Ground Storage	These systems can provide both storm water attenuation and treatment. They are designed to support emergent and submerged aquatic vegetation along their shoreline. Given the nature of the development, where the majority of the site will comprise of the proposed building the use of basins and ponds is not a feasible SuDS method.
Filter Strips and Swales	Similar to Basins and Ponds can provide both attenuation, treatment and infiltration. Given the nature of the development, where the majority of the site will comprise of the proposed building the use of filter strips and swales is not a feasible SuDS method.
Rainwater Harvesting Tanks	Rainwater from roofs and hard surfaces can be stored and used. If designed appropriately, the systems can also be used to reduce the rates and volumes of runoff. There is not sufficient space for rainwater harvesting tanks within the development.
Flow Control and Attenuation System	In order to ensure the surface water is restricted to the desired rate a flow control system can be incorporated into the proposed drainage network. There will also be a requirement to store the attenuated water which could be achieved by oversized pipes, oversized manholes or a cellular storage structure. In this case it is proposed to install a cellular blue roof system with orifices at outlets from the blue roof to limit discharge.
Discharge Rainwater directly to watercourse	There are no watercourses within the direct vicinity of the site for the network to connect / discharge to.
Discharge Rainwater to a surface water sewer	There are no surface water sewers within the direct vicinity of the site for the network to connect / discharge to.
Discharge Rainwater to a combined water sewer	As there are no watercourses or surface water sewers within the direct vicinity of the site the only alternative would be to connect / discharge the surface water to the combined sewer.

5 Proposed Surface Water Management Strategy

SuDS Summary

Based on the SuDS analysis the most viable SuDS features for the proposed development are:

- Flow control and Attenuation

Flow control and attenuation in the form of an orifice or similar and cellular blue roof storage can be designed to restrict the peak surface water runoff rate and prevent flooding on site.

Surface Water Run-Off Rate

As the volume for the post development in the 1 in 100 year 6 hour event exceeds the volume of the pre development for the same event, in line with the standards laid out in the DEFRA Sustainable drainage technical standards 'the runoff volume must be discharged at a rate that does not adversely affect flood risk'.

Being the referred scope of works a refurbishment, 50% of the rate based on 1 in 100 years return period event was considered being in line with the London Plan SPG:

"Most developments referred to the Mayor have been able to achieve at least 50% attenuation of the site's (prior to re-development) surface water runoff at peak times. This is the minimum expectation from development proposals".

Attenuation Design

During peak storm events; rainfall events which have a rate of rainfall higher than the rate at which the surface water can discharge away will result in water accumulation within the development site. If not correctly managed, this water can cause flooding.

This section aims to investigate the amount of surface water attenuation needed for the sites restricted peak discharge rate.

A drainage model was created in accordance with BRE Digest 365 to size the attenuation tank. A copy of the results can be found in Appendix H2.

The storage method used in the model was cellular storage, to reflect a blue roof. This provides a storage tank without the need for a concrete structure and is composed plastic storage cells with a void ratio of 95%.

Flow restriction from the surface water system will be handled by a HydroBrake, orifice or similar which can be installed at the outfall from the blue roof system. The table below shows the attenuation tank and betterment provided.

Storm Event	Pre development Run-off Rates	Post development Run-off rates with betterment	Tank / Blue roof size
$Q_{1\text{-}15}$	2.8 l/s	2.8 l/s (0%)	9 m^3
$Q_{30\text{-}15}$	6.9 l/s	4.5 l/s (35%)	
$Q_{100\text{-}15}$	9.0 l/s	4.5 l/s (50%)	

The attenuation has been sized taking into account the peak rainfall event for the 1 in 100 year return period + 40% climate change. Blue-roof design will be confirmed at further details design stages with relevant specialists.

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6 Preliminary Foul Water Strategy

The foul water flows from the proposed development site are likely to increase due to the introduction of new storeys.

The foul water generated from the site is proposed to be conveyed into the below ground drainage network and discharged into the public sewer by gravity where possible.

Flows generated at below ground level is proposed to benefit from a pumped device which will convey foul water via a rising main to the combined water outfall location for the site.

A pump size and specification is to be confirmed however the design is to be carried out to incorporate any Building Regulation Part H requirements.

7 Maintenance

To help with maintenance, best practice measures as recommended within the following documents has been incorporated into the drainage design:

- Building Regulations Part H,
- Sewers for Adoption 7th Edition

An upstream manhole has been designed within close proximity of the outfall to allow for adequate maintenance. Jetting or rodding from this point towards the outfall is anticipated to remove any blockage. This should be carried out in the event of low tide to ensure that the manual opening of the flap valve does not allow backflow of tidal water into the site.
The efficiency of the proposed drainage network together with the outfall is subject to a routine maintenance and inspection regime.
The table below sets out the tasks recommended to be carried out. These tasks are not exhaustive and should be in addition to manufacturers recommended maintenance schedule.
The maintenance should be carried out to safe working practice standards and a method statement by specialist and onsite staff.

Maintenance Schedule

Schedule	Task	By Whom
Immediately after construction		
Immediately after construction	• Carry out CCTV of new drainage network and as-built records	Specialist Contractor
Immediately after construction	• Check for leakage in the internal pipework at basement level.	Specialist Contractor and design engineers
Within the First Year After Construction		
Weekly	-	-
Monthly	-	-
Bi Annually	• Jet the pipework towards the outfall and clear any debris • Check joints around the outfall • Inspect pump	Specialist only and/or qualified personnel.
After the First Year After Construction		
6 Monthly	• Check outfall manhole for debris and silt build up • Carry out jetting where necessary	Maintenance staff and/or specialist

Costs associated with the maintenance schedule is subject to the specification of the different components used in the proposed drainage system. This is to be conformed at a later stage of the design.

8 Conclusion

The proposed / post development surface water drainage has aimed to meet the requirement of The London Plan Paragraph 5.13 that states that the preferred surface water run-off is to greenfield levels where practical.

All SuDS methods have been assessed to establish whether they are feasible for the development in order to reduce the surface water run-off to the preferred greenfield rate.

Due to the size and nature of the site, and as well as the ground conditions, the use of wetlands, ponds, detention basins or infiltration structures are not feasible SuDS options for the development site.

Therefore, the only alternative would be to formally restrict the surface water run-off via an orifice or similar prior to formal discharge into an existing sewer network.

The peak surface water discharge rate for the proposed development will be restricted to 4.5 l/s. Attenuation will be provided in the form of cellular storage / blue roof of 9 m^3 up to a 1 in 100 year + 40% Climate Change peak event. This attenuation will provide the 50% betterment for the new build portion of the site as per Camden Planning Guidance 3 (CPG3). Blue-roof design will be confirmed at further details design stages with relevant specialists.

The Surface water drainage pro-forma for new developments required from Camden Planning Guidance 3 (CPG3) is attached in Appendix H3 with all the relevant information and rates.

A pre-development enquiry has yet to be submitted to Thames Water, it is assumed that due to the decrease in surface water flows this will offset the proposed increase in foul water flows.

The preliminary drainage strategy is subject to change at detail design stages once architectural plans are finalized and agreed. The strategy is based on preliminary information available at the time of writing this report.

SUDS devices should be maintained in line with the manufacturer's recommendations to ensure the system remains operational and effective throughout the intended design life of the network. A service and inspection agreement should remain in place for mechanical devices used to manage surface water.

Appendix H1 - Pre and Post Development SW Run-Off Rates

Heyne Tillett Steel		Page 1
4 Pear Tree Court London EC1R 0DS	Koko Camden Greenfield Runoff Calculations	
Date 28/02/2017 File	Designed by Alex Herman Checked by Niall Greenan	
XP Solutions	Source Control 2016.1.1	

IH 124 Mean Annual Flood

Input

Return Period (years) 1 SAAR (mm) 600 Urban 0.750
Area (ha) 50.000 Soil 0.300 Region Number Region 6

Results l/s

QBAR Rural	76.1
QBAR Urban	282.8
Q1 year	240.4
Q1 year	240.4
Q2 years	287.1
Q5 years	380.6
Q10 years	429.6
Q20 years	471.7
Q25 years	482.5
Q30 years	491.1
Q50 years	518.9
Q100 years	566.9
Q200 years	605.1
Q250 years	615.7
Q1000 years	685.4

Above flows prorated for site area of 0.0312 ha

Q_{BAR} Rural 0.05
Q_1 year 0.15
Q_2 years 0.18
Q_5 years 0.24
Q_{10} years 0.27
Q_{20} years 0.29
Q_{25} years 0.30
Q_{30} years 0.31
Q_{50} years 0.32
Q_{100} years 0.35
Q_{200} years 0.38
Q_{250} years 0.38
Q_{1000} years 0.43

HEYNE TILLETT STEEL

Project: Koko
Address: Camden, NW1

Project No: 1444
Date: 01/03/17
Calcs by: AGH
Page No: 1

Design Rainfall

Site Details

Existing Site Area	**A=**	*312*	**m²**
Existing Impermeable Area	**A_E =**	*312*	**m²**
Proposed Impermeable Area	**A_P =**	*312*	**m²**
Volumetric Runoff Coefficient	**C_v =**	*0.75*	

From Wallingford Procedure, Volume 3 - Maps

Rainfall Depths (M5-60 min)	***M5_60 =***	*21.0*	**mm**
Rainfall Ratio:	***r =***	*0.439*	
Standard Annual Average Rainfall	***SAAR =***	*600*	**mm**
Soil Class	**SOIL =**	*3*	
Hydrological growth curve		*6\7*	
Climate Change Allowance		*40*	**%**

Figure 1: UK Hydrological Growth Curve Regions

HEYNE TILLETT STEEL

Project: Koko
Address: Camden, NW1

Project No: 1444
Date: 01/03/17
Calcs by: AGH
Page No: 2

Pre-development Peak Rates

Q_1 = 3.61 x 0.75 x 312 x 33.4 = *2.8* **litres/sec** **Limit to a minimum 5 l/sec (DEFRA/EA Guidance)**

Q_{100} = 3.61 x 0.75 x 312 x 106.5 = *9.0* **litres/sec**

Post-development Peak Rates

Q_1 = 3.61 x 0.75 x 312 x 33.4 = *2.8* **litres/sec**

Q_{100} = 3.61 x 0.75 x 312 x 106.5 = *9.0* **litres/sec**

Post-development Peak Rates with Climate Change

$Q_{1+30\%}$ = *3.9* **litres/sec**

$Q_{100+30\%}$ = *12.6* **litres/sec**

Greenfield Rates

Q_{bar} = 0.00108 x $0.5^{0.89}$ x $600^{1.17}$ x $0.40^{2.17}$ = *142.0* **litres/sec (for 50ha)**

Q_{bar} = (142 x 0.0312) / 50 = *0.09* **litres/sec (for site)**

Growth factor for Region 6\7 - South East England = 3.146

Therefore, Q_{100} = *0.28* **litres/sec** **Limit to a minimum 5 l/sec (DEFRA/EA Guidance)**

Approximate Attenuation Volumes

Discharge Condition	Discharge Rate	Storage Volume Required
Mitigate climate change and hardstanding increase	*9.0* **litres/sec**	*5* m^3
50% reduction on existing (London Plan Essential Standard)	*4.5* **litres/sec**	*9* m^3
1-year Pre-development peak rate	*2.8* **litres/sec**	*11* m^3
Greenfield rate	*0.28* **litres/sec**	*23* m^3

Runoff Volumes

For the 1 in 100 year event with a 6 hour duration:

Pre-development runoff volume = *20* m^3

Post-development runoff volume **prior to mitigation** = *28* m^3

Additional volume post-development prior to mitigation = *8* m^3

50% Reduction

Design Rainfall

CC Allowance = 40 %

From Wallingford Procedure, Volume 3 - Maps
Rainfall Depths (M5 - 60minutes) ***M5_60 =*** *21.0 mm*

from BRE Digest 365, fig. 1 ***rainfall ratio r =*** *0.439*

Design Storm Return Period, ***P =*** *100 years*

D mins	M5_D	Z2	R = MP_D	Rainfall Intensity
5	8.2 mm	1.864	21.3 mm	256 mm/hr
10	11.5 mm	1.934	31.3 mm	188 mm/hr
15	13.6 mm	1.968	37.5 mm	150 mm/hr
30	17.3 mm	2.008	48.5 mm	97 mm/hr
60	21.0 mm	2.026	59.6 mm	60 mm/hr
120	25.0 mm	2.010	70.3 mm	35 mm/hr
240	29.4 mm	1.976	81.2 mm	20 mm/hr
360	32.2 mm	1.953	88.0 mm	15 mm/hr
600	36.0 mm	1.922	97.0 mm	10 mm/hr
1440	43.6 mm	1.861	113.7 mm	5 mm/hr
5000	57.1 mm	1.762	140.9 mm	2 mm/hr

Infiltration Rate	0.00E+00	m/s	(OR Outlet Flow Rate	4.50	l/s)
Impermeable Area	312	m^2	ie	16.2	m^3/hr
Width	1.00	m	Gravel Pit or Trench Soakaway		
Depth	1.00	m			
Min Length (optional)	0.00	m	Gravel free volume	95%	

D	Length req	Inflow	Outflow	Storage	t_{s50} (hrs)	Storage Prov
5	5.58	6.6	1.4	5.3	0.16	5.3
10	7.42	9.8	2.7	7.1	0.22	7.1
15	8.06	11.7	4.1	7.7	0.24	7.7
30	7.40	15.1	8.1	7.0	0.22	7.0
60	2.51	18.6	16.2	2.4	0.07	2.4
120	0.00	21.9	32.4	0.0	0.00	0.0
240	0.00	25.3	64.8	0.0	0.00	0.0
360	0.00	27.5	97.2	0.0	0.00	0.0
600	0.00	30.3	162.0	0.0	0.00	0.0
1440	0.00	35.5	388.8	0.0	0.00	0.0
5000	0.00	44.0	1350.0	0.0	0.00	0.0

Time until system can cope with additional influx of 50% design storage volume < 24 hrs ~ OK

Provide storage pit, 8.25 m x 1 m x 1 m deep

Minimum Free Volume = 95%

9 Rounded volume Actual Volume = 8.3m^3

(Note that the depth is measured below the inlet pipe invert)

Advice Note on contents of a Surface Water Drainage Statement

London Borough of Camden

1. Introduction

1.1 The Government has strengthened planning policy on the provision of sustainable drainage and new consultation arrangements for 'major' planning applications will come into force from 6 April 2015 as defined in the Written Ministerial Statement (18th Dec 2014).

1.2 The new requirements make Lead Local Flood Authorises statutory consultees with respect to flood risk and SuDS for all major applications. Previously the Environment Agency had that statutory responsibility for sites above 1ha in flood zone 1.

1.3 Therefore all 'major' planning applications submitted from 6 April 2015 are required demonstrate compliance with this policy and we'd encourage this is shown in a **Surface Water Drainage Statement**.

1.4 The purpose of this advice note is to set out what information should be included in such statements.

2. Requirements

2.1 It is essential that the type of Sustainable Drainage System (SuDS) for a site, along with **details of its extent and position**, is identified within the planning application to clearly demonstrate that the proposed SuDS can be accommodated within the development.

2.2 It will now not be acceptable to leave the design of SuDs to a later stage to be dealt with by planning conditions.

2.3 The NPPF paragraph 103 requires that developments do not increase flood risk elsewhere, and gives priority to the use of SuDS. Major developments must include SuDS for the management of run-off, unless demonstrated to be inappropriate. The proposed minimum standards of operation must be appropriate and as such, a **maintenance plan** should be included within the Surface Water Drainage Statement,clearly demonstrating that the SuDS have been designed to ensure that the maintenance and operation requirements are economically proportionate Planning Practice Guidance suggests that this should be considered by reference to the costs that would be incurred by consumers for the use of an effective drainage system connecting directly to a public sewer.

2.4 Camden Council will use planning conditions or obligations to ensure that there are clear arrangements in place for ongoing maintenance over the lifetime of the development.

2.5 Within Camden, SuDS systems must be designed in accordance with London Plan policy 5.13. This requires that developments should utilise sustainable urban drainage systems (SUDS) unless there are practical reasons for not doing so, and should aim to achieve **greenfield run-off rates** and ensure that surface water run-off is managed as close to its source as possible in line with the following **drainage hierarchy**:

1 store rainwater for later use
2 use infiltration techniques, such as porous surfaces in non-clay areas
3 attenuate rainwater in ponds or open water features for gradual release
4 attenuate rainwater by storing in tanks or sealed water features for gradual release
5 discharge rainwater direct to a watercourse
6 discharge rainwater to a surface water sewer/drain
7 discharge rainwater to the combined sewer.

2.6 The hierarchy above seeks to ensure that surface water run-off is controlled as near to its source as possible to mimic natural drainage systems and retain water on or near to the site, in contrast to traditional drainage approaches, which tend to pipe water off-site as quickly as possible.

2.7 Before disposal of surface water to the public sewer is considered all other options set out in the drainage hierarchy should be exhausted. When no other practicable alternative exists to dispose of surface water other than the public sewer, the Water Company or its agents should confirm that there is adequate spare capacity in the existing system taking future development requirements into account.

2.8 Best practice guidance within the non-statutory technical standards for the design, maintenance and operation of sustainable drainage systems will also need to be followed. Runoff volumes from the development to any highway drain, sewer or surface water body in the 1 in 100 year, 6 hour rainfall event must be constrained to a value as close as is reasonably practicable to the **greenfield runoff volume** for the same event.

2.9 Camden Development Policy 23 (Water) requires developments to reduce pressure on combined sewer network and the risk of flooding by limiting the rate of run-off through sustainable urban drainage systems. This policy also requires that developments in areas known to be at risk of surface water flooding are designed to cope with being flooded. Camden's SFRA surface water flood maps, updated SFRA figures 6 (LFRZs), and 4e (increased susceptibility to elevated groundwater) , as well as the Environment Agency updated flood maps for surface water (ufmfsw), should be referred to when determining whether developments are in an area at risk of flooding.

2.10 Camden Planning Guidance 3 (CPG3) requires developments to achieve a greenfield run off rate once SuDS have been installed. Where it can be demonstrated that this is not feasible, a minimum 50% reduction in run off rate across the development is required. Further guidance on how to reduce the risk of flooding can be found in CPG3 paragraphs 11.4-11.8.

2.11 Where an application is part of a larger site which already has planning permission it is essential that the new proposal does not compromise the drainage scheme already approved.

3. Further information and guidance

3.1 Applicants are strongly advised to discuss their proposals with the Lead Local Flood Authority at the pre-application stage to ensure that an acceptable SuDS scheme is submitted.

3.2 For general clarification of these requirements please Camden's Local Planning Authority or Lead Local Flood Authority

□urface □ ater □rainage □ro□forma for ne□ de□e□o□ment□

□his pro-forma accompanies our advice note on surface water drainage. Developers should complete this form and submit it to the Local Planning Authority□referencing from where in their submission documents this information is ta□en. □he pro-forma is supported by the Defra□□A guidance on □ainfall □unoff □anagement and uses the storage calculator on www.□□suds.com. □his pro-forma is based on current industry best practice and focuses on ensuring surface water drainage proposals meet national and local policy requirements. □he pro-forma should be considered alongside other supporting SuDS □uidance.

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□□the de□e□o□ment in a □F□□ or in an area □no□n to □e at ri□□ of □urface or ground □ater f□ooding□ □f □e□□ □ea□e demon□trate ho□ thi□ i□managed□in□ine □ith □□□3□	□he development is not located in a Local Flood □is□ □one. □nvironment Agency flood surface water flood maps identify areas of surface water flooding in Crowndale □oad and □ayham St ad□acent to the site.
□ota□□ite □rea □er□ed □□drainage □□tem □e□cluding o□en □□ace□□□a□□	□.□312 □a

□The Greenfield runoff off rate from the development which is to be used for assessing the requirements for limiting discharge flow rates and attenuation storage from a site should be calculated for the area that forms the drainage network for the site whatever size of site and type of drainage technique. Please refer to the Rainfall Runoff Management document or CIRIA manual for detail on this.

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□m□ermea□□e area □ha□	□.□312	□.□312	□	□f the proposed amount of impermeable surface is greater□then runoff rates and volumes will increase. Section □must be filled in. □f proposed impermeability is equal or less than e□isting□then section □can be s□ipped and section □filled in.
□rainage □ethod □infiltration□sewer□watercourse□	sewer	sewer	□□A	□f different from the e□isting□please fill in section 3. □f e□isting drainage is by infiltration and the proposed is not□discharge volumes may increase. Fill in section □.

3. □ro□o□ing to □i□charge □urface □ater □ia

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□□i□ting and □ro□o□ed □icro□rainage ca□cu□ation□	X			Please provide □icroDrainage calculations of e□isting and proposed run-off rates and volumes in accordance with a recognised methodology or the results of a full infiltration test □see line below□if infiltration is proposed.
□nfi□tration		□		e.g. soa□age tests. Section □□infiltration□must be filled in if infiltration is proposed.
□o □atercour□e		□		e.g. □s there a watercourse nearby□
□o □urface □ater □e□□er	□			Confirmation from sewer provider that sufficient capacity e□ists for this connection.
□om□ination of a□o□e		□		e.g. part infiltration part discharge to sewer or watercourse. Provide evidence above.
□a□the drainage □ro□o□a□ had regard to the □u□□ hierarch□□	X			□vidence must be provided to demonstrate that the proposed Sustainable Drainage strategy has had regard to the SuDS hierarchy as outlined in Section 2.□above.
□a□out □an □ho□ing □here the □u□taina□□e drainage infra□tructure □i□□e □ocated on □ite.	□			Please provide plan reference numbers showing the details of the site layout showing where the sustainable drainage infrastructure will be located on the site. □f the development is to be constructed in phases this should be shown on a separate plan and confirmation should be provided that the sustainable drainage proposal for each phase can be constructed and can operate independently and is not reliant on any later phase of development.

. ea i charge ate his is the ma imum flow rate at which storm water runoff leaves the site during a particular storm event.

	i ting ate	ro o ed ate	ifference ro o ed i ting	ifference difference e i ting	ote for de e o er
reenfie d	.	/A	/A	/A	A is appro . 1 in 2 storm event. Provide this if Section A is proposed.
in	2.	2.			Proposed discharge rates with mitigation should aim to be equivalent to greenfield rates for all corresponding storm events. As a minimum pea discharge rates must be reduced by from the e isting sites for all corresponding rainfall events.
in 3	.	.			
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in u c imate change	/A	12.			he proposed 1 in 1 CC pea discharge rate with mitigation should aim to be equivalent to greenfield rates. As a minimum proposed 1 in 1 CC pea discharge rate must be reduced by from the e isting 1 in 1 runoff rate sites.

. a cu ate additiona o ume for torage he total volume of water leaving the development site. ew hard surfaces potentially restrict the amount of stormwater that can go to the ground so this needs to be controlled so not to ma e flood ris worse to properties downstream.

	reenfie d runoff o ume m³	i ting o ume m³	ro o ed o ume m³	ifference m³ ro o ed i ting	ote for de e o er
in	1.2	3.	3.		Proposed discharge volumes with mitigation should be constrained to a value as close as is reasonably practicable to the greenfield runoff volume wherever practicable and as a minimum should be no greater than e isting volumes for all corresponding storm events. Any increase in volume increases flood ris elsewhere. here volumes are increased section must be filled in.
in 3	2.	.	.		
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in hour u c imate change	/A	/A	2		he proposed 1 in 1 CC discharge volume should be constrained to a value as close as is reasonably practicable to the greenfield runoff volume wherever practicable. As a minimum to mitigate for climate change the proposed 1 in 1 CC volume discharge from site must be no greater than the e isting 1 in 1 storm event. f not flood ris increases under climate change.

. a cu ate attenuation torage Attenuation storage is provided to enable the rate of runoff from the site into the receiving watercourse to be limited to an acceptable rate to protect against erosion and flooding downstream. he attenuation storage volume is a function of the degree of development relative to the greenfield discharge rate.

		ote for de e o er
torage ttenuation o ume Fo rate contro re uired to meet greenfie d run off rate m³	23	olume of water to attenuate on site if discharging at a greenfield run off rate. Can't be used where discharge volumes are increasing
torage ttenuation o ume Fo rate contro re uired to reduce rate m³		olume of water to attenuate on site if discharging at a reduction from e isting rates. Can't be used where discharge volumes are increasing
torage ttenuation o ume Fo rate contro re uired to meet FF a c o e to greenfie d rate a o i e m³		olume of water to attenuate on site if discharging at a rate different from the above please state in 1st column what rate this volume corresponds to. n previously developed sites runoff rates should not be more than three times the calculated greenfield rate. Can't be used where discharge volumes are increasing
torage ttenuation o ume Fo rate contro re uired to retain rate a e i ting m³		olume of water to attenuate on site if discharging at e isting rates. Can't be used where discharge volumes are increasing
ercentage of attenuation o ume tored a o e ground	1 - oof layout allow for reen and lue oofs	Percentage of attenuation volume which will be held above ground in swales ponds basins green roofs etc. f please demonstrate why.

. o i torm ater tored on ite

Storage is required for the additional volume from site but also for holding bac water to slow down the rate from the site. his is nown as attenuation storage and long term storage. he idea is that the additional volume does not get into the watercourses or if it does it is at an e ceptionally low rate. ou can either infiltrate the stored water bac to ground or if this isn't possible hold it bac with on site storage. Firstly can infiltration wor on site

			ote for de e o er
nfi tration	tate the ite eo og and no n ource rotection one	/A	Avoid infiltrating in made ground. nfiltration rates are highly variable and refer to nvironment Agency website to identify and source protection ones SP
	re infi tration rate uita e	A	nfiltration rates should be no lower than 1 1 m s. eed 1m min between the base of the infiltration device the water table to protect roundwater quality ensure doesn't enter infiltration devices. Avoid infiltration where this isn't possible.
	tate the di tance et een a ro o ed infi tration de ice a e and the ground ater e	/A	

	□ ere infi□tration rate□ o□tained □□ de□□ □tud□ or infi□tration te□t□	□□A	□nfiltration rates can be estimated from des□studies at most stages of the planning system if a bac□up attenuation scheme is provided..
	□□the □ite contaminated□ □f □e□□ con□ider ad□ice from other□ on □hether infi□tration can ha□□en.	□□A	Advice on contaminated Land in Camden can be found on our supporting documents webpage □ ater should not be infiltrated through land that is contaminated. □he □nvironment Agency may provide bespo□e advice in planning consultations for contaminated sites that should be considered.
□n □ight of the a□o□e□ infi□tration fea□i□e□	**□e□□o□ □f the an□□er i□ □o□□ea□e identif□ ho□ the □torm □ater □i□□e □tored □rior to re□ea□e**	□□A	□f infiltration is not feasible how will the additional volume be stored□. □he applicant should then consider the following options in the ne□t section.

□torage re□uirement□

□he developer must confirm that either of the two methods for dealing with the amount of water that needs to be stored on site.

□□**tion □ □im□□e** □Store both the additional volume and attenuation volume in order to ma□e a final discharge from site at the greenfield run off rate. □his is preferred if no infiltration can be made on site. □his very simply satisfies the runoff rates and volume criteria.

□□**tion □ □om□□e□ □** □f some of the additional volume of water can be infiltrated bac□into the ground□the remainder can be discharged at a very low rate of 2 l□sec□hectare. A combined storage calculation using the partial permissible rate of 2 l□sec□hectare and the attenuation rate used to slow the runoff from site.

		□ote□for de□e o□er□
□ea□e confirm □hat o□tion ha□ □een cho□en and ho□ much □torage i□re□uired on □ite.	□ption 1	□he developer at this stage should have an idea of the site characteristics and be able to e□plain what the storage requirements are on site and how it will be achieved.

□. □ea□e confirm

		□ote□for de□e o□er□
□ hich □rainage □□□tem□mea□ure□ha□e □een u□ed□ inc□uding green roof□□	□reen roof □ above ground attenuation tan□s □blue roofs□	S□DS can be adapted for most situations even where infiltration isn't feasible e.g. impermeable liners beneath some S□DS devices allows treatment but not infiltration. See C□□A S□DS □anual C□□□
□rainage □□□tem can contain in the □in 3□ □torm e□ent □ithout f□ooding	□es	□his a requirement for sewers for adoption □is good practice even where drainage system is not adopted.
□ i□the drainage □□□tem contain the □in □□□ □□□ □torm e□ent□ f no □ea□e demon□trate ho□ □ui□ding□ and uti i□□ □ant□ □i□□e □rotected.	□es	□ational standards require that the drainage system is designed so that flooding does not occur during a 1 in 1□□ year rainfall event in any part of□a building □including a basement□□or in any utility plant susceptible to water □e.g. pumping station or electricity substation□ within the development.
□n□f□ooding □et□een the □in 3□ □ □in □□□ □u□c imate change □torm e□ent□ □i□□e □afe□□ contained on □ite.	□es	□**afe**□□not causing property flooding or posing a ha□ard to site users i.e. no deeper than 3□□mm on roads□footpaths. Flood waters must drain away at section □rates. □□isting rates can be used where runoff volumes are not increased.
□o□ □i□e□ceedance e□ent□ □e catered on □ite □ithout increa□ing f□ood ri□□□ □□oth on □ite and out□ide the de□e□o□ment□□	□ainfall □vents e□ceeding the 1 in 1□□ year event plus climate change can not be dealt with due to site constraints. this is due to the fact that the building occupies the entirety of the development site therefore implementing measures such as pathways to convey the water away from the development is not possible.	□**afe**□□not causing property flooding or posing a ha□ard to site users i.e. no deeper than 3□□mm on roads□footpaths. Flood waters must drain away at section □rates. □□isting rates can be used where runoff volumes are not increased. □□ceedance events are defined as those larger than the 1 in 1□□ □CC event.
□o□ are rate□ □eing re□tricted □orte□ contro□orifice etc□	□rifices at outlets from □lue □oofs	Detail of how the flow control systems have been designed to avoid pipe bloc□ages and ease of maintenance should be provided.
□ea□e confirm the o□ner□ado□ter□of the entire drainage □□□tem□throughout the de□e□o□ment. □ea□e i□□t a□the o□ner□.	□□C	□f these are multiple owners then a drawing illustrating e□actly what features will be within each owner's remit must be submitted with this Proforma.
□o□ i□the entire drainage □□□tem to □e maintained□	□□C	□f the features are to be maintained directly by the owners as stated in answer to the above question please answer yes to this question and submit the relevant maintenance schedule for each feature. □f it is to be maintained by others than above please give details of each feature and the maintenance schedule. Clear details of the maintenance proposals of all elements of the proposed drainage system must be provided. Details must demonstrate that maintenance and operation requirements are economically proportionate. Poorly maintained drainage can lead to increased flooding problems in the future.

. idence Please identify where the details quoted in the sections above were ta en from. i.e. Plans reports etc. Please also provide relevant drawings that need to accompany your proforma in particular e ceedance routes and ownership and location of SuDS maintenance access strips etc

ro forma ection	ocument reference here detai uoted a o e are ta en from	age um er
ection		
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he above form should be completed using evidence from the Flood is Assessment and site plans. t should serve as a summary sheet of the drainage proposals and should clearly show that the proposed rate and volume as a result of development will not be increasing. f there is an increase in rate or volume the rate or volume section should be completed to set out how the additional rate volume is being dealt with.

his form is completed using factual information from the Flood is Assessment and Site Plans and can be used as a summary of the surface water drainage strategy on this site.

Form Completed y Ale erman ....
ualification of person responsible for signing off this pro-forma Associate nfrastructure ngineer - Sc ons ....

Company eyne illett Steel Ltd ....
n behalf of Client's details he ope Lease Ltd 1 1 Stonhouse Street London S ....
Date 2 2 2 1 ....

CLASS F D

Alex Herman

From: Lopez, Ana <Ana.Lopez@camden.gov.uk>
Sent: 20 February 2017 14:26
To: Alex Herman
Cc: Sophie Reay; Martin Smith (martin.smith@burkehunteradams.com); Nick Belsten; Matthew Turner; James Morgan
Subject: RE: 2016/6959/P - Koko [Filed 20 Feb 2017 17:42]

Hi Alex,

Yes this is fine.

Thanks,

Ana Lopez
Sustainability Officer

Telephone: 020 7974 5011

From: Alex Herman [mailto:AHerman@hts.uk.com]
Sent: 20 February 2017 13:36
To: Lopez, Ana
Cc: Sophie Reay; Martin Smith (martin.smith@burkehunteradams.com); Nick Belsten; Matthew Turner; James Morgan
Subject: RE: 2016/6959/P - Koko

Hi Ana,

Thank you for your prompt response. Yes as you say, we intend to produce calculations for the isolated new build part of the site and will present these in an updated Drainage Strategy Report, which will also cover the points raised in David Peres Da Costa's original email below. I trust this is acceptable.

Kind Regards,

Alex

From: Lopez, Ana [mailto:Ana.Lopez@camden.gov.uk]
Sent: 20 February 2017 10:30
To: Alex Herman <AHerman@hts.uk.com>
Cc: Sophie Reay <sophie.reay@indigoplanning.com>; Martin Smith (martin.smith@burkehunteradams.com) <martin.smith@burkehunteradams.com>; Nick Belsten <nick.belsten@indigoplanning.com>; Matthew Turner <MTurner@hts.uk.com>; James Morgan <JMorgan@hts.uk.com>
Subject: RE: 2016/6959/P - Koko

Hi Alex,

Yes this approach would be accepted. I understand there will be green roof proposed in some parts of the new build extension also.

When undertaking your modelling and run-off calculations, will you be isolating the new build parts from the existing parts of the site and only presenting the new build parts in the report?

Thanks,

Ana Lopez
Sustainability Officer

Telephone: 020 7974 5011

From: Alex Herman [mailto:AHerman@hts.uk.com]
Sent: 20 February 2017 10:26
To: Lopez, Ana
Cc: Sophie Reay; Martin Smith (martin.smith@burkehunteradams.com); Nick Belsten; Matthew Turner; James Morgan
Subject: RE: 2016/6959/P - Koko

Dear Ana,

Following our recent discussion regarding The Hope Project, we understand you had a meeting with our colleagues Neil Cartwright (RTKA – M&E engineer) and Edwina Hunt (Archer Humphryes Architects) to discuss sustainability items including surface water attenuation. Since receiving your comments on the planning application, we have reviewed our surface water attenuation proposals and have the following comments. We understand that these were discussed during last week's meeting:

- The attenuation calculations submitted previously were undertaken for the whole site – design development has confirmed this is not practical as we cannot re-route above ground surface water drainage through the Grade II listed building and areas we are not refurbishing.
- Surface water attenuation tanks are currently proposed to be located at basement level – design development and a review of Thames Water sewer levels has confirmed this approach is not sustainable. The attenuated surface water would have to be pumped from below basement level to basement high level before being discharged via gravity to the public sewer.
- We have explored options for repositioning attenuation tanks at ground floor level – this approach would make the scheme unviable.
- Blue roof – we understand that a 'blue roof' was discussed as a viable alternative during your meeting with the design team. We have since explored this option and could provide a 50mm thick blue roof over the new build (non listed) areas of the site. This would equate to 295m^2 surface area as indicated on the attached drawing. By adopting this blue roof approach, we could attenuate the surface water across this roof area, discharge at a reduced rate of 5l/s and provide sufficient attenuation to cope with storms up to the critical 1 in 100 year + 40% climate change event.

Please could you confirm if this revised approach of a blue roof would be accepted by Camden and how we should proceed in response to your previous comments.

Kind Regards,

Alex Herman
HEYNE TILLETT STEEL
4 Pear Tree Court, T: 020 7870 8050
London, EC1R 0DS M: 07957 463 183
hts.uk.com

From: Sophie Reay [mailto:sophie.reay@indigoplanning.com]
Sent: 27 January 2017 15:04
To: Matthew Turner <MTurner@hts.uk.com>; James Morgan <JMorgan@hts.uk.com>
Cc: Martin Smith (martin.smith@burkehunteradams.com) <martin.smith@burkehunteradams.com>; Nick Belsten <nick.belsten@indigoplanning.com>
Subject: FW: 2016/6959/P - Koko

Dear Matt/James,

Please see below response on drainage. I would be grateful if you can please response on this.

Many thanks

Sophie

Sophie Reay | Senior Planner

T 020 7269 6300
M 07469 156 842
sophie.reay@indigoplanning.com

RTPI Planning Consultancy of the Year 2015

From: Peres Da Costa, David [mailto:David.PeresDaCosta@Camden.gov.uk]
Sent: 27 January 2017 15:02
To: Sophie Reay <sophie.reay@indigoplanning.com>
Subject: 2016/6959/P - Koko

Dear Sophie,

The LLFA has provided comments re drainage

Major developments to achieve greenfield run-off rates wherever feasible and as a minimum 50% reduction in run off rates.
Comment: The applicant is targeting 50% reduction in run-off for the peak 1:100 year storm event meaning flows will be controlled to a maximum of 60.9 l/s. This means that the SuDS system will not have any impact on reducing flows in less intense storms. The applicant should confirm if it is possible to reduce flows further. The applicant should also provide details of exceedance flow routes.

Action for applicant: The applicant should confirm if it is possible to reduce flows further. The applicant should also provide details of exceedance flow routes.

Comment: Rainwater harvesting not considered feasible due to space constraints. The drainage statement says that green roofs are not proposed however plans include green roofs. The drainage statement should be updated to reflect this. Opportunities to expand the provision of green roofs to other flat roof space should be explored. No plans have been provided showing attenuation tank location etc.

Action for applicant: The applicant should update the drainage statement to reflect the fact that green roofs are proposed. The applicant should confirm whether it is possible to expand the provision of green roofs to other flat roof spaces. The applicant should provide plans indicating the location and size of the attenuation tank and how this connects to the drainage network.

Please provide the further information requested.

Kind regards

David

David Peres da Costa
Senior Planning Officer
Regeneration and planning
Supporting Communities
London Borough of Camden
2nd floor, 5 Pancras Square, London N1C 4AG

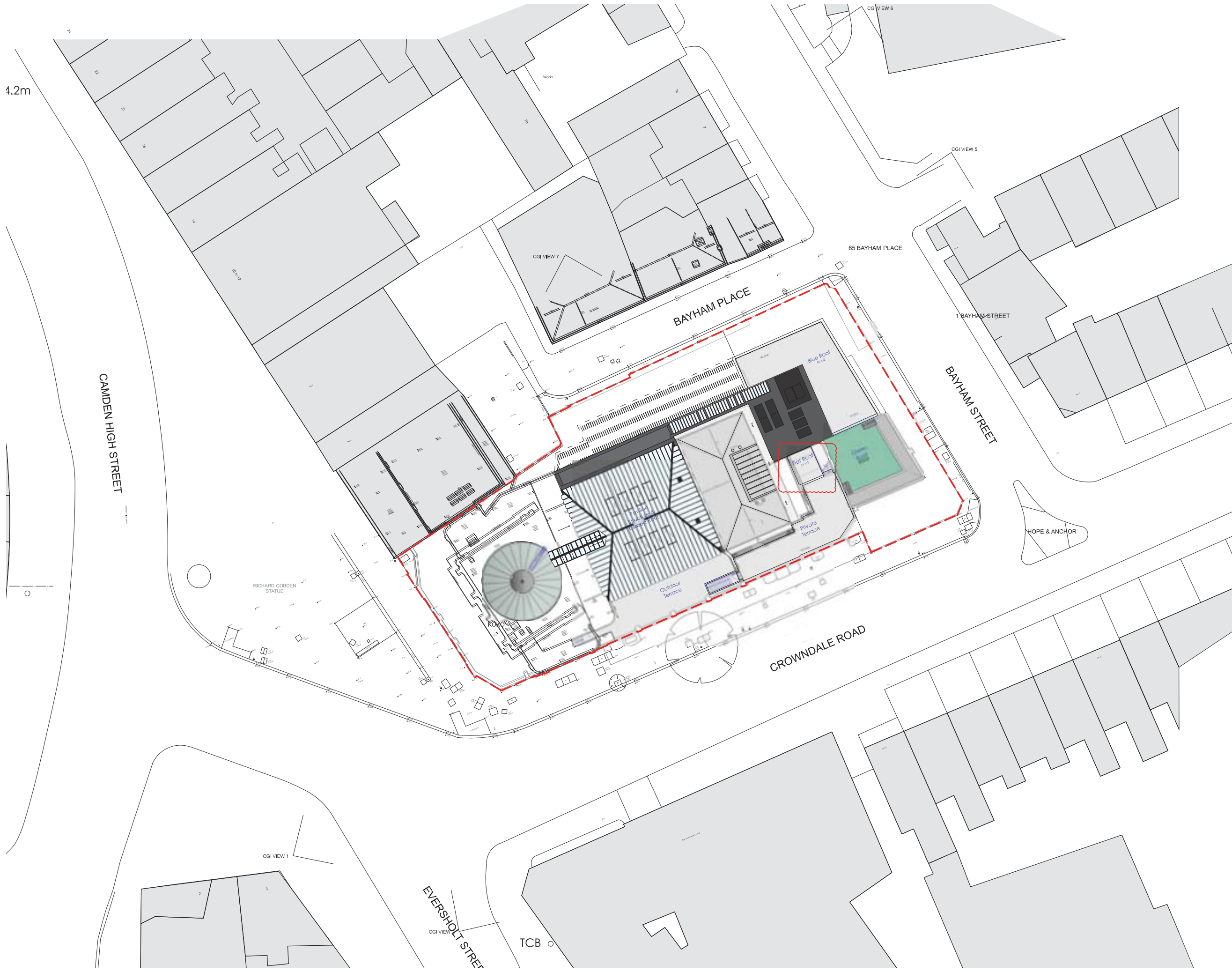
Tel.: 020 7974 5262
Visit camden.gov.uk for the latest council information and news

From 1 October 2016 you will not receive a letter from us if your neighbour submits a planning application. You can still find out about planning applications:

- on new improved posters on lamp posts
- by signing up to planning e-alerts
- in the planning section of the Camden Account
- through adverts in the Camden New Journal and Ham & High

You can sign up to our new and improved planning e-alerts to let you know about new planning applications, decisions and appeals.

This e-mail may contain information which is confidential, legally privileged and/or copyright protected. This e- mail is intended for the addressee only. If you receive this in error, please contact the sender and delete the material from your computer.



Only the original drawing should be relied upon. Contractors, subcontractors and suppliers must verify all dimensions on site before commencing any work or making any shop drawings.

All shop drawings to be submitted to the architect for comment prior to fabrication.

This drawing is to be read in conjunction with the Architect's specification, bills of quantities / schedules, structural, mechanical & electrical drawings and all discrepancies are to be reported to the architect.

Do not scale from this drawing. Dimensions are in millimetres unless otherwise stated.

revision / date / amendments

DRAFT

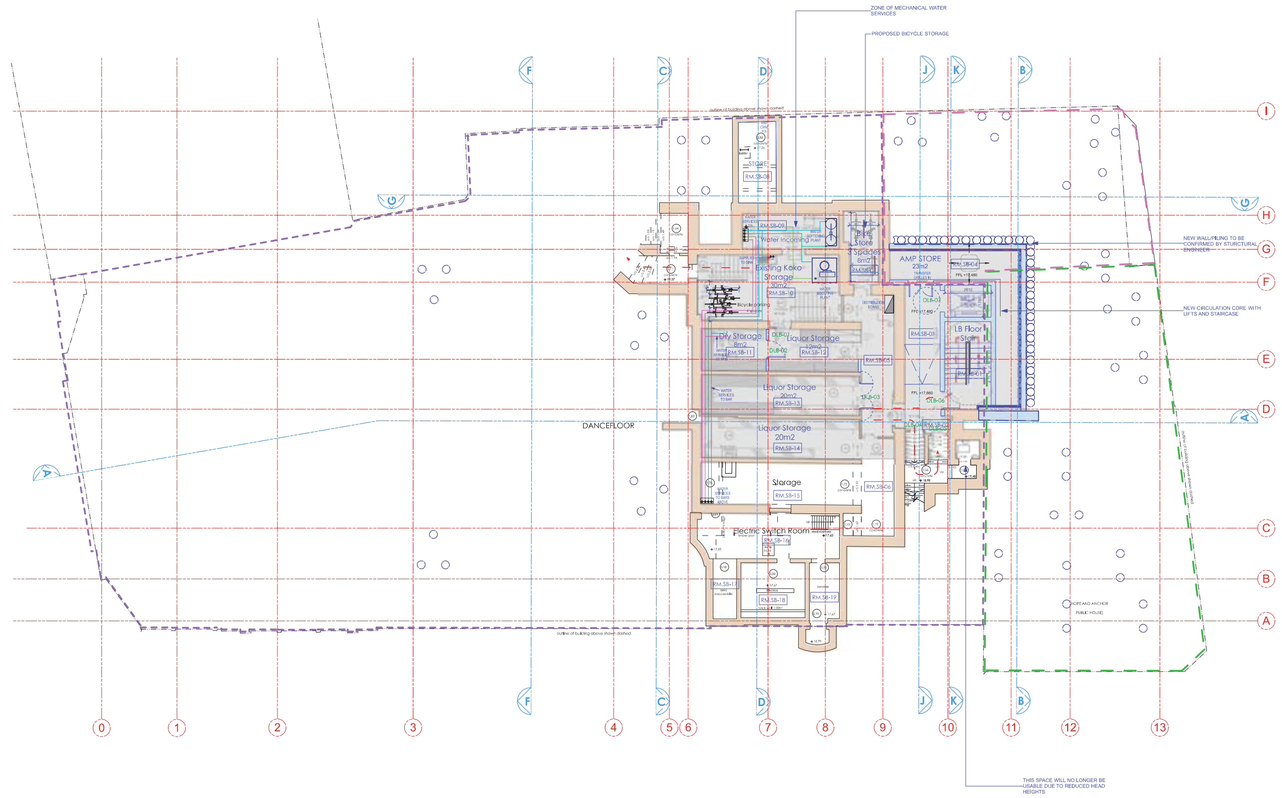
02.10.17

PLANNING

Archer Humphryes Architects

Basement
Central House
142 Central Street
London, United Kingdom
EC1V 8AR
T : +44 (0) 20 7251 8555

project title		
KOKO + Hope & Anchor + Bayham Place Camden, London		
drawing title: Proposed Site Plan	scale: 1:200 @ A1	date: 26.05.17
	drawn: EH	checked: DA
drawing number: AHA/ KKC /GA/001	revision: -	



Only the original drawing should be relied upon. Contractors, subcontractors and suppliers must verify all dimensions on site before commencing any work or making any shop drawings.

All shop drawings to be submitted to the architect for comment prior to fabrication.

This drawing is to be read in conjunction with the Architect's specification, bills of quantities / schedules, structural, mechanical & electrical drawings and all discrepancies are to be reported to the architect.

Do not scale from this drawing. Dimensions are in millimetres unless otherwise stated.

revision / date / amendments
- / –/–/– / -

AREA
188m2

POPULATIONS
GF - 150
1F - 130
2F - 180
3F - 70
4F - 310 total
(60 Dome)
(150 Pavilion)
(100 Terrace)

LEGEND
- Existing Building Fabric KOKO née Camden Palace Theatre (1900)
- Existing Building Fabric Hope & Anchor (approx. 1850)
- Existing Building Fabric Bayham Place (from 1875)
- Existing Modern Building Fabric Bayham Place (from 2006)
- Building Fabric to be demolished
- Demolition of Flooring / Elevation / Wall
- Proposed Excavation
- Remove and retain in alternate location
- Retain and protect existing
- Retain, make good, ease and adjusted
- Artist Route
- Guest Route to Rooftop Restaurant
- Means of escape route
- Proposed Riser
- Proposed Risers Above
- RM.4-06 Room Number
- D4-02 Door Number
- W4-05 Window Number
- Hope & Anchor Demise
- Koko Demise
- 1 Bayham Street & 65 Bayham Place Demise
- Blue Roof

02.10.17

DRAFT

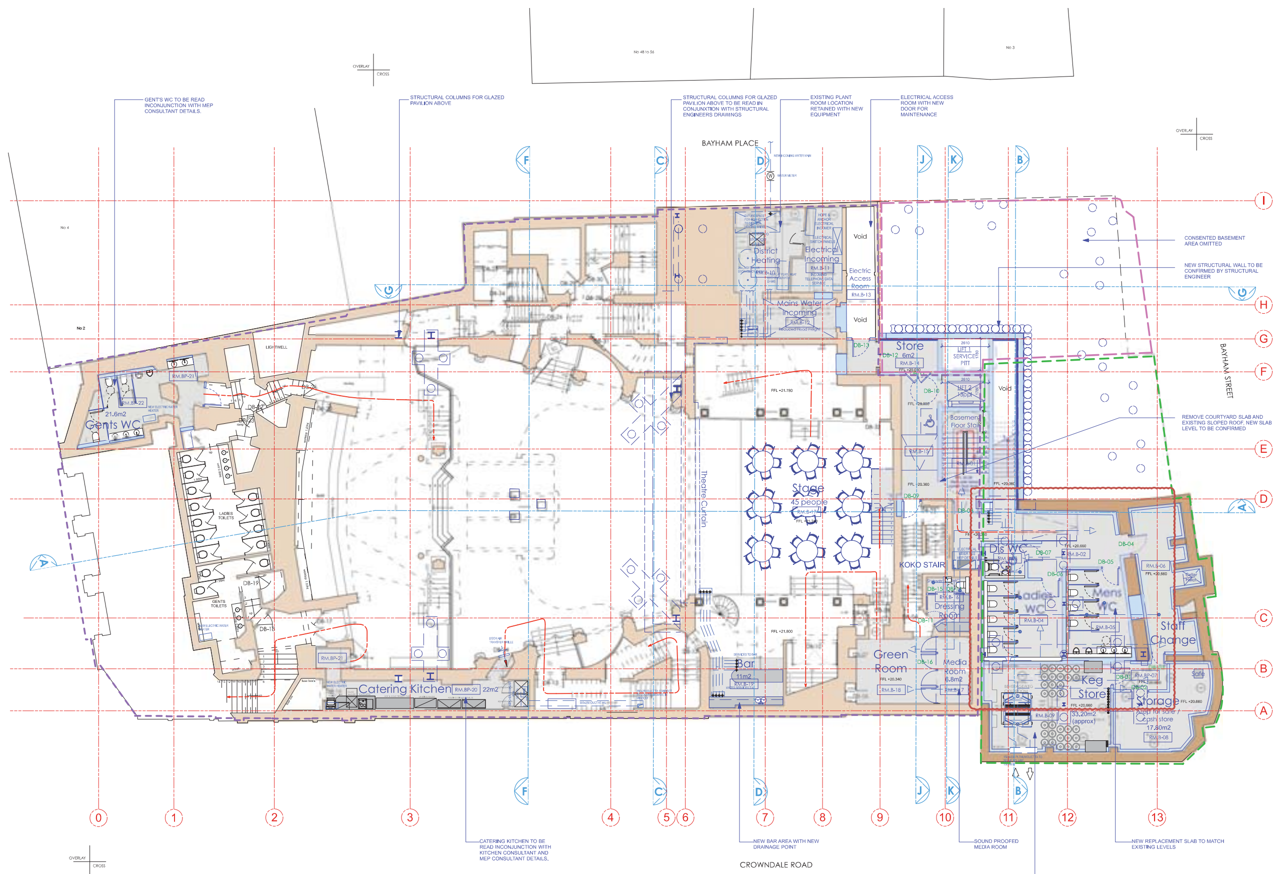
0 1 2 3 4 5 8m

PLANNING

Archer Humphryes Architects

Basement
Central House
142 Central Street
London, United Kingdom
EC1V 8AR
T : +44 (0) 20 7251 8555

project title		
KOKO + Hope & Anchor + Bayham Place Camden, London		
drawing title: Proposed Sub Basement Plan	scale: 1:100 @ A1	date: 13.04.17
	drawn: FR/PC	checked: DA
drawing number: AHA/KKC/GA/098	revision: -	



revision / date / amendments
- / --/--/-- / -

AREA
321m2

POPULATIONS
GF - 150
1F - 130
2F - 180
3F - 70
4F - 310 total
(60 Dome)
(150 Pavilion)
(100 Terrace)

LEGEND
- Existing Building Fabric KOKO née Camden Palace Theatre (1900)
- Existing Building Fabric Hope & Anchor (approx. 1850)
- Existing Building Fabric Bayham Place (from 1875)
- Existing Modern Building Fabric Bayham Place (from 2006)
- Building Fabric to be demolished
- Demolition of Flooring / Elevation / Wall
- Proposed Excavation
- Remove and retain in alternate location
- Retain and protect existing
- Retain, make good, ease and adjusted
- Artist Route
- Guest Route to Rooftop Restaurant
- Means of escape route
- Proposed Riser
- Proposed Risers Above
- RM.4-06 Room Number
- D4-02 Door Number
- W4-05 Window Number
- Hope & Anchor Demise
- Koko Demise
- 1 Bayham Street & 65 Bayham Place Demise
- Blue Roof

02.10.17

DRAFT

0 1 2 3 4 5 8m

PLANNING

Archer Humphryes Architects

Basement
Central House
142 Central Street
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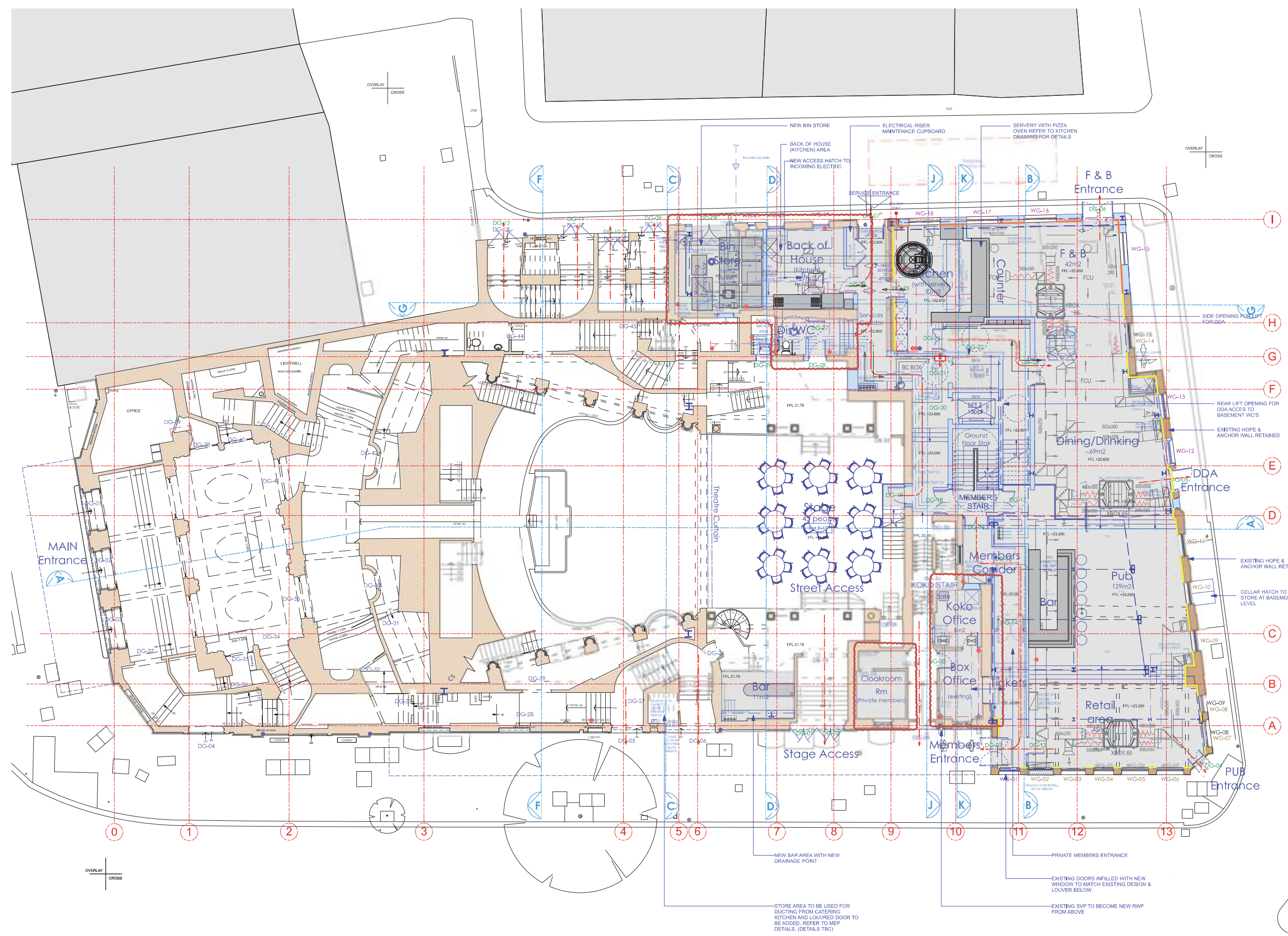
project title
KOKO + Hope & Anchor + Bayham Place
Camden, London

drawing title	scale	date
Proposed Basement Plan	1:100 @ A1	13.04.17
	drawn FR/PC	checked DA
drawing number AHA/KKC/GA/099	revision -	



revision / date / amendments
- / --/--/-- / -

AREA
475m2

POPULATIONS
GF - 150
1F - 130
2F - 180
3F - 70
4F - 310 total
(60 Dome)
(150 Pavilion)
(100 Terrace)

LEGEND
- Proposed Works
- Existing Building Fabric KOKO née Camden Palace Theatre (1900)
- Existing Building Fabric Hope & Anchor (approx. 1850)
- Existing Building Fabric Bayham Place (from 1875)
- Existing Modern Building Fabric Bayham Place (from 2006)
- Building Fabric to be demolished
- Demolition of Flooring / Elevation / Wall
- Proposed Excavation
- Remove and retain in alternate location
- Remove (Protect) and retain for reinstatement
- Retain, make good, ease and adjusted
- Artist Route
- Guest Route to Rooftop Restaurant
- Means of escape route
- Proposed Riser
- Proposed Risers Above
- RM.4-06 Room Number
- D4-02 Door Number
- W4-05 Window Number
- Hope & Anchor Demise
- Koko Demise
- 1 Bayham Street & 65 Bayham Place Demise
- Original brickwork exposed
- New brickwork exposed

02.10.17

DRAFT

0 1 2 3 4 5 8m

PLANNING

Archer Humphryes Architects

Basement
Central House
142 Central Street
London, United Kingdom
EC1V 8AR
T : +44 (0) 20 7251 8555

project title
KOKO + Hope & Anchor + Bayham Place
Camden, London

drawing title	scale	date
Proposed Ground Floor Plan	1:100 @ A1	13.04.17
	drawn FR/PC	checked DA
drawing number AHA/ KKC /GA/100	revision -	