

**CAPITA**



**North London Waste Plan**

**Flood Risk Addendum**

**September 2020**

## Quality Management

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## Contents

|            |  |           |
|------------|--|-----------|
| <b>1.0</b> | <b>Introduction</b>  | <b>3</b>  |
| <b>2.0</b> | <b>Validity of data used in Flood Risk Sequential Test (October 2019)</b>  | <b>4</b>  |
| <b>3.0</b> | <b>Conclusion of Flood Risk Sequential Test (October 2019)</b>             | <b>5</b>  |
| <b>4.0</b> | <b>Flood risk from development</b>   | <b>7</b>  |
| <b>5.0</b> | <b>A22-HR – Friern Barnet Sewage Works (LEA 1) / Pinkham Way, Haringey</b> | <b>10</b> |
| <b>6.0</b> | <b>Conclusion</b>  | <b>13</b> |

## **1.0 Introduction**

1.1 This document is an addendum report to the Flood Risk Sequential Test (October 2019). It considers issues that were raised about flood risk during the hearings, chiefly in the context of Pinkham Way. This document consolidates comments and responses principally focuses on the following three areas:

- Validity of data used in Flood Risk Sequential Test (October 2019).
- Conclusion of Flood Risk Sequential Test (October 2019).
- Flood risk from development, looking at Pinkham Way as an example.

## 2.0 Validity of data used in Flood Risk Sequential Test (October 2019)

- 2.1 Following comments from the Environment Agency and other representors the flood risk mapping data was reviewed and where necessary updated to the latest available information at the time of publication. This updated information informed the Sequential Test Report 2019
- 2.2 The updated report was reviewed by the Environment Agency who concluded in their statement to the Inspector that *“The Sequential Test Report has been updated to ensure that the most up to date present day flood risk information is taken into account”*.
- 2.3 The impact of climate change on flood risk was assessed in the Sequential Test report. This was undertaken by using the existing flood modelling using a 20% climate change extent. Current guidance (as set out in section 3.17 of the Flood Risk Sequential Test October 2019) specifies climate change values of 25% and 35% be used. However, a consistent source of data compliant with current climate change guidance is not available across the plan area to enable a consistent approach to the assessment of the impact of climate change for all site areas within the Sequential Test. To this end the Sequential Test was undertaken using the 20% climate change allowance results that are uniformly available across the plan area. This is considered acceptable and agreed by the Environment Agency at a Strategic level, provided the current climate change allowances are used to assess flood risk in a site-specific flood risk assessment at the time individual site applications are progressed.
- 2.4 To further support this approach, a sensitivity assessment has been undertaken to consider the effect of using the 0.1% AEP event as a proxy to the 1% AEP event. This approach to climate change is precautionary though is considered to be the most pragmatic methodology available. This approach is also consistent with other SFRAs and professional modelling experience.
- 2.5 The use of the 20% climate change allowance results that are uniformly available across the plan area to inform climate change assessment and the sequential planning of sites (as set out in Sections 3.25 – 3.28 of the Flood Risk Sequential Test October 2019) does not undermine the very clear conclusion of the Sequential Test as set out in section 3.40 – 3.46 of the report and discussed here in section 3.0.
- 2.6 In agreement with the Environment Agency, a proportionate approach has been followed in regard to the assessment of current and future flood risk of the proposed areas.
- 2.7 The Environment Agency concluded in their statement to the Inspector that *“given the constrained nature of the allocations (including vulnerability classification and level of risk), the climate change extent in this case is adequate. We also consider that any additional assessment work is unlikely to change the outcome of the sequential test exercise for the NLWP”*.

## 3.0 Conclusion of Flood Risk Sequential Test (October 2019)

- 3.1 The conclusions of the Sequential test are set out in sections 3.40 – 3.46 and 4.4-4.6 of the Flood Risk Sequential Test report (October 2019) and are summarised below.
- 3.2 It has been assumed that all site areas are to be used for waste transfer and processing of non-hazardous and are therefore considered to be ‘less vulnerable’ in accordance with national planning guidance Table 2: “Flood risk vulnerability classification”<sup>1</sup>.
- 3.3 As shown in Flood Risk Sequential Test (October 2019), not all of the required development can be located within the available area of Flood Zone 1, therefore development in Flood Zone 2 is appropriate. Not all the development can be located exclusively within the available areas of Flood Zone 1 or 2, therefore development in Flood Zone 3a is appropriate. Development in Flood Zone 3b is not appropriate.
- 3.1 Within the lifetime of the development there is potential for areas currently within Flood Zone 1 to fall within the future equivalent of Flood Zone 2<sup>2</sup>; there is potential for areas currently within Flood Zone 2 to fall within the future equivalent of Flood Zone 3a<sup>3</sup>; there is potential for areas currently within Flood Zone 3a to fall within the future equivalent of Flood Zone 3b<sup>4</sup>.
- 3.2 As the sequential review of site areas finds that it is necessary and appropriate to site less vulnerable development within the current Flood Zone 1, 2 and 3a the increase in sites that may be within Flood Zone 2 or 3a in the future as a result of climate change does not undermine the conclusions of the Sequential Test.
- 3.3 In regard to ‘less vulnerable’ development there is no national policy differentiation between land that is currently in Flood Zone 3a and that will remain so as a result of climate change and land that is currently in Flood Zone 3a which will become Flood Zone 3b as a result of climate change. However, for the purposes of the North London Waste Plan it was recommended that such local policy be established to require all site areas, as part of their site-specific flood risk assessment to consider the impact of climate change on the 0.1%, 1.0% and 20% AEP undefended and defended flood events. This has been captured in the proposed modification to Policy 5 and accompanying paragraph 9.48.
- 3.4 It is recognised that within a non-hazardous waste site that has an overall classification of ‘less vulnerable’ there may be different specific areas of operation that have differing tolerances for compatibility with flood water based on how impactful flooding of that area or operation would be to the site and to the wider environment. Therefore,

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<sup>1</sup> <https://www.gov.uk/guidance/flood-risk-and-coastal-change#Table-2-Flood-Risk-Vulnerability-Classification>

<sup>2</sup> Noting that Flood Zone 2 is based on the present day undefended 0.1% AEP event

<sup>3</sup> Noting that Flood Zone 3a is based on the present day undefended 1% AEP event

<sup>4</sup> Noting that Flood Zone 3b defined in the individual borough SFRAs.

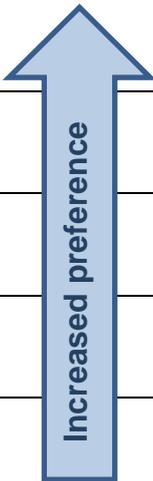
it is important to consider at the site layout planning stage the layout of the site and how differing parts of the site area may be impacted by flooding now and in the future.

3.5 To this end individual planning applications should demonstrate, including allowances for climate change:

- how site layout planning has been applied to locate the least water compatible operations in the least hazardous areas of the site area<sup>5</sup>,
- how the development will be safe for the lifetime of the development<sup>6</sup>,
- how they will not have an impact on flood risk to 3<sup>rd</sup> party land<sup>7</sup>.

3.6 The table below sets out how layout planning should consider the differing operational areas within a 'Less Vulnerable' development when choosing where to locate water sensitive operations.

*Table 1 Site layout planning within Less Vulnerable development, where to locate water sensitive operations*

|                                  | Preference  | Area  |
|----------------------------------|---|---|
| Most preferred                   |   | Currently in Flood Zone 1 and estimated to remain so in 2080 including allowances for climate change          |
|                                  |   | Currently in Flood Zone 1 but estimated become Flood Zone 2 in 2080 including allowances for climate change   |
|                                  |   | Currently in Flood Zone 2 and estimated to remain so in 2080 including allowances for climate change          |
|                                  |   | Currently in Flood Zone 3 but estimated become Flood Zone 3a in 2080 including allowances for climate change  |
| Least preferred but acceptable   |   | Currently in Flood Zone 3a and estimated to remain so in 2080 including allowances for climate change         |
| No development                   |  | Currently in Flood Zone 3a but estimated become Flood Zone 3b in 2080 including allowances for climate change |
| No development – not appropriate |  | Currently in Flood Zone 3b and estimated to remain so in 2080 including allowances for climate change         |

<sup>5</sup> NPPF Paragraphs 155 and 163 bullet point a)

<sup>6</sup> NPPF Paragraphs 155 and 163 bullet points b), c), d) and e).

<sup>7</sup> NPPF Paragraphs 155 and 163

## 4.0 Flood risk from development

- 4.1 NPPF Paragraph 156 states that *“Strategic policies should be informed by a strategic flood risk assessment, and should manage flood risk from all sources. They should consider cumulative impacts in, or affecting, local areas susceptible to flooding, and take account of advice from the Environment Agency and other relevant flood risk management authorities, such as lead local flood authorities and internal drainage boards”*. The Flood Risk Sequential Test (October 2019) sets out how the NLWP has been informed by SFRA and sets out the flood risk from all sources. The SFRA and Flood Risk Sequential Test report (October 2019) consider the cumulative impact in, or affecting, local areas susceptible to flooding. However, this should be understood in the context of this being a cumulative impact from multiple sites / areas within a policy coming forward which is distinct from individual site impacts, which are dealt with elsewhere in the NPPF and planning regime. The areas identified in the report are spread across multiple catchments and drainage areas so as not to have a significant cumulative impact on the local areas. That is not to say the individual sites / areas do not have the potential to have individual site impact on local flood risk. The SFRA and subsequent report have been prepared in consultation with the Environment Agency and other relevant flood risk management authorities.
- 4.2 NPPF Paragraph 157 states that *“All plans should apply a sequential, risk-based approach to the location of development – taking into account the current and future impacts of climate change – so as to avoid, where possible, flood risk to people and property. They should do this, and manage any residual risk, by:*
- *applying the sequential test and then, if necessary, the exception test as set out below;*
  - *safeguarding land from development that is required, or likely to be required, for current or future flood management;*
  - *using opportunities provided by new development to reduce the causes and impacts of flooding (where appropriate through the use of natural flood management techniques); and*
  - *where climate change is expected to increase flood risk so that some existing development may not be sustainable in the long-term, seeking opportunities to relocate development, including housing, to more sustainable locations”*. As highlighted in Section 3.0 and 4.1 above the Flood Risk Sequential Test report (v6.0 October 2019) sets out how the NLWP has applied the Sequential Test. The Exception Test is not required by virtue of the proposed use being “less vulnerable”<sup>8</sup>. None of the 13 areas listed in the NLWP

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<sup>8</sup> <https://www.gov.uk/guidance/flood-risk-and-coastal-change#Table-2-Flood-Risk-Vulnerability-Classification>

have been identified as land that is required, or likely to be required, for current or future flood management. The NLWP includes provision for new development to reduce the causes and impacts of flooding including through the use of natural flood management techniques, principally in the requirements for how site runoff is to be managed. And as outlined above, the plan includes consideration of how climate change is expected to increase flood risk in the future and accounts for this in the requirements for individual site applications.

- 4.3 Paragraph 158 of the NPPF states that *“The aim of the sequential test is to steer new development to areas with the lowest risk of flooding. Development should not be allocated or permitted if there are reasonably available sites appropriate for the proposed development in areas with a lower risk of flooding. The strategic flood risk assessment will provide the basis for applying this test. The sequential approach should be used in areas known to be at risk now or in the future from any form of flooding”*. As shown in Flood Risk Sequential Test (October 2019), not all of the required development can be located within the available area of Flood Zone 1, therefore development in Flood Zone 2 is appropriate. Not all the development can be located exclusively within the available areas of Flood Zone 1 or 2 therefore development in Flood Zone 3a is appropriate. Development in Flood Zone 3b is not appropriate. Site areas were ranked with a Sequential preference based on their susceptibility to all sources of flood risk (present and with climate change) in Appendix B of the Flood Risk Sequential Test (October 2019).
- 4.4 Paragraphs 159 to 162 of the NPPF concern the Exception test which is not relevant to the proposed ‘less vulnerable’ uses.
- 4.5 Paragraph 163 of NPPF states that *“When determining any planning applications, local planning authorities should ensure that flood risk is not increased elsewhere”*. This makes clear that the burden of considering flood risk from developments sits at the individual planning application stage and not at the Plan making stage. This is because it is often not possible to undertake the level of detailed required for a Site-specific flood risk assessment at plan making stage, nor is it possible or realistic to subject a large number of sites to the higher level of scrutiny required for site-specific flood risk assessment at plan making stage.
- 4.6 The NLWP, as well as the NPPF and London Plan contain requirements for the site-specific flood risk assessment not to have an impact on flood risk elsewhere, and specific requirements in regard to surface water runoff management and disposal. These are resolved at the planning application stage.
- 4.7 Plans should have regard to the feasibility and practicality of delivering the development of a site or area they have allocated including unavoidable local impact

on flood risk. Plainly a site that cannot be advanced at planning application stage by virtue of being undeliverable, due to the unavoidable local flood risk impact it has, should not be allocated. This however is not the case for any of the 13 sites / areas that have been identified in the NLWP. All 13 sites have potential for sustainable drainage options to meet the requirements of NPPF, London Plan and NLWP so as not to increase flood risk elsewhere, and where possible reduce it. This is captured in the Sustainability Appraisal alongside other feasibility and impact criteria. Good quality design of development proposals including the maximising of permeable surfaces and replication of greenfield conditions will be important to achieving this as individual site applications come forward for determination.

- 4.8 In summary:
- 4.9 All sites put forward under the plan have potential to have local impacts on flood risk if designed badly. This is true of all sites and all plans.
- 4.10 All sites put forward in the NLWP have feasible options to be developed for the intended purposes without increasing flood risk elsewhere – subject to good design which should be captured at the individual site application stage.
- 4.11 It is for the Plan to consider the cumulative impact of the proposed policies (and allocations), supported by a strategic flood risk assessment.
- 4.12 It is for the individual site applications to consider individual site impact of the proposed development, supported by a site-specific flood risk assessment. The next section considers how sustainable drainage techniques can be applied in the context of Pinkham Way.

## 5.0 A22-HR – Friern Barnet Sewage Works (LEA 1) / Pinkham Way, Haringey

### Historic and Current Condition

- 5.1 The above referenced site (measuring 5.95ha) is a former sewerage treatment works and was used thereafter as landfill. The site has had no formal use for some time and has become largely overgrown with a mix of largely deciduous trees and vegetation and has been designated as a SINC (Site of Importance for Nature Conservation).
- 5.2 At some point in the past the watercourse running through the site (the Muswell Hill Golf Course Brook) was culverted over and ground levels across the site have been raised. This is likely to have been as a result of the landfill activities. The Muswell Hill Golf Course Brook feeds the Bounds Green Brook to the north of the site which is also culverted at this location.
- 5.3 There are no significant existing areas of impermeable ground at the surface within the site with any former infrastructure long ago re-vegetated. However, site investigations identified areas of buried concrete and it is reported that some of the previous sewer treatment works buildings have been buried as part of the land raising.
- 5.4 Review of British Geological Society borehole records in the vicinity<sup>9</sup> and other Ground Investigation reports for the site confirms the presence of significant depths of made ground of a mix of materials including bricks, wood, glass, glass bottles, metal, ash, clinker, paving slabs, asphalt, ceramics and paper. The made ground is of significant potential for contamination due to the historic sewer treatment works and landfill. The made ground is underlain for the most part by thick band of London Clay, although parts towards the north of the site report as being underlain by River Terrace Deposits (associated with Bounds Green Brook).
- 5.5 Given the current condition it is considered that the site should be considered as generating greenfield runoff. It is considered that rainfall on the site will be subject to a number of processes. Initially a portion of the rainfall will be subject to interception by the vegetation canopy. This effect will be most marked from late spring to early Autumn when the largely deciduous vegetation is in leaf and the role of interception is much less marked between late Autumn and early Spring when the majority of vegetation is bare of leaf and the canopy much less extensive. Rainfall that is not intercepted will arrive at the ground level where, given the made ground surface it is expected to infiltrate. Surface infiltration test results are not available for the site, but for moderate storms most water infiltrates the upper made-ground strata with some

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<sup>9</sup> Boreholes TQ29SE79 and TQ29SE78 are located along the eastern site boundary – data from <http://mapapps.bgs.ac.uk/geologyofbritain/home.html>

local ponding. Given the reported depth of the made ground, the potential for saturation during a single storm event is not considered high. However, a prolonged wet winter can potentially saturate the most permeable of catchments.

- 5.6 It is expected that water will percolate through the made ground until it reaches the much less permeable clay strata. It will then form a perched water table and drain laterally along the clay strata towards the lower river corridor of the Bounds Green Brook.
- 5.7 Whilst there is no full condition assessment or local flow monitoring, it is highly likely that the culverted Muswell Hill Golf Course Brook suffers from water incursion where it sits within the perched water table. It is unlikely that the culvert would have been designed to prevent this at the time of construction and subsequent treatment of the site will not have improved its condition. Water utility companies invest significant sums in their drainage network to prevent groundwater ingress or loss with limited success therefore it is reasonable to assume that the Muswell Hill Golf Course Brook culverts suffers the same issues.
- 5.8 It is expected that the majority of rainfall landing on the site will infiltrate into the made ground will make its way into the Bounds Green Brook. In the event of an exceedance event – either as a result of extreme rainfall beyond the infiltration rate, or moderate rainfall on a saturated catchment – then overland flow is expected to flow towards the Bounds Green Brook and follow local drainage paths.
- 5.9 During the course of a rainfall event there is expected to be limited evapotranspiration, however after the event it possible that local vegetation may slowly draw down local soil moisture reserves. This will be most prominent in in the summer months.

## **Sympathetic development**

- 5.10 The redevelopment of the site offers many opportunities for enhancement. One potential option to explore is the de-culverting of the exiting Muswell Hill Golf Course Brook through part-of or all-of the site. There are many successful industrial sites that are bisected by open watercourses with many benefits. Additionally, for redevelopment of the site it would be recommended that the contaminated land is, in some way, treated to reduce the risk of mobilisation of contaminants. Specific contaminated land advice should be sort in this regard. Infiltration and percolation testing should be undertaken to establish existing runoff regimes. A water balance model should be constructed to simulate how the site behaves under current conditions with due consideration paid to the seasonality of conditions.
- 5.11 From this a Sustainable Drainage Strategy should be planned for the site. This should include minimising the areas of impermeable surfaces and providing infiltration and

percolation opportunities through inert materials to replicate the current processes expected on site. Where impermeable surfaces are unavoidable then secondary treatments should be specified to reduce runoff volumes and rates. A treatment-train approach should be followed to manage site runoff starting at the source. An example of this is that extensive blue/green roofs could be specified to for site buildings, these have the potential to intercept and temporarily store rainfall landing on them. Rainfall draining from the roofs should be directed to secondary attenuation in the form of above ground storage pond(s) from where water can be further infiltrated or released at a controlled rate commensurate with the baseline condition. It is expected that there will be some areas of the proposed development used for waste handling / processing that would not be suited to local attenuation by virtue of the high levels of potential contamination. Given the site area constraints it is recommended that for these small areas runoff is collected and directed to the Thames Sewer network at an agreed rate for processing at a specialist water treatment works site along with any wash-down water or liquid emitted from the waste.

- 5.12 There are a range of techniques that can be implemented to manage runoff from the site to replicate the current regime with the added benefit of removing the risk of waterborne contaminants being mobilised into the local river system. The design of the surface water drainage will be influenced by the final specific waste use advanced for the site, but early planning for a comprehensive flood risk and surface water drainage strategy will be required to inform the site design, and later site-specific flood risk assessment and planning application.

## 6.0 Conclusion

- 6.1 The NPPF sets out the Government's policy on development and flood risk. It requires planning authorities to avoid inappropriate development in areas at risk of flooding by steering new development to areas of lowest risk. To ensure that this approach is embedded within the plan preparation process, the NPPF stipulates that planning authorities identifying land for development in their Local Plans, should apply a Sequential Test to demonstrate that there are no reasonably available site areas in areas with a lower probability of flooding that would be appropriate to the type of development or land use proposed.
- 6.2 This addendum sets out the validity of the data used in the Flood Risk Sequential Test (October 2019) and addresses concerns about flood risk raised at Regulation 19 and at the hearings concerning Pinkham Way.
- 6.3 This addendum summarises the conclusions of the Flood Risk Sequential Test (October 2019). 13 areas were included in the NLWP at Regulation 19. The Flood Risk Sequential Test (October 2019) examined whether these areas are suitable locations for waste management facilities, based upon the level of flood risk present at each site area, and whether there are any available site areas at a lower risk of flooding that would be appropriate for the development proposed. No other available site areas, beyond the 13 listed in the report were identified. Site areas were ranked with a Sequential preference in Appendix B of the Flood Risk Sequential Test (October 2019).
- 6.4 The Flood Risk Sequential Test (October 2019) has shown how the Sequential Test has been applied to the proposed development and the conclusion of that report is twofold, firstly to conclude that it is necessary and appropriate to locate the proposed development in Flood Zone 1, 2 and 3a, and secondly that due to the proposed use consideration under the "Exception Test" is not required. They therefore pass the Sequential Test and may be considered further as areas for allocation in the NLWP.
- 6.5 This addendum summarises how the NLWP has satisfied the NPPF's requirements in regard to flood risk and the consideration of the impact of flood risk elsewhere as a result of proposed development.