

**FLOOD RISK ASSESSMENT
AND
DRAINAGE STRATEGY**

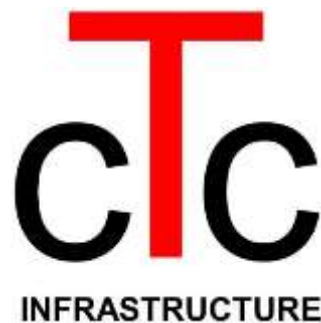
for

MR WHITTINGHAM

PROPOSED RESIDENTIAL DEVELOPMENT

on

**LAND AT CLIFTON HOUSE FARM
SCHOOL LANE, FORTON**



www.tonks-consulting.co.uk

CONTENTS

| SECTION | TITLE | PAGE |
|---------|-------------------------------------|------|
| 1 | INTRODUCTION | 3 |
| 2 | DESCRIPTION OF THE SITE | 4 |
| 3 | SCOPE OF THE ASSESSMENT | 5 |
| 4 | CONSULTATIONS AND DATA ACQUISITIONS | 8 |
| 5 | SOURCES OF FLOOD RISK | 10 |
| 6 | FLOOD RISK ASESMENT | 14 |
| 7 | PREDICTED IMPACTS AND MITIGATION | 16 |
| 8 | DRAINAGE STRATEGY | 17 |
| 9 | CONCLUSIONS | 19 |

APPENDICES

- A Location plan
- B Sewer records
- C Attenuation calculations

1. INTRODUCTION

- 1.1 This flood risk assessment and drainage strategy has been produced on behalf of Mr Whittingham in support of an outline planning application for a proposed residential development on land at Clifton House Farm, School Lane, Forton, Lancashire. A location plan is included within Appendix A.
- 1.2 The Flood Risk Assessment (FRA) is compliant with the requirements set out in the National Planning Policy Framework (NPPF) and the Planning Practice Guidance (NPPG) in relation to Flood Risk and Coastal Change, which was updated in April 2015, and describes the existing site conditions and proposed development. It assesses the potential sources of flooding to the site from tidal, fluvial, groundwater, surface water and other sources, taking a risk based approach in accordance with National Policy.
- 1.3 The drainage strategy describes the existing site conditions and proposed development. It assesses the potential impact of proposals on existing sewers and includes a proposed strategy for the provision of new drainage to serve the proposed development.

Site summary

| | |
|-----------------------------|-------------------------------|
| Site Name | Land at Clifton House Farm |
| Location | Forton, Lancashire |
| NGR (approx.) | SD485512 |
| Application site area | 2.734 ha |
| Development type | Residential |
| Vulnerability | Residential – More Vulnerable |
| Indicative Flood Zone | Flood Zone 1 |
| EA Development Control Area | Lancashire and Cumbria |
| Local Planning Authority | Wyre Borough Council |

2. DESCRIPTION OF THE SITE

Existing site

- 2.1 The proposal relates to land (2.734 hectares) at Clifton House Farm, School Lane, Forton, Lancashire, PR3 0AR.
- 2.2 School Lane is on the eastern boundary of the site along with a sports ground that lies on the northern boundary. The site is comprised of green fields.
- 2.3 Green fields lie beyond the site on its western and southern boundaries. Forton village lies to the site's eastern boundary.
- 2.4 An unnamed watercourse runs through the centre of the land ownership approx. 100m from the northern boundary of the land to be developed. The watercourse flows to the west and discharges into the River Cocker approx. 1.2km from the site.
- 2.5 Land within the development site has a general fall towards the watercourse enabling surface water runoff from the site to discharge into it.
- 2.6 Two ponds lie along the site's southern boundary, one at the eastern end and the other midway along; and one on the western boundary to the northwest of the site.
- 2.7 The Lancaster Canal lies approx. 400m to the west of the site.

Proposed development

- 2.8 It is proposed that the development site will comprise 46 residential dwellings.
- 2.9 The indicative site layout plan is shown on drawing GA3020-PSP-01 accompanying the planning application.
- 2.10 It is proposed that the access into the developed site will be from a new access from School Lane.

3. SCOPE OF THE ASSESSMENT

Flood risk planning policy

- 3.1 The National Planning Policy Framework (NPPF) sets out the Government's national policies on different aspects of land use planning in England in relation to flood risk. Supporting Planning Practice Guidance is also available.
- 3.2 The NPPF sets out the vulnerability to flooding of different land uses. It encourages development to be located in areas of lower flood risk where possible, and stresses the importance of preventing increases in flood risk off site to the wider catchment area.
- 3.3 The NPPF also state that alternative sources of flooding, other than fluvial (river flooding), should also be considered when preparing a Flood Risk Assessment.
- 3.4 As set out in NPPF, local planning authorities should only consider development in flood risk areas appropriate where informed by a site specific Flood Risk Assessment. This document will identify and assess the risk associated with all forms of flooding to and from the development. Where necessary it will demonstrate how these flood risks will be managed so that the development remains safe throughout its lifetime, taking climate change into account.
- 3.5 This Flood Risk Assessment is written in accordance with the NPPF and the Planning Practice Guidance in relation to Flood Risk and Coastal Change.

Flood zones

- 3.6 In investigating the flood risk relating to the site, the Environment Agency flood zone mapping identifies the proposed development site lies within Flood Zone 1. Flood Zone 1 is the lowest risk and is identified as land assessed as having a less than 1 in 1000 annual probability of river or sea flooding (<0.1%).
- 3.7 An extract from the Environment Agency's Flood Zone Map for Planning is shown below.



Strategic Flood Risk Assessment

- 3.8 The site is within the area covered by the Wyre Borough Council Strategic Flood Risk Assessment, April 2007.
- 3.9 No reference is made to the site within the SFRA.

Sequential Test

- 3.10 A requirement of NPPF is that developers considering submitting a planning application should consult with the Local Planning Authority at all stages of development to ensure that the Sequential Test is applied at all stages of the planning process. The purpose of the test is to direct new development to areas with the lowest probability of flooding.
- 3.11 Strategic Flood Risk Assessments (SFRA) refine information on the probability of flooding, taking other sources of flooding and the impacts of climate change into account. They provide the basis for applying the Sequential Test, on the basis of the flood zones in NPPG Table 1.
- 3.12 The flood zones are the starting point for this sequential approach. As already stated, the Environment Agency's flood mapping identifies the site as lying within Flood Zone 1, the lowest risk.

- 3.13 With reference to NPPF, Environment Agency Flood Maps and the SFRA, the site lies within an area identified as being potentially developable and following the sequential approach, all of the development is located within Flood Zone 1.
- 3.14 The current development proposals are classified as “More Vulnerable” for residential development. Table 3 within NPPG indicates Flood Risk Vulnerability and Flood Zone ‘compatibility’. Using Zone 1 and the “More Vulnerable” classification for residential use, NPPG considers that a development of this type would be deemed appropriate for development within Flood Zone 1.
- 3.15 Subject to the suitable assessment of flood risk, the development would be considered sequentially preferable in this location.

4. CONSULTATIONS AND DATA ACQUISITIONS

Environment Agency

- 4.1 The Environment Agency's flood zone mapping confirms that the site lies within an area of Flood Zone 1, the lowest risk. There is no record of any historic flooding occurring at the site.

United Utilities

- 4.2 Public sewer records have been obtained for the site and the local area and are included within Appendix B. The records identify a 225mm public combined sewer in School Lane to the east of the site that collects foul and surface water from the properties within the village and discharges into a pumping station located opposite the sports ground. Water is pumped via a rising main to the public foul sewer running along the eastern part of School Lane. Where surface water sewers exist, they discharge into the watercourse.
- 4.3 United Utilities has stated that foul discharges from the development will be allowed to drain to the public combined / foul sewer network, their preferred point of discharge being to the 225mm public combined sewer on School Lane at an unrestricted rate. Surface water from this site should drain to either soak away, pond or directly to a watercourse. Discharge rates and consents must be discussed and agreed with all interested parties.

Topographical Survey

- 4.4 A topographical survey has been carried out for this site. The site has a general fall to the watercourse that passes through the centre of the land ownership approx. 100m from the northern boundary of the land to be developed.

Site Investigation

- 4.5 Site investigations have not been carried out for the site.

- 4.6 The Soilscales viewer has identified that the geology encountered will be slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils, which are not likely to be conducive to infiltration of surface water.

Site Inspections

- 4.7 A site visit was made to examine site conditions and levels as well as any significant visible features that would affect the flood characteristics of the site. Such inspections are limited to areas that could readily and safely be accessed and no intrusive investigations or drainage surveys were carried out.
- 4.8 The site visit assessed how the current surface water drainage discharges were dealt with. Surface water runoff discharges to the watercourse that runs through the centre of the land ownership approx. 100m from the northern boundary of the land to be developed.

5. SOURCES OF FLOOD RISK

Potential Sources of Flood Risk

- 5.1 Potential sources of flood risk to the site are identified below. The significance of these sources is investigated further into Section 6.

Fluvial flooding

- 5.2 An unnamed watercourse runs through the centre of the land ownership approx. 100m from the northern boundary of the land to be developed. The watercourse flows to the west and discharges into the River Cocker approx. 1.2km from the site.

- 5.3 The site to be developed is identified as lying within Flood Zone 1 on the Environment Agency's flood maps, land assessed as having an annual probability of flooding of less than 1 in 1000 (<0.1%).

Tidal flooding

- 5.4 The site is a significant distance from the nearest tidal estuary and is, therefore, not at risk of flooding from the sea. The site is not identified as being at risk of flooding from the sea by any Environment Agency Flood Zone maps or within the SFRA for the area. As such, coastal and tidal flooding is not considered further within this assessment.

Canals, reservoirs and other sources

- 5.5 The Lancaster Canal is approximately 400m to the west of the site.
- 5.6 The Environment Agency's risk of flooding from reservoirs mapping identifies no risk.
- 5.7 Two ponds lie along the site's southern boundary, one at the eastern end and the other midway along; and one on the western boundary to the northwest of the site.

Groundwater

5.8 Groundwater flooding tends to occur after much longer periods of sustained high rainfall. The areas that are at risk tend to be those low-lying areas where the water table is shallow. Flooding tends to occur in areas that are underlain by major aquifers, although groundwater flooding is also noted in localised floodplain sands and gravels. The main causes of groundwater flooding are:

- Natural groundwater rising due to tidal influence, or exceptionally wet periods leading to rapid recharge;
- Groundwater rebound due to cessation of abstraction and mine dewatering;
- Existence of confined aquifers and springs.

5.9 There are no recorded incidents of flooding associated with groundwater levels within the site.

Sewers

5.10 Flooding from drainage system occurs when flow entering a system exceeds its discharge capacity, the system becomes blocked or, in the case of surface water sewers, it cannot discharge due to high water level in the receiving watercourse. Sewer flooding is often caused by surface water discharging into the combined sewerage system, sewer capacity is exceeded in large rainfall events causing backing up of flood waters within properties or discharging through manholes.

5.11 Surface water (including the risk of sewers and culverted watercourses surcharging) poses the highest risk of more frequent flooding. Surface water drainage from new developments is critical in reducing the risk of localised flooding.

5.12 Where possible the preference for dealing with surface water runoff from the developed site is for it to infiltrate back into the ground or alternatively to a watercourse. Only if it is not possible for either of these options is surface water from the development to be allowed into the public sewers.

- 5.13 United Utilities has advised there is a 225mm public combined sewer in School Lane to the east of the site that collects foul and surface water from the properties within the village and discharges into a pumping station located opposite the sports ground.

Pluvial runoff

- 5.14 The Environment Agency Risk of Flooding from Surface Water map indicates the site is at a very low risk of surface water flooding, except for an area in the south west of the site where a low spot is identified. A very low risk means that each year, this area has a chance of flooding of less than 1 in 1000 (0.1%).
- 5.15 It should be noted that surface water flooding can be difficult to predict, much more so than river or sea flooding as it is hard to forecast exactly where or how much rain will fall in any storm.

Development drainage

- 5.16 Surface water (including the risk of sewers and culverted watercourses surcharging) poses the highest risk of more frequent flooding. Surface water drainage from new developments is critical in reducing the risk of localised flooding.
- 5.17 If surface water runoff is not managed appropriately, there may be an increased risk presented elsewhere from development drainage, and the aim should be to implement appropriate sustainable drainage systems (SuDS) to treat and contain flows and mimic the existing conditions.
- 5.18 Where possible the preference for dealing with surface water runoff from the developed site is for it to infiltrate back into the ground or alternatively to a watercourse. Only if it is not possible for either of these options is surface water from the development to be allowed into public sewers.
- 5.19 The development of the site will increase the area of impermeable hardstanding on site and therefore has the potential to alter the surface water runoff regime of the site and to have an adverse effect on flood risk elsewhere in the wider catchment.

Historic flooding

5.20 There are no recorded instances of historic flooding at the site.

6. FLOOD RISK ASSESSMENT

- 6.1 This section of the Flood Risk Assessment looks at the flood risk to the site before any mitigation measures are put into place and hence identifies where mitigation will be required. Section 7 continues to explain the mitigation measures proposed and the residual risk following implementation of any proposed mitigation.

Risk of Flooding to Proposed Development

Fluvial Flood Risk

- 6.2 The watercourse that flows through the centre of the land ownership approx. 100m from the northern boundary of the land to be developed, poses no flood risk issues to the development plans. The risk of fluvial flooding is therefore low.

Canals, reservoirs and other sources

- 6.3 The Lancaster Canal lies approximately 400m to the west of the development site and is below the levels of the site.
- 6.4 The ponds on the boundaries of the site are self-contained with no observable inlet or outlet and do not pose a flood risk to the site.
- 6.5 There are no reservoirs or other sources within the vicinity of the site. As such the risk of flooding from canals, reservoirs and other sources is low.

Groundwater

- 6.6 There are no recorded incidents of flooding associated with groundwater levels within the site and due to the nature of the underlying strata the flood risk from groundwater is low.

Sewer Flooding and Pluvial Runoff

- 6.7 A public combined sewer lies within School Lane. The sewer discharges to a pumping station located opposite the sports ground. The pumping station is

adopted by United Utilities whom maintain it. In addition there is an overflow from the pumping station that discharges into the watercourse.

- 6.8 The site would therefore not be at risk should the pumping station fail.
- 6.9 The Environment Agency's risk of flooding from surface water map identifies the possibility of a small amount of fluvial flooding occurring from land adjacent to the southern boundary of the site. The fluvial flooding is from a low spot in the topography of the site and adjoining land. A cut off drain to intercept and discharge this water into the watercourse can be provided to prevent this from occurring.
- 6.10 As such the risk is low from sewer flooding and pluvial runoff.

Effect of the Development on the Wider Catchment

Development Drainage

- 6.11 The proposed development will increase the area of impermeable surfaces on site and therefore has the potential to alter the surface water runoff regime of the site and to have an adverse effect on flood risk elsewhere in the wider catchment.
- 6.12 The surface water runoff from the existing site runs off and discharges into the watercourse that crosses the land ownership approx. 100m from the northern boundary of the land to be developed.
- 6.13 It is intended that new surface water drainage will be constructed, appropriately sized to take all surface water runoff from the new roofs and hardstanding, to mimic the existing situation and discharge into the watercourse.
- 6.14 As the discharge from the development will be attenuated to Greenfield runoff, there will therefore be no change to the flood risk upstream or downstream of this location.
- 6.15 Outline surface water requirements have been prepared and are discussed in the mitigation measures in Section 7 of this document. As a result of the mitigation measures, the risk of flooding from the development drainage is low.

7. PREDICTED IMPACTS AND MITIGATION

- 7.1 This section of the FRA sets out the mitigation measures recommended to reduce the risk of flooding to the proposed development and outlines any residual impacts.

Site arrangements

Access / Egress

- 7.2 If an extreme event was to occur, the access to the site would be from School Lane.

Upstream and downstream effects

- 7.3 There is no material effect on the floodplain due to the proposed development.
- 7.4 It is intended that surface water attenuation will be provided within the development site. Attenuation will be provided by underground storage and a controlled discharge made to the watercourse crossing the land ownership approx. 100m from the northern boundary of the land to be developed. The proposals will be designed so as not to affect the existing situation and therefore there will be no additional risk to upstream or downstream properties.
- 7.5 Following the granting of detailed planning permission for the development, a comprehensive drainage strategy will be agreed with the Lead Local Flood Authority to take into account proposed surface water runoff rate and volumes.

8. DRAINAGE STRATEGY

Surface water drainage

- 8.1 Guidance for the disposal of surface water from a development site is for soakaways to be considered as the primary solution. If this is not practical, discharge to a watercourse is to be considered as the next available alternative. Only if neither of these options is available, and other sustainable drainage methods not possible, should the use of the public sewerage system be considered.
- 8.2 The Soilscales viewer has identified that the geology encountered will be slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils, which are not likely to be conducive to infiltration of surface water.
- 8.3 The surface water runoff from the existing site discharges into the watercourse that crosses the land ownership approx. 100m from the northern boundary of the land to be developed.
- 8.4 To maintain status quo, it is intended that the surface water runoff from the new development will discharge via new outfalls into the watercourse.
- 8.5 The flow into the watercourse from the development will be controlled to Greenfield runoff rates allowing surface water runoff generated by all rainfall events up to the 100 year critical rain storm plus 30% on stored volumes, which has been included in the surface water volume.
- 8.6 The Greenfield runoff flow has been calculated using the 'Causeway Flow' programme. This gives a Q_{bar} of 7.6 l/s/ha. The calculation is provided within Appendix C. The limiting discharge from the developed site is to be restricted to Greenfield runoff when only considering the area of the proposed development that is to be impermeable.
- 8.7 Based upon a 40% development density, after completion of the development approximately 1.09 hectares of the site will be impermeable. The limiting discharge into the watercourse is therefore $1.09 \times 7.6 = 8.3$ l/s.

- 8.8 Preliminary calculations have been carried out to identify the size of the attenuation required for the development. Attenuation in the order of 554m³ to 837m³ is required for the 1 in 100 year storm event plus climate change, based upon the impermeable area of 1.34 hectares. It is expected that the attenuation volume will be reduced at the detailed design stage. The calculations are shown within Appendix C.

Foul water drainage

- 8.9 United Utilities has stated that foul discharges from the development will be allowed to drain to the public combined / foul sewer network, their preferred point of discharge being to the 225mm public combined sewer on School Lane at an unrestricted rate.
- 8.10 The foul sewage from the developed site will be collected by a piped system to an onsite foul pumping station located within the development site. A pumped discharge will be made into the public combined sewer that lies within School Lane.

9. CONCLUSIONS

- 9.1 This flood risk assessment and drainage strategy has been produced on behalf of Mr Whittingham in support of an outline planning application for a proposed residential development on land at Clifton House Farm, School Lane, Forton, Lancashire.

Flood risk assessment

- 9.2 The Site lies within Flood Zone 1, the lowest risk which is identified as land assessed as having a less than 1 in 1000 annual probability of river or sea flooding (<0.1%).
- 9.3 The Environment Agency Risk of Flooding from Surface Water map indicates the site is at a very low risk of surface water flooding except for an area in the south west of the site where a low spot is identified. A very low risk means that each year, this area has a chance of flooding of less than 1 in 1000 (0.1%).
- 9.4 There are no recorded instances of historic flooding at the site.
- 9.5 The risk of fluvial flooding is low.
- 9.6 The risk of flooding from canals, reservoirs and other sources is low.
- 9.7 The flood risk from groundwater is low.
- 9.8 The risk from sewer flooding and pluvial runoff is low.
- 9.9 The risk of flooding from the development drainage is low.

Drainage strategy

- 9.10 The Soilscales viewer has identified that the geology encountered will be slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils, which are not likely to be conducive to infiltration of surface water.
- 9.11 It is intended that the surface water runoff from the new development will discharge via a new outfall into the watercourse that crosses the land ownership approx. 100m from the northern boundary of the land to be developed.

- 9.12 The foul sewage from the developed site will be collected by a piped system to an onsite foul pumping station located within the development site. A pumped discharge will be made into the 225mm public combined sewer on School Lane at an unrestricted rate.

| | | | |
|------------------------|--|---|-----------|
| Client: | | Mr Whittingham | |
| Project Name: | | Land at Clifton House Farm | |
| Project Number: | | 2016-C-109 | |
| Report Title: | | Flood Risk Assessment and Drainage Strategy | |
| Created by: | Bob Ford | Date: | June 2017 |
| Proofed By: | Sarah Buckley | Date: | June 2017 |
| Approved by: | Bob Ford bob@tonks-consulting.co.uk | Date: | June 2017 |

APPENDIX A



CLIFTON HOUSE FARM – LOCATION PLAN

APPENDIX B

The plan is based upon the Ordnance Survey Map with the sanction of the Controller of H.M. Stationery Office. Crown and United Utilities copyrights are reserved. Unauthorised reproduction will infringe these copyrights.



**United
Utilities**

helping life flow smoothly

APPENDIX C

Greenfield Runoff

| | | |
|------------------------------|---------|------|
| Methodology | IH124 ▾ | OK |
| Positively Drained Area (ha) | 1.000 | |
| SAAR (mm) | 1037 | Load |
| Soil Index | 4 ▾ | |
| SPR | 0.47 | |
| Region | 10 ▾ | |
| Growth Factor 1 year | 0.87 | |
| Growth Factor 30 years | 1.70 | |
| Growth Factor 100 years | 2.08 | |
| | Calc | |
| QBar (l/s) | 7.6 | |
| Q 1 year (l/s) | 6.7 | |
| Q 30 year (l/s) | 13.0 | |
| Q 100 year (l/s) | 15.9 | |

Storage Estimate

| | | |
|-----------------------|-------|--------|
| Return Period (years) | 100 | OK |
| Climate Change (%) | 30 | Cancel |
| Impermeable Area (ha) | 1.090 | |
| Peak Discharge (l/s) | 8.300 | |
| Required Storage (m³) | Calc | |
| from | 554 | |
| to | 837 | |