



Bellway Homes Ltd

**Proposed Residential
Development at Snelsmoor
Grange, Boulton Moor**

**Flood Risk Assessment
and Drainage Strategy –
Addendum Report**

Document Control

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		Prepared by	Checked by
	Name	Dave Baker	Rob Travis
Date	Revision	Comments	
		Prepared by	Checked by
	Name		
Date	Revision	Comments	
		Prepared by	Checked by
	Name		
Date	Revision	Comments	
		Prepared by	Checked by
	Name		

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1.0 INTRODUCTION

1.1 Background to Report

- 1.1.1** A Flood Risk Assessment was prepared by Travis Baker Ltd in support of a planning application for residential development on land at Snelsmoor Grange, Boulton Moor. This is referenced 13018 RevA dated 26 March 2013.
- 1.1.2** As part of the planning application the Environment Agency have objected to the proposals.
- 1.1.3** This Supplementary Report has therefore been prepared to address those concerns. It should be read in conjunction with the main report.
- 1.1.4** As part of the preparation of this report a meeting took place on 6th February 2014 with Derby City Council, South Derbyshire Council and the Environment Agency. The purpose of the meeting was to discuss any flooding or drainage issues associated with the site. The Notes of the Meeting are included in the Appendices.

2.0 CONCERNS RAISED

2.1 The Environment Agency

2.1.1 A copy of the correspondence from the Environment Agency (ref: LT/2013/116040/01-LO1) is in the appendices. The letter requests additional information as summarised below:

- *The proposed development site has multiple watercourses that run through the site, have historic flood outlines and have potential to flood the new development. It has also been identified that large parts of the site flood from surface water mapping. An assessment of flood risk from the watercourses will need to be addressed within the FRA to establish the flood zones and flood risk to the site. When a flood plain extent from the watercourses has been established, no new development should be located within these areas and the master plan may need to be amended accordingly.*
- *Section 5.3.3 discusses works to re-profile ditches on the site to increase the hydraulic performance. Works should not increase the risk of flooding to others by increasing the velocity and volume of water downstream. The watercourses should be kept the same as existing with existing uniform trapezoidal channels running through the channel being encouraged to be changed into natural meandering watercourses.*
- *Due to the size of the proposed development, Long Term Storage will need to be considered within the Surface Water Drainage Scheme for the site. More information can be found in the document; 'Preliminary rainfall runoff management for development R&D Technical Report W5-074/A/TR/1 Revision E'. The FRA needs to include information to demonstrate a minimum two tier treatment train will be included for the whole new development.*

2.2 Severn Trent Water

2.2.1 STW have also raised concerns regarding the available capacity within the off-site foul sewers to which the new site system is proposed to outfall.

2.2.2 Severn Trent Water have now been instructed to model the offsite foul sewers and advise on the preferred connection point. The results of this modelling exercise are expected shortly.

3.0 EXISTING RUN-OFF, PROPOSED DRAINAGE SYSTEMS AND SUSTAINABLE MEASURES

3.1 Existing Run-off Regime and Proposed Outfall Point

- 3.1.1** The Drainage Enhancement Strategy Drawing has been revised and a copy is included in the Appendices.
- 3.1.2** As previously noted the development generally falls in a north east direction. In addition, land to the south west of the development falls in the same direction and therefore across our proposed development. As such, it is important to consider off site overland falls and the risk of such flows to our development.
- 3.1.3** The above drawing includes a series of proposed ecological enhancement swales on the boundary of the built development which will intercept overland flows from off site and the flow from there will be controlled with series of check dams.
- 3.1.4** These features will also be part of the new country park and will be suitably enhanced with ecological features. The detail design of these ponds and sizing will be undertaken once detailed layouts are available.
- 3.1.5** On the eastern boundary of the development, the drawing now includes a linear attenuation swale sized to attenuate the 1 in 100 years plus climate change event. This swale will also be linked to the area underneath the overhead electricity cable to provide additional volume if required. This scale will again be enhanced with suitable ecological features. The detail design of this swale will be undertaken as part of the development of the detailed layout.
- 3.1.6** The above attenuation swale has also been included in Phase 1 of this development and the appendices include a sketch layout showing this swale together with a smaller pond to ensure that the volume of attenuation for the 1 in 100 year event plus climate change can be incorporated within the layout.
- 3.1.7** JBA have been appointed to undertake a watercourse modelling in this vicinity of the site. Their report is included in the appendices of this report.
- 3.1.8** JBA's hydraulic profiles have also been incorporated into the Drainage Enhancement Strategy Drawing and includes 100 year, 100 year plus climate change and the 1000 year event. It is currently proposed to exclude development from the 1 in 100 year plus climate change event.
- 3.1.9** As discussed in the original FRA, the Environment Agencies flood map indicate some isolated areas of "flood plain" in the centre of the site. However, at the meeting on 6th February 2014 it was agreed that this was not fluvial flooding but standing water due to low lying levels.
- 3.1.10** However, it is appreciated that this volume of water should be considered within the new drainage strategy and therefore the new attenuation swale/ponds will be increased in size to accommodate this volume.



3.2 Existing Groundwater Levels

- 3.2.1** As part of this report GRM have been instructed to undertake a series of trial pits to determine groundwater levels. A drawing summarising their findings is included in the appendices which shows that ground water encountered at depths of between 1-2m and 2.9m. However, the average groundwater depth was at approximately 2.0m and is therefore not considered to be a problem.

3.3 Existing Public Sewers

- 3.3.1** As noted in the Drainage Enhancements Strategy Drawing there is a large adopted surface water sewer that crosses the site in a north easterly direction. This sewer is 1050mm diameter and increases to a 1350mm diameter at the eastern boundary of the site. It is currently understood that this increase in diameter (at manhole reference 0504) is to accommodate flows from proposed development.
- 3.3.2** Severn Trent Water have been commissioned to undertake modelling of this sewer to ascertain the spare capacity. Once confirmed, the flows will be diverted to this sewer with onsite attenuation as appropriate.



4.0 CONCLUSIONS

- 4.1.1** The Environment Agency objected to the planning application commenting that the Flood Risk Assessment required further information.
- 4.1.2** A meeting took place on 6 February 2014 with Derby City Council, South Derbyshire Council and the Environment Agency to discuss the proposed development.
- 4.1.3** This addendum report has been written to address concerns raised in order for objection to be removed.



5.0 APPENDICES

- Correspondence
- Drawings
- Reports



Correspondence

Environment Agency letter Ref : LT/2013/116040/01-L01

Notes of Meeting – 6th February 2014.

Ms Laura Raynor
Derby City Council
Development Control
Roman House Friar Gate
Derby
Derbyshire
DE1 1XB

Our ref: LT/2013/116040/01-L01
Your ref: 04/13/00351/PRI
Date: 29 August 2013

Dear Ms Raynor

OUTLINE APPLICATION FOR UP TO 800 DWELLINGS (CLASS C3) WITH ALL MATTERS RESERVED EXCEPT ACCESS TO BE FIXED OFF SNELSMOOR LANE AND FIELD LANE, PROPOSING SUSTAINABLE DRAINAGE SYSTEM PROVIDING ATTENUATION PONDS/SWALES, DEMOLITION OF EXISTING FARM BUILDINGS, NEW PRIMARY SCHOOL (CLASS D1) WITH PLAYING FIELD, ALONGSIDE OPEN SPACE INCLUDING CREATION OF COUNTRY PARK (INCLUDING FOOTPATH/CYCLEWAYS, WILDFLOWER MEADOWS, PUBLIC ORCHARD ETC.) AND GREEN INFRASTRUCTURE NETWORK. FULL APPLICATION FOR 145 DWELLINGS (CLASS C3) INCLUDING SITE ROADS, LANDSCAPING, ATTENUATION POND AND PLAY AREA. - LAND NORTH OF SNELSMOOR LANE, CHELLASTON, DERBY

Thank you for referring the above application which was received 8 April 2013 and we regret the delay in responding.

Environment Agency position

In the absence of an acceptable Flood Risk Assessment (FRA) we object to the grant of planning permission and recommend refusal on this basis for the following reasons:

Reason

The FRA submitted with this application does not comply with the requirements set out in paragraph 9 the Technical Guide to the National Planning Policy Framework. The submitted FRA does not therefore, provide a suitable basis for assessment to be made of the flood risks arising from the proposed development.

In particular, the submitted FRA fails to consider the effect of a range of flooding events including extreme events on people and property.

The proposed development site has multiple watercourses that run through the site, have historic flood outlines and have the potential to flood the new development. It has also been identified that large parts of the site flood from surface water mapping. An

Environment Agency
Trent Side North, West Bridgford, Nottingham, NG2 5FA.
Customer services line: 03708 506 506

www.environment-agency.gov.uk

Cont/d..

assessment of flood risk from the watercourses will need to be addressed within the FRA to establish the flood zones and flood risk to the site. When a flood plain extent from the watercourses has been established, no new development should be located within these areas and the master plan may need to be amended accordingly.

Section 5.3.3 discusses works to re-profile ditches on the site to increase the hydraulic performance. Works should not increase the risk of flooding to others by increasing the velocity and volume of water downstream. The watercourses should be kept the same as existing with existing uniform trapezoidal channels running through the channel being encouraged to be changed into natural meandering watercourses.

Due to the size of the proposed development, Long Term Storage will need to be considered within the Surface Water Drainage Scheme for the site. More information can be found in the document; 'Preliminary rainfall runoff management for developments R&D Technical Report W5-074/A/TR/1 Revision E'. The FRA needs to include information to demonstrate a minimum two tier treatment train will be included for the whole new development.

Overcoming our objection

Our objection can overcome our objection by submitting an FRA which covers the deficiencies highlighted above and demonstrates that the development will not increase risk elsewhere and where possible reduces flood risk overall. If this cannot be achieved we are likely to maintain our objection to the application. Production of an FRA will not in itself result in the removal of an objection.

Yours sincerely

Mr Andrew Pitts

Planning Advisor Sustainable Places - Midlands East Area

Direct dial 0115 8462612

Direct e-mail andrew.pitts@environment-agency.gov.uk

cc R P S Group



NOTES OF MEETING

800 Units off Snelsmoor Lane, Boulton Moor

Flood Risk and Drainage Principles

06 February 2014

11:15 Derby Council Offices

Attendees: Nick Tolley – Derby City Council NT
 Steven Lee – Derby City Council SL
 Kevin Exley – South Derbyshire Council KE
 Naomi Doughty – Environment Agency ND
 Dan Clancy – Environment Agency DC
 Rob Travis – Travis Baker RT
 Karen Whelan – Travis Baker RT

Apologies: Keith Baker – Severn Trent Water

NOTES OF MEETING:

ITEM		ACTION
1	Introduction by RT. Flood Risk Assessment (FRA) prepared by Travis Baker was submitted with planning application for 800 units on proposed development site off Snelsmoor Lane in Chellason. Phase 1 of the site has been submitted for full approval, with the remainder for outline. The application has not yet been determined and is awaiting the allocation of the wider area, which includes another three sites.	
2	The FRA requires developing further, to adequately support the application.	
3	NT raised the following concerns prior to the meeting: 1. The size (hence capacity) and condition (Thulston Brook is heavily silted and could become blocked) of the watercourses providing the outfalls for the development. 2. The existing SW flood storage on the site its location and the proposal to re-site it. 3. Managing the overland flow through the development from adjacent green fields. 4. Capacity of watercourses running through the site and managing exceedance flows.	

	5. Maintenance and adoption arrangements of the watercourses and onsite drainage system. (Section 106 agreement may be necessary) 6. Lack of fall through the site. 7. The fact that as it currently stands it appears that more than one watercourse drains to STW SW sewer system raising the legality of the connection. 8. Watercourse culvert blockage will need to be considered. 9. The lack of provision of a full SUDS drainage system (i.e. source control) 10. The bunded balancing area is not desirable. 11. It is understood that area suffers from a high groundwater table. The implication of the development on groundwater levels and possible groundwater flooding will need to be considered.	
4	NT – this site needs to be considered as part of overall development in the wider area, which includes another three sites.	
5	NT – phasing and direction of land fall needs to be considered in more detail across all four sites.	
6	Part of the site lies in Flood Zone 2. This is based on historical flood records rather than hydraulic modelling. It is debatable whether the historical flooding was fluvial. NT and RT witnessed the historical flooding in 2013 and are of the opinion it is pluvial and should therefore not be classed as Flood Zone 2.	
7	Photographs were tabled and support the suggestion that the historical flooding was pluvial. The flooding was a collection within a low spot on the site, remote from any adjacent land drainage ditch or watercourse. Fluvial flooding is more likely to be continuous with an adjacent watercourse.	
8	NT also tabled surface water flood maps and LiDAR maps demonstrating the flood outlines are linked to a low spot on the site.	
9	Developer of one adjacent site has submitted a flood map challenge for the same reason, siting pluvial flooding, not fluvial flooding, affects their site.	
10	Sequentially, the flood outline needs to be removed from flood zone 2	
11	Policies in emerging Local Plan, link together the four sites. The new policy document has been commissioned by the four developers involved. The Boulton Moor Development Framework Document is being compiled by Barton Wilmore.	
13	Thulston Brook was historically deepened for development in the area.	

14	There used to be an Internal Drainage Board (IDB) in the area therefore the local watercourses are engineered. The IDB was dissolved and watercourses went over to the Environment Agency (EA).	
15	The LiDAR maps show that historically land has obviously been raised around the site to facilitate previous development, cutting off flow routes from the site and leaving it in a low spot. Outfall routes from the lowspot have therefore become forced in other directions.	
16	Manholes have been raised along sewer outfall routes	
17	Thulston Brook is in part ordinary watercourse and in part main river. Part of Thulston Brook has been piped and is classed as a Severn Trent sewer according to sewer records	
18	Part of the culverted Thulston Brook classed as sewer passes through private land, therefore it would be difficult, politically and legally, to di-vest the sewers and put additional responsibilities onto riparian owners.	
19	Land drainage ditches on the site currently discharge (overflow) into adopted surface water sewers. The site also discharges into the Thulston Brook, but the outfalls are becoming blocked with silt.	
20	NT – Thulston Brook culverts need to be de-silted. Derby City or South Derbyshire are looking to clear culverts to return reasonable flow conditions.	
21	ND enquired whether there was an opportunity to naturalise any culverted sections of the watercourse. NT & KE do not believe it is possible due to the culverts passing in private land with little room available.	
22	NT – believes a new watercourse would be beneficial across all four sites to reinstate a more natural flow direction, rather than the current strategy and is looking for a more joined up approach between the various land owners.	
23	Other options for discharge from the site include the north-east corner of the site, however, NT would like a developer contribution towards de-silting for this option to be used.	
24	Thulston Brook is flat for 2km until it reaches the Trent	
25	Thulston Brook was culverted in 1996 through adjacent development	
26	Possibly make some swales within South Derbyshire Parkland, under pylons.	
27	NT is commissioning survey of Thulston Brook (possibly by Atkins) and study on de-silting. Due to be complete by April 2014.	
28	Drainage Strategy within the FRA:	

	Phase 1 of the site has been submitted for full planning approval, therefore the FRA currently includes detailed drainage proposals for phase 1 showing an attenuation pond at the bottom of the drainage network prior to discharge into an existing highway ditch. This is considered to maintain the current greenfield drainage regime from phase 1 of the site.	
29	DC – another treatment train will be required, possibly swales. RT considering whether existing north-south ditch could be utilised as a swale. Needs careful consideration of existing hedgerows and trees to evaluate whether a practical solution. NT is concerned about the attenuation basin serving phase 1 being bunded - the creation of a swale or utilising the existing ditch may improve this situation. Looking at the allocated land, the developed area could be moved slightly west to provide more space for a swale. SL concerned that this would reduce the mouth to the new country park.	
31	NT has concerns about the capacity of the existing highway ditch and its future maintenance. NT would like the condition of this ditch investigated and the future maintenance considered, if it is to be used to serve the developed site. RT reiterated that the site currently falls in that direction and the ditch is outside the ownership of Bellway.	
32	Land drainage from the site currently discharges (in part) into an adopted surface water sewer. NT considers the site should be allowed to continue to discharge into this sewer at flows restricted to greenfield rates. RT is not confident that Severn Trent Water (STW) will accept continued flows from the developed site into the existing adopted surface water sewer.	
33	The drainage strategy for the remainder of the site includes holding back some flows from higher land before they reach the development site, within a new country park area; shifting the low spot on the site to an equivalent area beneath pylons on the site; raising the existing low spot locally and re-grading ditches on the site.	
34	NT – volume of surface water storage (pluvial flooding) must be calculated and new low spot designed to cater for sufficient volume. National Grid permission must be obtained for creating flood storage beneath pylons.	
35	ND welcomes the inclusion of ponds within a new country park and the amenity value they offer. ND has colleagues who can provide advice regarding design of wetlands and it is considered beneficial that the area be left as a wild / natural area rather than be landscaped.	
36	DC pointed out the need for detailed hydraulic calculations to size any new pond features.	
37	Maintenance options available currently are public open space transferred to the local authority with a Section 106 contribution; or a management company. NT confirmed that the Land Trust management company is acceptable to Derby City Council.	

38	ND requested details of SUDS proposals for new school. EA want more SUDS proposals and more information than is usually required for an outline application to ensure that space is allowed for SUDS in the layout.	
39	NT wants defined overland flow routes to be created across the site and allowed for in the proposed development layout. Ideally he would like a new watercourse to be established draining to the east, across the wider development area. This would involve the agreement of all the developers.	
40	KE will contact adjacent developers regarding the potential to co-ordinate a cross-boundary surface water drainage solution.	KE
41	NT raised potential problem of groundwater flooding on the site, as little information is available. RT proposes groundwater monitoring over a period.	RT
42	In the future, the EA will be statutory consultee for large or problem sites (including this site). Otherwise the Lead Local Flood Authority (LLFA) will be consulted. As this is a strategic allocation, the EA time is not chargeable. KE needs to invite the EA to discussions regarding the proposals for the site.	
43	ND would like to be kept in the loop regarding proposals for foul drainage also, as there are currently capacity and pumping problems – concerns regarding future pollution incidents.	



Drawings

Drainage Enhancement Strategy Drawing

Groundwater Water Level Assessment Drawing

Phase 1 Sketch Layout (including linear scale.)