Working in partnership

CONSTRUCTION SKILLS CENTRE & SITE ACCOMMODATION AT FORMER MARIA FIDELIS SCHOOL SITE FLOOD RISK ASSESSMENT LLFA OBJECTION RESPONSE NOTE

October 2021

1CP01-MDS_ARP-EV-REP-SS08_SL23-990017 - P01

Revision Key:
P =Preliminary Documents/Drawings – P01, P02, P02
C = Contractual Documents/Drawings – C01, C02, C03
X = As Built Mark-Up Drawings – X01, X02, X03
Z = As Built Record Drawings – Z01, Z02, Z03

Revision	Author	Checked By	Approved By	Date Approved **/**/****	Reason for Revision
P01	GSR	---	---	---	Appendices cross-referenced
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1 Introduction

1.1.1 This note has been produced by the Mace Dragados Joint Venture (MDjv), on behalf of High Speed 2 Ltd (HS2 Ltd), to provide a response to the comments received from London Borough of Camden (LBC) Lead Local Flood Authority (LLFA) dated 3rd September 2021 (see Appendix 1 of document 1CP01-MDS_ARP-EV-REP-SS08_SL23-990018) in relation to Flood Risk Assessment 1CP01-MDS_ARP-EV-REP-SS08_SL23-990007_P02 dated August 2021.

1.1.2 Each comment with an associated response is set out below.

2 Response

The applicant does not provide full consideration of the drainage hierarchy (London Plan Policy SI13) and does not provide sufficient justification for the lack of green infrastructure incorporated within the proposed drainage strategy.

2.1.1 The London Plan requires surface water discharge methods to be considered in line with the following hierarchy:

1. Store rainwater for later use (most preferred)
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 (least preferred)

2.1.2 As discussed within the FRA there is very limited demand for rainwater harvesting and the underlying geology has been identified as not being suitable for infiltration.

2.1.3 The site is also small with the majority being taken up by the proposed new building, therefore the use of ponds and/or open water features are not considered to be viable given the space constraints. An attenuation tank has therefore been proposed within the site with flow restricted to the QBar greenfield rate for all events up to the 1 in 100yr return period plus a 40% climate change allowance. This tank is also supported by upstream permeable paving which will provide an element of storage within its subbase, as well as an area of green roof atop the building.

2.1.4 In terms of final discharge from the site infiltration is not considered viable as previously discussed within the FRA, and there are no watercourses or surface water sewers within the vicinity of the site. The only viable discharge location has been identified as the existing combined sewer located within the site boundary.

2.1.5 It is therefore considered that the current surface water drainage proposals are compliant with The London Plan drainage hierarchy.

The applicant does not indicate the location of the proposed flow control device on the figure showing the proposed drainage strategy. This is also not clearly stated within the text. We do note however that an online flow control device is modelled in MicroDrainage, as part of the submitted calculations.

2.1.6 Please see drawing 1CP01-MDS_WWH-DR-DGA-SS08_SL23_GF-000001_P03 within Appendix 2 of document 1CP01-MDS_ARP-EV-REP-SS08_SL23-990018. The flow control (in the form of a Hydrobrake) is provided at the manhole immediately downstream of the proposed cellular storage tank (manhole S1).

Given the susceptibility to groundwater levels being elevated on site (reports of groundwater 2m BGL), the applicant is required to consider flotation and risk of groundwater uplift for the proposed features in the drainage strategy.

2.1.7 Anti-flotation check calculations have been undertaken and presented in the notes within drawing 1CP01-MDS_WWH-DS-DDE-SS08_SL23_GF-000001_P03 as found within Appendix 2 of document 1CP01-MDS_ARP-EV-REP-SS08_SL23-990018. These calculations have found that assuming a worst-case groundwater level of 2.0mBGL no excess movement of the proposed drainage assets is expected to occur.

2.1.8 Given the extent of aggregate being used for the porous containment areas we do not expect any significant measures to be required as the buoyancy uplift forces are being counterbalanced with the dead weights of the infill areas.

The applicant has not submitted a plan showing the drainage strategy. A snip of a plan has been included in the FRA as Figure 5.1. Figure 5.1 does not indicate the connectivity between the proposed drainage features on site.

2.1.9 Please see drawing 1CP01-MDS_WWH-DR-DGA-SS08_SL23_GF-000001_P03 provided within Appendix 2 of document 1CP01-MDS_ARP-EV-REP-SS08_SL23-990018.

The applicant has not provided greenfield and existing site runoff volumes. (NTTS, Policy S4 and S5).

2.1.10 Table 2-1 below sets out the greenfield and existing site runoff volumes based upon the full site area of 0.2446ha.

Table 2-1 – Greenfield and existing site runoff volumes

Return Period	Greenfield Runoff Volume (m^3) [1]	Existing Site Runoff Volume (m^3) [2]
1 in 1yr	11.0	53.5
1 in 30yr	26.5	117.9
1 in 100yr	37.5	152.9
1 in 100yr (+40% CC)	n/a	214.0

[1] Calculated using Source Control Rural Runoff Calculator Greenfield Runoff Volume tool based upon FSR rainfall data and a storm duration of 360 minutes (6hrs) for each return period – see Appendix 3 of document 1CP01-MDS_ARP-EV-REP-SS08_SL23-990018.

[2] Determined based upon a storm duration of 360 minutes (6hrs); volumetric runoff coefficient of 1 used for full site area; average rainfall intensities based upon FSR rainfall data for respective return periods; average rainfall intensities of 3.646mm/hr, 8.034mm/hr, 10.418mm/hr, and 14.585mm/hr used for the 1yr, 30yr, 100yr, and 100yr+40%CC return periods respectively.

The applicant has not included the whole site area in the greenfield runoff rates. No calculations have been submitted as evidence of the existing runoff rates.

2.1.11 Table 2-2 below is an updated version of Table 4-1 from the FRA which now considers the entire site area of 0.2446ha. Updated greenfield runoff rate calculations are provided in Appendix 4 of document 1CP01-MDS_ARP-EV-REP-SS08_SL23-990018.

Table 2-2 – Summary of existing, greenfield, and proposed surface water discharge rates

Return Period	Existing Peak Runoff Rate (l/s) [1]	Greenfield Runoff Rate (l/s) [2]	Proposed Discharge Rate (l/s)	Percentage Betterment (%) [3]
1 in 1yr	13.7	0.86	1.0	92.7%
Qbar	n/a	1.02	1.0	n/a
1 in 30yr	33.6	2.34	1.0	97.0%
1 in 100yr	44.0	3.24	1.0	97.7%
1 in 100yr (+40% CC)	61.6	n/a	1.0	98.4%

[1] Determined by the Modified Rational Method with a storm duration of 30 minutes; volumetric runoff coefficient of 1 used for full site area; rainfall intensities based upon FSR rainfall data for respective return periods; rainfall intensities of 20.215mm/hr, 49.499mm/hr, 64.789mm/hr, and 90.705mm/hr used for the 1yr, 30yr, 100yr, and 100yr+40%CC return periods respectively.
[2] Calculated based on IH124 methodology – see Appendix 4 of document 1CP01-MDS_ARP-EV-REP-SS08_SL23-990018.
[3] Percentage difference between existing peak runoff rate and proposed discharge rate.

The entire site area has not been included in the proposed drainage network calculations.

2.1.12 The drainage network calculations have been revised to take account of the whole site area – see Appendix 5 of document 1CP01-MDS_ARP-EV-REP-SS08_SL23-990018 for full calculation printouts.

2.1.13 Given that a small percentage of the site will consist of green planted areas (130m^2), these areas have been assumed as 50% impermeable. The proposed percentage of impermeable areas within the site has therefore been calculated as 97%. Details of these assumptions are set out in the notes of drawing 1CP01-MDS_WWH-DR-DGA-SS08_SL23_GF-000001_P03 within Appendix 2 of document 1CP01-MDS_ARP-EV-REP-SS08_SL23-990018.

Maintenance activities for the proposed drainage strategy has not been provided. (Ministerial Statement, 18 December 2014).

2.1.14 The tables below provide guidance on the maintenance of Sustainable Drainage Systems (SuDS) proposed within the Site and outlines who will be responsible for future maintenance.

2.1.15 Tables 2-3, 2-4 and 2-5 Set out the maintenance requirements for cellular storage tanks, permeable paving and green roofs respectively.

Table 2-3 – Attenuation Storage Tank Maintenance Requirements

Maintenance Schedule	Required Action	Recommended Frequency
Regular Maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for 3 months then annually
	Remove debris from the catchment surface (where it may cause risks to performance).	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary.	Annually
	Remove sediment from pre-treatment structures and/or internal forebays.	Annually or as required
Remedial Actions	Repair/Rehabilitate inlets, outlets, overflows, and vents.	As required
Monitoring	Inspect/check all inlets, outlets, vents, and overflows to ensure they are in good condition and operating as designed.	Annually
	Survey inside of tank for sediment build-up and remove if necessary.	Every 5 years or as required

Table 2-4 – Permeable Paving Maintenance Requirements

Maintenance Schedule	Required Action	Recommended Frequency
Regular Maintenance	Sweeping Note: Any jointing material between the blocks that is lost or displaced as a result of sweeping must be replaced. New jointing material must be the same type as that removed or a suitable replacement	Three times a year at the end of winter, mid-summer and after autumn leaf fall. Also as required based on site-specific observations
Occasional Maintenance	Stabilise and mow contributing and adjacent areas to prevent excess sediment being washed into the paving	As required

	Removal of weeds	As required – once per year on less frequently used pavements
Remedial Actions	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users	As required
	Rehabilitation of surface and underlying sand and geotextile	As required (if infiltration performance is significantly reduced as a result of significant clogging).
Monitoring	Initial inspection	Monthly for three months after installation
	Inspect for evidence of poor operation and/or weed growth – if required, take remediation action	Three monthly, 48 hr after large storms in first six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Three monthly, 48 hr after large storms in first six months
	Monitor Inspection Chambers	Annually

Table 2-5 – Green Roof Maintenance Requirements

Maintenance Schedule	Required Action	Recommended Frequency
Regular Inspections	Inspect all components including soil substrate, vegetation, drains, irrigation systems (if applicable), membranes and roof structure for proper operation, integrity of waterproofing and structural stability	Annually and after severe storms
	Inspect soil substrate for evidence of erosion channels and identify any sediment sources	Annually and after severe storms
	Inspect drain inlets to ensure unrestricted runoff from the drainage layer to the conveyance or roof drain system	Annually and after severe storms
	Inspect underside of roof for evidence of leakage	Annually and after severe storms
Regular Maintenance	Remove debris and litter to prevent clogging of inlet drains and interface with plant growth	Six monthly and annually or as required

	During establishment (i.e. year one), replace dead plants as required	Monthly (but usually responsibility of manufacturer)
	Post establishment, replace dead plants as required (where >5% of coverage)	Annually (in autumn)
	Remove fallen leaves and debris from deciduous plant foliage	Six monthly or as required
	Remove nuisance and invasive vegetation, including weeds	Six monthly or as required
	Mow grass, prune shrubs and manage other planting (if appropriate) as required – clippings should be removed and not allowed to accumulate	Six monthly or as required
Remedial Actions	If erosion channels are evident, these should be stabilised with extra soil substrate similar to the original material, and sources of erosion damage should be identified and controlled	As required
	If drain inlet has settled, cracked or moved, investigate and repair as appropriate.	As required