

Fort Vale Engineering Ltd

Simonstone Works

Flood Risk Assessment

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Prepared	Vincent Cooke	8 May 2005
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This document has been prepared solely as an assessment of the flood risk at the Simonstone Works site and adjacent greenfield land, as detailed within, for Fort Vale Engineering Ltd. Bullen Consultants accepts no responsibility or liability for any use other than by the client for the purposes for which it was originally commissioned and prepared.

1.0 Introduction

Fort Vale Engineering is currently proposing to redevelop part of a site at Simonstone, near Burnley, to create a new factory. Other parts of the site may also be developed in future but, there are no definite proposals to consider at present.

This report was prepared for Fort Vale Engineering Ltd [FVEL], who instructed Bullen Consultants, and addresses the risk of flooding to the whole site.

Consequent to recent national flood events, guidelines have been developed to assist the planning authorities in situations where flooding is likely ⁽¹⁾. The Environment Agency aims to ensure that all future developments are assessed with these guidelines in mind, and in general planning restrictions in such areas are becoming more stringent.

A desk study of the site was undertaken, and the Environment Agency was also consulted with regard to the known flooding regime.

¹ Department of Transport, Local Government and the Regions
Planning Policy Guidance Note 25 : Development and Flood Risk. 2001

2.0 Current Situation and Proposals

The site, being land associated with the Simonstone Works extends westwards from Simonstone Lane for nearly 1km, with Gooseleach Wood at its furthest extent. A dismantled railway forms the northern boundary, and the River Calder predominantly limits the site to the south, although around 0.5 hectares of the opposite bank is also included. In total the site covers approximately 69 hectares.

This study will differentiate between three areas within the site boundary – the northern and southern halves of the existing factory site, and the adjacent greenfield land. Planning applications for these different areas may be submitted at various times, and so care should be taken to ensure that flood criteria is still relevant. In the first instance, from May 2005, the northern half of the site will be predominantly under consideration.

The site is situated off Simonstone Lane between Simonstone and Altham, at national grid reference SD773335. The site is currently disused, and the northern part of the site, (previously known as “Building R”), consists of a large factory to be demolished and redeveloped for other industrial use, as Phase 1 of the scheme. The southern building, (or “Building S”), is a more modern and adaptable commercial unit, and no changes to this are proposed at present, although a possible Phase 2 could move towards a new business park on this area and the remainder of the existing factory land alongside Simonstone Lane. The greenfield land west of the factory is to be currently kept in reserve for possible further phases of development.

Some ancillary structures to Building R have already been demolished, such as external storage tanks and material storage bays

The existing factory site is built on two well defined plateaus, with a grass embankment slope and access ramps between. Formby Surveys’ topographic plan, (ref 4572:500:1:1,) indicates that around Building S, ground levels are around 68.7 mAOD, rising to over 70 mAOD around Building R. Ground levels at the south end of the site are not included on the survey, however it appears from visual inspection that there are no significant differences from the lower level of 68.7 mAOD. The landscaping at the northern end of the site does reach 72.8 mAOD, although this offers no advantage against flooding to any development proposal. Phase 1 of the development will be limited to the higher plateau.

Ground levels around the rest of the site have not been measured. To the west of Simonstone Brook, the river floodplain narrows, and high ground becomes more evident, leading to Gooseleach Wood.

Access to the site is currently from Simonstone Lane, off the A678. It is assumed this will be maintained after development for Phases 1 & 2 but, additional routes may be created to reach the reserved land.

The River Calder flows east to west, running parallel to the A678 past the junction with Simonstone Lane. After passing under the A678 at Altham Bridge through a large double arch structure the river then also flows approximately 350m to the south west of the current factory site and towards Gooseleach Wood. The river does not form the boundary of the site, as other parts of the floodplain are in different ownerships.

Simonstone Brook runs northeast to southwest through the whole site, being initially alongside Building R, before moving away from the existing buildings. The brook joins the River Calder approximately 400m west - south west of the site, and has a steep channel gradient. A 600mm culvert beneath a field access is of insufficient capacity, and evidence of out-of-channel flow at this point has been observed. However this only causes flows to pass over and around the access bridge, and while this needs to be considered for the reserved land, would not necessarily affect the existing developed areas.

3.0 Flood Regime

The Environment Agency records show the southern part of the site, including Building S, as being at risk of flooding on their Flood Zone plans during extreme events of less than 1% probability of occurring in any given year. Building R is outside of this defined area. However plans are often of insufficient detail on which to base a flood risk assessment for a specific site and more detailed studies may assess the level of risk to be different from that which is apparent from the Flood Zone maps.

Information obtained from the Environment Agency for this site indicates that the predicted flood level during the 1% annual probability event along this part of the River Calder would currently be between 69.1 mAOD to the east of Simonstone Lane and 66.3 mAOD near the confluence with Simonstone Brook. At Altham Bridge, between these two points, this flood level is expected to be 67.81 mAOD.

There are no flood defences to the river that could help protect the site. River bank levels near Simonstone Lane appear to be in the region of 69.0 mAOD, and although this height is then extended upwards by a stone wall, flooding could potentially bypass this structure either around the upstream end of the wall, or through observed holes at ground level and reach the A678. Flows could then pass down Simonstone Lane, which drops slightly away from the river and then into the site via the main vehicle access.

Similarly, downstream of Altham Bridge, the floodplain could flood up to the edge of the Building S plateau, although the 1% probability water level would not overtop to the site from this direction.

The 1% probability flood level in Simonstone Brook would be different from that in the River Calder, and for complete certainty of how this could affect the site, this level could be calculated. However the walkover survey indicates that for most of its length past the site, spilling would tend to occur to the west bank away from the Phase 1 & 2 areas and fall rapidly to the main river floodplain. The River Calder water levels are thus the predominant influence. Only flooding immediately downstream of the culvert, beneath the disused railway bordering the north end of the existing factory, could potentially affect the current proposals, and this is discussed further in Section 4.

It is not known if any of the site has ever been flooded.

It should be noted that as climate change is expected to increase static water levels, the standard (but not the level) of any flood contained within the channel or against the Building S plateau could be reduced. This could also occur if hydrological conditions alter or the statistical return periods are reassessed. Floods of greater magnitude than the planning minimum could also occur at any time, and potentially affect the site to a greater degree than that considered in this report.

The pumping station to the south of the factory site operates in connection with United Utilities sewerage undertaking, and is not thought to be part of any land drainage system, and so does not need to be considered further, although should this system fail, there may be a backup within the pipe network which could have implications to the site or surrounding areas.

A disused colliery lies adjacent to this pumping station and the site. At least one shaft is known to have been sunk, and there may be evidence of subsidence running towards the river. However due to the probable length of time since operation, it is unlikely that any further subsidence would occur, and so the flood risk should not increase.

4.0 Discussion

Under the current planning guidelines, the minimum flood that needs to be taken into consideration is that which has a 1% probability of occurring in any given year for a fluvial or river based event; [hereafter '*the 1% flood*']. The precautionary principle outlined in PPG25 also states that changes to this level, from the effects of climate change, should be allowed for.

Phase 1 development

Ground levels in the Phase 1 development will be at least 1.4m above the 1% flood level in the River Calder, and the proposed floor level of 71.25 mAOD, nearly 2m higher, [and at least 150mm higher than the existing floor level]. The effect of climate change on river levels is unlikely to increase levels by this amount, and so any new development here would, at worst, be at Low to Medium risk of flooding from this event.

However, it is possible that for approximately 50m from where Simonstone Brook emerges from the culvert beneath the disused railway at the north end of the factory, overtopping to the site could occur during extreme events. Water levels do need to rise by 1.5 – 2m before this would occur, and again the proposed raised floor levels offer some 400mm additional protection. Thus flooding to the building due to flooding from this watercourse is very unlikely. It is also probable that, should flooding occur, it would not be to great depth, as it would tend to spread then spill down the vehicle access ramps to the lower parts of the site.

Areas at Low to Medium risk should be suitable for most types of development according to PPG25.

Phase 2 development

Ground levels in this area, and the existing floor level of 68.95 mAOD, are marginally below the current 1% flood level, as predicted upstream of Simonstone Lane, and so would be at High Risk of flooding from the River Calder. Approximately 150mm depth of water could affect this building during the 1% flood. However, it is likely that depths would be less than this figure, as waters would spread through the site and over the edge of the plateau to re-enter the river floodplain downstream of Altham Bridge. As climate change occurs, this risk would increase, and both the frequency and depth of flooding from the 1% flood event would worsen.

Being categorised at High Risk does not necessary preclude redevelopment but, adequate defences should be maintained for the lifetime of the development, and warning or evacuation procedures are considered necessary. Other mitigation measures may also be required.

The topography around Simonstone Brook should prevent it causing direct flooding of this part of the site. However, if overtopping occurs from adjacent to the Phase 1 development, flows would tend to pass down the vehicle access ramps and affect this part of the site.

Reserve land

At Altham Bridge, all land below 67.8 mAOD would be at High Risk of flooding. This reduces to 66.3 mAOD at Simonstone Brook some 800m downstream. Ground levels have not been obtained here and exact boundaries cannot be delineated. It is likely that all flat land immediately adjacent to the river would function as floodplain and would therefore be unsuitable for most development. Some land downstream and to the west of Simonstone Brook, would be above flood levels from the River Calder and the Beck but, again suitable delineation would be needed.

It should also be noted that the criteria on which all the above risk zones are based could change over time. Thus if development occurs in the future, it should be ensured that any delineation to the 1% flood is still relevant.

Consequences for the Development

There are few consequences to Phase 1 of the development from flooding as it is elevated above the River Calder, and the raised floor levels provide additional protection. It may be beneficial to consider some form of localised flood protection to Simonstone Brook, which could be incorporated into the hard or soft landscaping of the site. Whilst any such defence may slightly increase flooding to the right bank of the Brook, this is unlikely to be problematical, as it would be liable to flood anyway. Also, no buildings would be affected and the land is within the site rather than under different ownership.

Alternatively, either the fabric of the new building could be waterproofed, or any vulnerable machinery specifically protected. However further investigation of the expected 1% flood on the Brook, might indicate that these options would be over cautious.

Should flooding occur from upstream of Altham Bridge, some ponding could occur in Simonstone Lane and around Building S to a depth of 300mm or more. This could potentially cause access problems to the Phase 1 area, and the economic and operational impacts of this may need to be considered further. Similarly, emergency access could be jeopardised which might necessitate other restrictions being stipulated to ensure safety.

Given the potential for flooding to Building S from a 1% flood or lesser event, floor levels in any new development in this area should ideally be at least 600mm above the 1% level, after an allowance for climate change has been made. However, in this instance this may not be essential, as even after climate change, water levels downstream of Altham Bridge are unlikely to affect the site, as an increase of over 900mm to the current 1% flood would be required.

Flooding from Simonstone Lane is therefore also unlikely to accumulate to a depth of one metre or more on current ground levels, as spillage from the site should still be able to occur down to the river floodplain. Some backing up may initially occur against the faces of buildings that interrupt flows. Floor levels should therefore be at least 600mm above ground levels, or a minimum of 69.3 mAOD. This is also above the current 1% flood level for standing water. The design should ensure that adequate spillage off the plateau can occur well before this level is reached, and that there are no changes during redevelopment which prohibit this. Note that some development types should not be situated in High Risk areas. It will therefore be necessary to verify that any proposal for Phase 2 remains suitable.

Should Simonstone Brook overtop the bank near Building R, flows could pass down the access ramps between the two levels. Whilst ponding to any depth is unlikely, as discussed above, it may be beneficial to position doorways out of direct flow paths to minimise any water ingress. The current ground levels near Simonstone Brook appear to prevent direct spillage into this part of the site, although some of this could be affected by proposed earthworks. If any changes are made which could increase the risk of flooding, adequate ground levels should be maintained to afford protection to the site by including suitable features in the scheme, [e.g. new bunds].

If the current buildings are simply re-occupied, the level of risk remains unchanged. Whilst further requirements would not be sought for this scenario, consideration should be given as to whether this flooding was acceptable without voluntary alleviation measures, [e.g. waterproofing or installing barriers at openings].

Commercial losses from greater flood events can also be minimised by careful planning of ground floor use. For example, by avoiding or elevating storage areas. Any underfloor services should be suitably protected.

Should FVEL consider it essential to prevent flood water entering the site from Simonstone Lane, floodgates could be installed at the site entrance. However, the full implications of this measure would need to be considered, as they could cause increased flooding to premises on the opposite side of Simonstone Lane. Alternatively, it might be appropriate to undertake feasibility studies into increasing the standard of defence to the river near the A678.

There is at least one open pipe draining to the river from an unknown source near the end of Simonstone Lane. There are also three 900mm diameter outfalls downstream of the bridge that are assumed to be related to Buildings R & S. All of these could allow high water levels to reach areas remote to the river. Investigation into any ongoing function may be required.

To prevent potential risk to staff attempting to move vehicles in the car park adjacent to Simonstone Lane during flooding, FVEL should plan to evacuate the site before overtopping occurs. It is possible that the Environment Agency may be able to offer a flood warning service for the site, or other dedicated systems could be installed in the channel.

It is assumed that no basements will be incorporated to the development. However, if this is not the case, flood risk and personal safety may have to be considered further.

Drainage

The existing factory site is relatively impermeable, apart from occasional soft landscaping, and it is assumed that surface water currently drains directly off site via a normal pipe network. The Phase 1 & 2 developments will not alter this, although it may be beneficial to consider using Sustainable Urban Drainage Systems [SUDS] to effect increased equilibrium in the water environment. The use of ponds, swales, infiltration strips or semi permeable hardstandings are means of achieving this.

Development on the reserved ground would dramatically change existing runoff rates, due to both decreased permeability and the speed at which a new pipe network would drain an area. It is likely that any such development would need to incorporate some form of flow attenuation to maintain the existing rate.

Any surface water system, whether traditional pipes and storage, or a sustainable solution, could backup and cause flooding of the site, if it was unable to discharge adequately. High river levels may increase the risk of this occurring and appropriate storage volumes should be incorporated within the system.

5.0 Conclusion

Phase 1 of the development, being demolition of Building R and reconstruction of a new manufacturing facility, with slightly higher floor levels at the northwest corner, would not be affected by a 1% flood event on the River Calder. The adjacent Simonstone Brook could potentially overtop to this part of the site but, is unlikely to affect the new building. New defences to part of the Brook could be considered.

The 1% flood in the river could flood Simonstone Lane and affect Phase 2 by flowing via the main vehicle access at the gatehouse. Should Simonstone Brook overtop, water could also flow towards Phase 2, from the higher Phase 1, via the access ramps.

Whilst flooding from the river flowing via Simonstone Lane could inundate the Building S to 150mm and the adjacent ground to over 300mm depth (during the 1% flood), it is considered thought that both this and flooding from the Brook would tend to flow across the site and drain off the lower plateau to the river floodplain downstream of Altham Bridge. Depths should thus be limited. If the existing building is reused, it would be at High Risk of flooding, but voluntary mitigation could be undertaken.

Alternatively, if new buildings are erected, floor levels should be no lower than 600mm above current ground, or at least 69.3 mAOD. This should ensure sufficient clearance for any flood flows from Simonstone Lane to pass through the site without affecting the building. It should be noted that this level is lower than the normal requirement of floor levels being 600mm above the 1% flood level after an allowance for climate change has been made, and relies on the fact that ponding depths would be limited. However, when firm proposals for Phase 2 of the development are known, that this is acceptable should be checked. FVEL should also ensure that the proposed development is suitable for a High Risk Area.

Should Simonstone Lane be flooded, delivery, emergency and staff access, may be limited to both Phases 1 & 2. The economic and operational effects of this need to be considered. Although a 1% flood event could occur at any time, it should only affect the development infrequently. Conversely, Simonstone Lane rises immediately adjacent to Building R and thus Phase 1 would not be completely isolated should flooding occur.

It is probable that some development on the reserved land would be possible from a flood risk point of view, although the flat areas adjacent to the river should be avoided. Delineation of the minimum development level would be required from both the river and Simonstone Brook, and it will be necessary to check that for any future development of the whole site, the criteria has not changed from that outlined in this report. Access to this area alongside the river should also not be relied on due to the potential for flooding.

Any part of the site could be at risk from unprecedented events.