Mayfield Market Town

Technical Note on Flood Risk & Drainage

For

LAMBS
Document Control Sheet

Technical Note on Flood Risk & Drainage

Mayfield Market Town

LAMBS

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<th>Approved by</th>
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1.0 Introduction

1.1 This Technical Note has been produced by Motion on behalf of Locals Against Mayfield Building Sprawl (LAMBS) to assess the flood risk, drainage and water quality impacts associated with the proposed Mayfield Market Town (MMT) development located on land between Wineham, Sayers Common and Henfield.

1.2 The MMT development is a proposal for approximately 7,000 new homes with education, healthcare, leisure, employment and other community facilities. The proposed development site is situated within Horsham District and it is understood that it is being promoted as a potential Strategic Site to be allocated for development through the update to the Horsham District Planning Framework (HDPF).

1.3 The aim of this Technical Note is to support LAMBS representation to Horsham District Council in respect of the ongoing review of the HDPF in order to object to the MMT development and the potential allocation of the site.

1.4 Motion is an independent consultancy specialising in transport and infrastructure planning and design services. Motion regularly provides professional advice on flood risk, sustainable drainage solutions, wastewater drainage assessments and designs and infrastructure planning.
2.0 Site Location

2.1 The proposed development is located in the Sussex Weald, to the west of the A23, Burgess Hill, Hassocks and Hurstpierpoint, north east of Henfield and South of Gatwick and Crawley. An extract of the site location plan is illustrated in Figure 2.1 and can be found in full in Appendix A.

2.2 The proposed development site is currently open field and agricultural land which can be described as a combination of grassland, marshland and shrubland. The site is surrounded by agricultural land, Wineham Lane runs along the site’s eastern boundary and the River Adur runs along the site’s northern boundary.

2.3 The proposals for the site would include 7,000 new homes and associated infrastructure, roads, parking areas; and local amenities such as schools, healthcare, shops and essential infrastructure.

2.4 The proposed development site is located on the upper reaches of the River Adur and there are a number of significant watercourses and tributaries crossing the site. The confluence of these tributaries to the River Adur is to the west of the development site.

![Figure 2.1 Site Location Plan](image-url)
3.0 Legislative and Policy Framework

**Flood and Water Management Act**

3.1 The Flood and Water Management Act 2010 (FWMA) received Royal Assent on 8th April 2010. The Act was introduced to enforce some of the key proposals set out within UK Government flood and water strategies along with UK Government’s response to the Sir Michael Pitt’s Review of the summer 2007 floods.

3.2 Lead Local Flood Authorities (LLFA’s) including West Sussex County Council (WSCC) which the development site falls in have a responsibility under the FWMA to develop, maintain, apply and monitor the application of a strategy for local flood risk in their area. Local flood risk is defined as flood risk arising from surface run-off, groundwater and ordinary watercourses (i.e. non main rivers). The Environment Agency (EA) plays a role in managing the watercourses designated as ‘main rivers’ only.

3.3 Relevant to the MMT development, the FWMA will encourage the uptake of sustainable drainage systems (SuDS) by removing the automatic right to connect to sewers and providing for LLFA to adopt SuDS for new developments. Development is expected to adhere to the Act through the provision of SuDS as a fundamental element of the surface water drainage system.

**The Water Framework Directive**

3.4 The monitoring and assessment of the chemical and ecological quality of surface waters is currently driven by the Water Framework Directive (WFD), which requires the physical, ecological and chemical condition of waters to be assessed, with plans and actions put in place to improve the condition towards ‘Good’ status.

**National Planning Policy Framework**

3.5 The NPPF and the online ‘planning practice guidance’ set out the Government’s planning policies for England and how these are expected to be applied. This includes ensuring that flood risk is taken into account at all stages of the planning process, avoiding inappropriate development in areas at risk of flooding and directing development away from those areas where risks are highest. All forms of flooding need to be accessed to and from any proposed development and it needs to be demonstrated how these flood risks will be managed so that the development remains safe throughout its lifetime, taking climate change and future flood risk into account.

**The Sequential and Exception Tests**

3.6 The NPPF Sequential Test classifies proposed development into one of four Flood Zones, detailed in Table 3.1

<table>
<thead>
<tr>
<th>Flood Zone</th>
<th>Annual Probability of Flooding (%)</th>
<th>Corresponding Annual Chance of Flooding (1 in x)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 -Low Probability</td>
<td>Fluvial &lt;0.1%</td>
<td>&gt;1,000</td>
</tr>
<tr>
<td></td>
<td>Tidal &lt;0.1%</td>
<td>&gt;1,000</td>
</tr>
<tr>
<td>2 - Medium Probability</td>
<td>Fluvial 0.1 – 1.0%</td>
<td>1,000 – 100</td>
</tr>
<tr>
<td></td>
<td>Tidal 0.1 – 0.5%</td>
<td>1,000 – 200</td>
</tr>
<tr>
<td>3a - High Probability</td>
<td>Fluvial &gt;1.0%</td>
<td>&lt;100</td>
</tr>
<tr>
<td></td>
<td>Tidal &gt;0.5%</td>
<td>&lt;200</td>
</tr>
<tr>
<td>3b - The Functional Floodplain</td>
<td>Fluvial &gt;5.0%*</td>
<td>&lt;20</td>
</tr>
<tr>
<td></td>
<td>Tidal &gt;5.0%*</td>
<td>&lt;20</td>
</tr>
</tbody>
</table>

*Starting point for consideration. LPAs should identify Functional Floodplain, which should not be defined solely by rigid probability parameters.

Table 3.1 Flood Zones
3.7 The NPPF specifies that the suitability of all new development in relation to flood risk should be assessed by applying the Sequential Test to demonstrate that there are no reasonably available sites in areas with a lower probability of flooding that would be appropriate to the type of development proposed. The NPPF provides a summary of the different land use classifications, in the PPG table 2, and also provides guidance on the compatibility of each land use classification in relation to each of the Flood Zones as summarised in Table 3.2.

<table>
<thead>
<tr>
<th>Flood Zone</th>
<th>Essential Infrastructure</th>
<th>Water Compatible</th>
<th>Highly Vulnerable</th>
<th>More Vulnerable</th>
<th>Less Vulnerable</th>
</tr>
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<tbody>
<tr>
<td>Zone 1</td>
<td></td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Zone 2</td>
<td></td>
<td>*</td>
<td>Exception test required</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Zone 3a</td>
<td>Exception test required</td>
<td>*</td>
<td>*</td>
<td>Exception test required</td>
<td>*</td>
</tr>
<tr>
<td>Zone 3b</td>
<td>Exception test required</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
</tbody>
</table>

Key:
- Development is appropriate
- Development should not be permitted

Table 3.2 Flood Risk Vulnerability Classification

3.8 For the Sequential Test to be passed, it needs to be demonstrated that within the local district (in the case of MMT Horsham) that there are no alternative sites with a lower risk of flooding that could be used for the proposed development.

3.9 For the Exception Test to be passed the following two criteria need to be satisfied:

- It must be demonstrated that the development provides wider sustainability benefits to the community that will outweigh flood risk.
- A site-specific FRA must demonstrate that the development will be safe for its lifetime taking account of its vulnerability of its users, without increasing flood risk elsewhere, and, where possible will reduce flood risk overall.

Horsham Strategic Flood Risk Assessment

3.10 A SFRA for Horsham District council was completed in 2007. The primary objective of the SFRA is to help local authorities identify the areas that are at risk from all forms of flooding and to allocate development away from vulnerable flood risk areas. The SFRA recognises development on land outside Flood Zones 2 and 3 should be pursued first. The SFRA states that the watercourses in the Upper Adur catchment respond rapidly to rainfall due to the impermeable nature of the site. The impermeable nature is due to the catchment predominantly being underlain by Weald Clay. The SFRA also states that The River Adur has its normal tidal limit near Partridge Green and Figure 3.1 (taken from Horsham District SFRA) illustrates the River Adurs tidal limits. The SFRA also states that in 1974 and 1979 that there were flood events which caused widespread flooding in Henfield and surrounding areas which had the potential to have affected the site.
The River Adur Catchment Flood Management Plan (CFMP)

3.11 The MMT development falls within the River Adur Catchment Flood Management Plan (CFMP) which was completed in December 2009. CFMPs aim to deliver sustainable long-term flood risk management for the catchment area by identifying flood risk management policies to assist decision making. The CFMP confirmed that the Upper Adur area is low lying and most of the land is moderate grade agricultural land. In addition, the main sources of flood risk in the Adur catchment area are from both localised river flooding and surface water flooding, including flooding in urban areas due to under capacity of, or blockages in, the drainage network. The CFMP predicts an increase in river flooding in the area but the perceived risk to residential properties is considered low due to the small number of residential dwellings in this location.

3.12 The MMT development site falls within CFMP area ‘Rural areas to the south and west of the Burgess Hill/Hassocks area (Upper Adur and South Downs - East)’. This area has been identified as ‘areas of low to moderate flood risk’ where the action is to store water or manage run-off in locations that provide overall flood risk reduction or environmental benefits. The proposed CFMP actions for the Upper Adur include investigating opportunities where additional storage of water on the floodplain could reduce flood risk to downstream areas, restore rivers and floodplains to a naturally functioning state, and contribute to meeting biodiversity action plan targets.

Strategic Ecological Assessment

3.13 A Strategic Ecological Assessment was produced by Wildlife Splash for the Horsham District Council Planning Framework Examination. The document described the MMT site as having ‘a low-lying landscape, naturally high-water table, high proportion of watercourses, and predominately clayey floodplain soils. The report also confirmed that the site has a high frequency of ponds and marshy ground. In addition, 50% of the site’s boundary features have ditches.

3.14 This is supported by the Sussex Biodiversity Record Centre, which has identified the proposed MMT site as having some of the site area being classed as marshy grassland, damp grassland, swamp and ponds. This is located within Appendix B.
The CIRIA SuDS Manual C753

3.15 The CIRIA SuDS Manual C753 states for greenfield developments, the peak runoff rate from the development to any highway drain, sewer or surface water body for the 1 in 1 year rainfall event and the 1 in 100 year rainfall event should never exceed the peak greenfield runoff rate for the same event.

3.1 The use of SuDS is needed to replicate the pre-developed Greenfield conditions so as not to increase flood risk to the site or surrounding sites by managing excess run-off at the source. Careful design of SuDS features would need to be considered as part of the development to ensure that the site surface water drainage closely reflects the natural hydrology and hydrogeology of the site.

3.2 The key benefits of SuDS are as follows:

- Improving water quality over a conventional piped system by removing pollutants from diffuse pollutant sources (e.g. roads);
- Improving amenity through the provision of open green space and wildlife habitat; and
- Enabling a natural drainage regime which recharges groundwater (where possible).
4.0 **Flood Risk Impacts**

4.1 This section of the report provides a summary of potential sources of flood risk to the development and their potential impact.

**Flooding from Rivers and the Sea**

4.2 The EA Flood Map and EA flood product 4 data (Appendix D and an extract in Figure 4.1) illustrates that the MMT development site is located within Flood Zone 3 (more than 1 in 100 annual probability of flooding from rivers or the sea), Flood Zone 2 (between 1 in 100 and 1 in 1,000 annual probability of flooding from rivers or the sea) and Flood Zone 1 (less than 1 in 1,000 annual probability of flooding from rivers or the sea). Parts of the site located within Flood Zone 3 are also located within Flood Zone 3b which is classed as functional floodplain. The MMT development site is not protected by any flood defences. The Flood Product 4 data provided predicted flood depths on site which demonstrates that for the 1 in 100 plus climate change event that flood depths on the site could reach to up to 1.07 m AOD.

![Figure 4.1 EA Flood Maps](image)

4.3 The River Adur and a number of its tributaries cross the site flowing in a south westerly direction. There are also a number of drainage ditches flowing across the site. The River Adur CFMP and Horsham District SFRA confirm that the River Adurs tidal influence extends to Shermanbury, just west of the proposed site. The limit being around the location of Mock Bridge. This confirms the River Adur is not currently tidally influenced at the MMT site. However, the tidal limit is very close to the MMT development site and with climate change there is potential in the future for the site to be tidally influenced.

4.4 Photographic evidence of historic flood events close to the MMT development site are located in Appendix C. The photographs illustrate that parts of the existing public highway currently flood. It is understood this flooding is a regular and frequent occurrence. The photographs demonstrate that the depth of flooding is such that the majority of motor vehicles would experience difficulty in navigating these flooded roads and lanes. Any proposal for the MMT site would need to demonstrate that safe access and egress into the site for the residents of 7,000 new homes and for emergency services could be achieved. It is considered unlikely that this would be possible. It should be noted that existing residents in the vicinity of the site already struggle for safe means of access during flood events and this risk will be intensified by the development of the site, contrary to current guidance in the NPPF on the need to provide safe access and escape routes.
4.5 As detailed in Table 3.2 the NPPF, does not allow development within the functional flood plain (Flood Zone 3b) and for residential development which is classed as ‘More Vulnerable’ to be allowed in Flood Zone 3a the Sequential and Exception Tests need to be passed. In addition, any development located within Flood Zone 3 would need to provide level for level flood plain compensation. No information has yet been provided by the prospective developer to demonstrate how the site would pass the Sequential and Exception Tests and without this, the comprehensive development of this site would not be possible.

4.6 The River Adur CFMP predicts an increase in river flooding due to Climate Change in the catchment but the perceived risk to residential properties was considered low due to the small number of residential dwellings in this location. However, this would change significantly should the MMT development proceed and needs to be fully assessed. The Horsham District SFRA recommend allocating development away from vulnerable flood risk areas such as those detailed on the MMT development site.

4.7 Summary – The Development Site lies within Flood Zone 3a and 3b. Residential development is not allowed in Flood Zone 3b. Development in Flood Zone 3a require the Sequential and Exception Test to be passed. Any development in Flood Zone 3 requires level for level flood plain compensation. Consequently, some areas of the site are not suitable for development at all and the impact of climate change and flood risk on the potential development of the rest of the site would require a significant level of mitigation which may not be possible to achieve.

**Surface Water Flooding**

4.8 The EA surface water flood map in Appendix E and illustrated in Figure 4.2 shows that the site is at ‘High’ risk of surface water flooding (less than 1 in 30 chance of flooding), ‘Medium’ risk of surface water flooding (between 1 in 100 and 1 in 30 chance of flooding), ‘Low’ risk of surface water flooding (between 1 in 1000 and 1 in 100 chance of flooding) and ‘Very Low’ risk of surface water flooding (Less than 1 in 1000 chance of flooding).

![Figure 4.2 Surface Water Flood Maps](image)

4.9 The NPPF, Horsham District SFRA all recommend allocating development away from vulnerable flood risk areas and that careful consideration is required for development in areas perceived to be at risk of flooding from all sources.

4.10 The Horsham District SFRA states that the watercourses in the Upper Adur catchment respond rapidly to rainfall due to the impermeable nature of the site, so when considering surface water management for the MMT development the fact that it is located within a flashy catchment needs significant deliberation.
4.11 The MMT development will cause an increase in surface water runoff from the site due to the increase in the amount of impermeable area on site. Therefore, an appropriate surface water management strategy is required.

4.12 The MMT development would be expected to adhere to the Flood and Water Management Act through the provision of SuDS. It is a requirement that the surface water runoff rate post development should not exceed the pre-development runoff rate. The use of SuDS is needed to replicate the pre-developed Greenfield conditions so as not to increase flood risk to the site or surrounding sites by managing excess run-off at the source.

4.13 It is understood that the site is underlain by Weald Clay which is known to be impermeable. Therefore, the use of infiltration SuDS techniques on the MMT development site would not be possible. In addition, the MMT development site is known to be covered by areas of land defined as ‘wet grassland’ and swamp and to have a high ground water table. This prohibits a number of potential SuDS techniques with only the least sustainable SuDS methods such as tanking being appropriate on the MMT development site.

4.14 The proposed surface water drainage system for the MMT development will need to consider how it will operate during a flood event when taking into account the scale of the MMT development proposals, the low lying nature of the site, the high groundwater table and the level of the water within the receiving watercourses.

4.15 **Summary** – The MMT development will cause a significant increase in surface water runoff from the development due to the significant increase in the amount of built form and impermeable hardsurfacing on site. Therefore, an appropriate surface water management strategy is required. The Upper Adur catchment responds rapidly to rainfall due to the impermeable nature of the site as it is underlain by Weald Clay. Therefore, the use of infiltration SuDS techniques on the MMT development site is not possible. In addition, the MMT development site is known to have a high ground water table. This prohibits a number of potential SuDS techniques with only the least sustainable SuDS methods such as tanking being appropriate on the MMT development site. Due to the nature of the site how any surface water drainage system will operate during a flood event needs to be fully addressed within any development scheme.

**Groundwater Flooding**

4.16 Groundwater flooding occurs when water originating in aquifers reaches the surface, typically as a result of high groundwater levels caused by prolonged rainfall. It has been identified using public data provided by the British Geological Survey (BGS), that the site is underlain by Weald Clay Formation with no superficial deposits. It is understood that Weald Clay formation exhibits very low permeability. The BGS borehole logs located within **Appendix F** confirmed the general characteristics of the substrata but did not reveal much detail of the ground water level. However, it is understood that in Twineham groundwater has been recorded to be 2.4m below ground level on October 2009 and only 0.94m below ground level in the western part of the site.

4.17 The SFRA confirms that some of the upper Adur catchment which the MMT development falls into overlies major and minor aquifers so therefore the site has a high groundwater vulnerability. This will need to be addressed in any SuDS design.

4.18 Based on the Sussex Biodiversity Record Centre located within **Appendix B** parts of the site has been described as swamp and ‘wet grassland’. This again suggests areas of the MMT development site has the potential to be at risk from groundwater flooding. It is unusual for homes being built on swamp or marsh land and its suitability needs to be considered.

4.19 As discussed in section 4.13 due to the sites high water table the suitability of SuDS features needs to be considered, especially in relation to the contamination of groundwater by surface water. The use of infiltration SuDS techniques on the MMT development site would not be possible and as a result only the least sustainable SuDS methods such as tanking would be appropriate on the MMT development site. Lined and tanked SuDS options will prevent cross contamination of surface water and ground water but would contribute to an increase surface water runoff volume from the MMT development site.
4.20 Summary – The MMT development is underlain by Weald Clay and has a high water table. This prohibits a number of potential SuDS techniques. Careful consideration is required for the potential of the contamination of groundwater with surface water. Lined and tanked SuDS options will prevent cross contamination of surface water and ground water but would contribute to an increase surface water runoff volume from the MMT development site.
5.0 Water Quality

5.1 The chemical and biological water quality of the River Adur is monitored under the requirements of the WFD. Data presented in the Adur and Ouse Management Catchment indicate that the current ecological status of the Upper Adur in close proximity to the site is ‘Poor’, but the chemical status is classed as ‘Good’.

5.2 Information provided on the Defra Magic mapping website (https://magic.defra.gov.uk/MagicMap.aspx) indicates that the Adur Estuary which is downstream of the MMT site is a Site of Special Scientific Interest (SSSI). This is shown in Figure 5.1 below.

5.3 There is potential for an increase in pollutants discharging into the River Adur resulting from the MMT development. This can result from an increase in surface water runoff carrying pollutants during the construction phase and post development. In addition, the increase in foul flows into the River Adur as a result of the development will also have a negative impact. The ecological status of the watercourse is currently poor so additional pollutants are not acceptable. The increase in pollutants also has the potential to negatively impact on the current chemical status of the River Adur. This will not meet the WFD requirements. In addition, the increase in pollutants resulting from the MMT development has potential to impact on the Adur Estuary SSSI. Careful deliberation on how this will be managed is required.

5.4 Summary – The MMT development will increase the risk of an unacceptable level of pollutants and treated effluent discharging into the River Adur. This would likely impact on the current ecological status and chemical status of the River Adur. In addition, the increase in pollutants resulting from the MMT development could have a potential negative impact on the Adur Estuary SSSI.
6.0 Foul Water Drainage

6.1 It is understood that currently there is no foul water infrastructure that serves the proposed MMT development site. However, early consultation has been held with both Southern Water and the EA.

6.2 The foul drainage strategy for the MMT development is reliant on the need to upgrade the Henfield wastewater treatment works (WwTW) to enable the development to be built. It is understood that the MMT development would have to be developed in phases and in line with the Henfield WwTW upgrades. Careful deliberation will be needed by Southern Water and the developer for this to be achievable. As of yet the site has not been allocated for development. Therefore, there is a great deal of uncertainty as to whether the Henfield WwTW upgrades will be included in Southern Waters Five Year Plan and if it is not included it will impact on the deliverability of the MMT development.

6.3 The proposed Henfield WwTW is planned to treat at least 7,000 homes as well as a number of commercial, health and educational facilities.

6.4 The peak foul flow rate from the proposed 7,000 homes has been based on the following assumptions as dictated by Sewers for Adoption 7th Edition:

6.5 4000 l Litres per dwelling per day

4000 x 7000 = 28,000,000

28000000/86400 = 324 l/s.

6.6 The Dry Weather Flows (DWF) has been calculated as follows.

200 litres/person/day x 3 = 600

600 x 7000 = 4,200,000

4,200,000/1000 = 4,200 cume/day

6.7 The calculated peak foul flow rate from the 7,000 homes is therefore 324 l/s and the domestic foul volume that will be generated by the site is 4,200 cume. The rate and volume will be significantly greater than this as we have not included for the additional site facilities.

6.8 The EA have not confirmed the required discharge consent levels for the WwTW. The impact of the treated discharge on the River Adur also needs to be carefully considered and investigated especially in terms of water quality.

6.9 Summary – Currently there is no existing foul water infrastructure, which can serve the proposed MMT development site. The proposed foul drainage strategy for the MMT development is reliant on the need to upgrade the Henfield wastewater treatment works (WwTW) or provide a new WwTW. The impact of the treated discharge on the water quality of the River Adur and its capacity needs to be considered. Significant foul water infrastructure will need to be constructed in order to convey and treat effluent from the MMT development, which brings with it its own issues in terms of land take, impact on farm land, easements, and discharges consents; all of which will be a significant constraint to any development making it unlikely that the proposed settlement could be delivered.
7.0 Summary and Conclusions

7.1 This Technical Note has been produced by Motion on behalf of LAMBS to assess the potential flood risk and drainage impacts of the proposed new development of 7,000 homes with education, healthcare, leisure, employment and other community facilities known as Mayfield Market Town (MMT). The proposed development site is located between Henfield and Hurstpierpoint.

7.2 The proposed development site comprises an area of land which is currently open field and agricultural land. The site is located in the upper reaches of the River Adur and contains several significant watercourse and tributaries, the confluence of which is to the west of the site. There are surface water issues related to the site, the site has areas of high flood risk from rivers and surface water, and other drainage problems by virtue of the soil type and high water table. The development site would occupy a substantial area of the river Adur upper reach and the main river Adur and estuary is a SSSI. This development, should it be permitted, will clearly have a significant impact on;

- Flooding and Flood Risk;
- Drainage;
- Ground Water;
- Water Quality, and
- Wastewater Treatment.

7.3 The EA Flood Map illustrates that parts of the MMT development site are located within areas of higher flood risk in Flood Zone 3 and Flood Zone 2. Parts of the site are located within Flood Zone 3b, which is classed as functional floodplain and proposed residential development, that is classed as "More Vulnerable Development" is not allowed in Flood Zone 3b. National and local planning policy requires any Development to be directed into areas of lowest flood risk. Development in Flood Zone 3a requires proof that there are no more suitable alternative available sites with lower flood risk. Any development in Flood Zone 3 requires level for level flood plain compensation, which has the potential to take up development area and make the development less viable. Climate change will have an impact in the future as it will increase the areas of the site in Flood Zone 2 and 3 as increased rainfall raises flood levels, again potentially making the site less viable for development.

7.4 The River Adur is not tidally influenced at the MMT site. However, the tidal limit is very close to the MMT development site and with climate change raising sea levels there is potential in the future for the site to be tidally influenced. This could have an impact on surface water drainage due to tide locking, including the need for pumping, larger attenuation storage and an increase in the area of the site being classified at risk of flooding.

7.5 The MMT development will cause a significant increase in surface water runoff from the development due to the significant increase in amount of impermeable area (buildings, roads, parking and hardstanding) on site. The increase in impermeable area will increase the rate and volume of water draining into the River Adur catchment, which uncontrolled has the potential to increase flood risk in neighbouring areas and downstream. Although the rate could be controlled to match the pre-development rate, there will be an increased volume which cannot be easily addressed due to the impermeable nature of the soil, without increasing attenuation volumes, which again has an impact on land take. The Upper Adur catchment responds rapidly to rainfall due to the impermeable nature of the site as it is underlain by Weald Clay. Therefore, the use of infiltration SuDS techniques on the MMT development site, which is the preferred method of disposal of surface water, will not be possible. In addition, the MMT development site is known to have a high ground water table and the site may be susceptible to ground water flooding. The high ground water table also prohibits several potential SuDS techniques with only the least sustainable SuDS methods such as tanking being appropriate.

7.6 The site is located on a major and minor aquifer and the MMT site has the potential to cause contamination of ground water and negatively impact on the aquifer.
7.7 There is potential for an increase in pollutants discharging into the River Adur resulting from the MMT development. This will have a negative impact on the current ecological status and chemical status of the River Adur. In addition, the increase in pollutants resulting from any development has potential to have an impact on the Adur Estuary SSSI.

7.8 Currently there is no foul water infrastructure that serves the proposed MMT development site. The MMT development would be reliant on the need to upgrade the Henfield wastewater treatment works (WwTW) or the provision of a new WwTW. Upgraded or new WwTW that discharges into the River Adur will increase the rate and volume of treated effluent draining into the watercourses and has the potential to increase pollutants and could negatively impact the River Adur and the River Adur Estuary SSSI. Stringent discharge consents would be required, and efforts would need to be made by the regulators to enforce these consents.

7.9 The publicly available information on the MMT proposals is limited, although a letter from the prospective developer to Horsham Councillors indicates their intention to “incorporate scheme-wide approaches to Sustainable Drainage”. No further information is provided but, as set out above, the site constraints are such that only the least sustainable SuDS techniques could be used. Any scheme for such a significant size of settlement would need to include a detailed assessment of the flooding and drainage impacts of the development. However, for the reasons set out above it is considered that the potential negative impacts of the development have not been shown to be mitigated and, therefore, the currently proposed location for this new settlement would be unacceptable in flood risk and drainage terms.
Appendix A

Site Location Plan
Appendix B

Sussex Biodiversity Record
Study Area - NW quarter

04/12/2014

Key to Map:
- Study Area
- Target Note
- Trees - Ancient/Veteran/Notable
- Trees
- Hedgerows
- Hedgerows - Species Rich/Important
- Scattered Scrub
- Arable Field Margin
- Drainage Ditch

Habitat Parcels
- Broadleaved Woodland (semi-natural)
- Broadleaved Woodland (plantation)
- Scrub (dense/continuous)
- Scrub (scattered)
- Ornamental Gardens
- Pond
- Swamp
- Arable
- Damp Grassland
- Improved Grassland
- Marshy Grassland
- Ruderals
- Ruderals on Damp Grassland
- Semi Improved Grassland

Study Area - SE quarter

04/12/2014

Key to Map:
- StudyArea
- Target Note
- Trees - Ancient/Veteran/Notable
- Trees
- Hedgerows
- Hedgerows - Species Rich/Important
- Scattered Scrub
- Arable Field Margin
- Drainage Ditch

Habitat Parcels
- Broadleaved Woodland (semi-natural)
- Broadleaved Woodland (plantation)
- Scrub (dense/continuous)
- Scrub (scattered)
- Ornamental Gardens
- Pond
- Swamp
- Arable
- Damp Grassland
- Improved Grassland
- Marshy Grassland
- Ruderals
- Ruderals on Damp Grassland
- Semi Improved Grassland

Study Area - SW quarter

04/12/2014

Key to Map:

- **StudyArea**
- **Target Note**
- **Trees - Ancient/Veteran/Notable**
- **Trees**
- **Hedgerows**
- **Hedgerows - Species Rich/Important**
- **Scattered Scrub**
- **Arable Field Margin**
- **Drainage Ditch**

**Habitat Parcels**

- **Broadleaved Woodland (semi-natural)**
- **Broadleaved Woodland (plantation)**
- **Scrub (dense/continuous)**
- **Scrub (scattered)**
- **Ornamental Gardens**
- **Pond**
- **Swamp**
- **Arable**
- **Damp Grassland**
- **Improved Grassland**
- **Marshy Grassland**
- **Ruderals**
- **Ruderals on Damp Grassland**
- **Semi Improved Grassland**

Appendix C

Photographic Evidence
A.  Herrings Bridge, Twineham (Jan 7 2016)

B.  Land South of Twineham Place Farm (Jan 7 2016)
C.  Land East of Great Wapses Farm (Jan 7 2016 except top rt which was Nov 24 2014)

D.  Land East of Little Wapses Farm (Jan 7 2016 except top rt which was Jan 3 2016)
E.  Land at Grendon House Stud & Eaton Thorne, B2116 (central Mayfields High Street)  
Nov 14 2014

F.  Land at Morley Farm, B2116 (Nov 14 2014)

G.  Whitebridge Farm, Wineham Lane & back garden, Wineham (Nov 14 2014, Nov 10 2014)
H. Wineham Bridge (Feb 1 2014, Jan 11 2011, Feb 1 2014 & 28 Oct 2013)

I. View from Frylands Lane (Oct 28 2013, Jan 10 2016)
COMPARISON OF SUMMER AND WINTER WATER LEVELS

Twineham – Herrings Stream
River Adur, Wineham
FLOODING ON EXISTING HIGHWAYS

Reeds Lane (access to Sayers Common and A23)

Twineham Lane
B281, Shermanbury (access to Horsham)

B2116 (access to Albourne and A23)
Truslers Hill Lane (route to Brighton over the Downs)

B2118 (old A23)

Flooding in Albourne
Appendix D
EA Flood Maps
Appendix E

Surface Water Flood Maps
Appendix F

BGS borehole logs


Yield 1,000 g.p.d. 1940. Windpump. 1959.

(b) WC

Hard blue or Brown Clay

Red Clay

Brown or Red clay

Blue & Red Clay

Blue Clay with veins of red clay

\[ \begin{align*}
21 & \quad 21 \\
7 & \quad 28 \\
6 & \quad 44 \\
7 & \quad 51 \\
81 & \quad 132
\end{align*} \]

\[ \begin{array}{c|cc|}
\text{Made ground} & \text{Thickness} & \text{Depth} \\
\hline
\text{Clay} & \text{Ft.} & \text{Ft.} \\
\text{Mottled clay} & 1 & 1 \\
\text{Blue sandy clay} & 3 & 15 \\
\text{Brown clay} & 10 & 25 \\
\text{Blue clay} & 41 & 294 \\
\text{Blue sandy clay} & 5 & 36 \\
\text{Claystone} & 4 & 39 \\
\text{Blue clay} & 6 & 39 \\
\text{Brown clay} & 40 & 80 \\
\text{Blue clay} & 25 & 108 \\
\text{Blue clay, sandy parting} & 5 & 113 \\
\text{Blue clay} & 17 & 130
\end{array} \]
**CONCEPT SITE INVESTIGATIONS**

8 Wapping Mews, Wapping Way
London E1 9EF
Telephone: 020 8811 2880, Fax: 020 8811 2881
E-mail: si@conceptconsultants.co.uk

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**Trial Pit No**

**TP05**

**Project**

A23 Sayers Common Wood

**Job No**

11/2371

**Date Started**

11/04/11

**Date Completed**

11/04/11

**Ground Level (mOD)**


**Co-Ordinates**


**Final Depth**

1.50m

**Client**

The Highways Agency

**Method/Plant Used/Hand Excavated**

Sheet 1 of 1

---

### STRATA

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<th>Water Level (mOD)</th>
<th>Legend</th>
<th>Depth (Thickness)</th>
<th>Strata Description</th>
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<td>0.10</td>
<td>Dark brown slightly silty CLAY. (TOPSOIL)</td>
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<td>B02</td>
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<td>1.20-1.50</td>
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### SAMPLES & TESTS

**GENERAL REMARKS**

1. Weather was clear and dry.
2. Trial pit was dry and stable.
3. Trial pit backfilled with soil arisings upon completion.
4. Trial pit dimensions: 0.40m x 0.40m x 1.50m deep.

---

**Issue No.**

01

**Logged By**

DS


(b) WC

Hard blue = Brown clay
Red clay

Brown = Red clay
Blue or Red clay
Blue clay with veins of red clay

21  21
7  28
16  44
7  51
81 132

A

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<th>Depth</th>
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<td>Blue clay, sandy parting</td>
<td>17</td>
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