Sewer Capacity Assessment

Blythe Bridge SCA

DE-1706-923

Version 1

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Sewer Capacity Assessment Summary

Sewer Capacity Assessment prepared for	Phil Jones Associates, Seven House, 18 High Street, Longbridge, B31 2UQ dan.mccrudden@pjaengineering.co.uk	
Development location and existing use	Land off Uttoxeter Road, Blythe Bridge ST11 9NR Greenfield Site. Grid Reference – X = 396648 Y = 340456	
Development proposals	The development will be solely dwellings, split into two phases. Phase 1 will contain 118 plots and is planned to be constructed between 2018 and 2019. Phase 2 will contain 132 dwellings and is planned to be constructed between 2019 and 2021. Flows will enter an existing connection via gravity from phase 1, with phase 2 being pumped to phase 1.	
Study aim	The aim of the study is to identify the potential impact of foul water flows from the proposed development on the sewerage system.	
Impact of proposed development on public sewer network	Sewer flooding	Low
	Combined Sewer Overflows	N/A
	Sewage Pumping Stations	N/A
Requirement for Capacity Improvements	Capacity improvements are not required to accommodate flows from the proposed development.	
Sewage Treatment Works capacity	The site drains to Checkley sewage treatment work. There is sufficient capacity at the STW to accommodate flows from this development.	

Important Information:

This Sewer Capacity Assessment has been prepared by WSP on behalf of Severn Trent Water Ltd for Phil Jones Associates. This report is based on the best available information at the time of undertaking, including Severn Trent Water hydraulic models and development proposals submitted by Phil Jones Associates. If there are any changes to the development proposals after the date of submission that may affect waste water, Severn Trent Water must be informed as there may be a requirement to revisit the assessment. If there is a delay in submitting the planning application or commencing construction on site from the anticipated dates provided, the information in this report may have become out of date and Severn Trent Water must be informed as there may be a requirement to revisit the assessment based on new information.

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1 Introduction

1.1 Site Location

The site is located adjacent to the A50 where it meets the A521 at Blythe Bridge, and is in the centre of the Checkley Sewage Catchment. Grid reference X = 396648 Y = 340456.

Site is a greenfield site and will drain to the public sewer network (foul only), proposed to connect into MH SJ96409601 on Uttoxeter Road.

The site location is shown in Figure A-1, Appendix A.

1.2 Local Sewerage Network

The site is located approximately 8.5km upstream of Checkley Sewage Treatment Works (STW), and drains by gravity for the entirety of this distance. There are no Combined Sewer Overflows, Pumping Stations or other critical assets downstream of the site before the STW.

There are currently capacity issues between the proposed connection manhole and downstream.

The local sewerage network and the location of critical sewer assets are shown in Figure A-2, Appendix A.

1.3 Proposed Development

The development will be solely dwellings, split into two phases. Phase 1 will contain 118 plots and is planned to be constructed between 2018 and 2019. Phase 2 will contain 132 dwellings and is planned to be constructed between 2019 and 2021. It is proposed that flows will enter an existing connection, SJ96409601, via gravity from phase 1, with phase 2 being pumped to phase 1. Surface water will be disposed of on site to a pond and will not be connected to the existing public sewer system. Planning permission is due to be submitted on 31/07/2017.

The proposed development is summarised in Table 1-1. Development plans are included in Appendix A.

Table 1-1: Summary of proposed development

Development Type	Units
Housing	*250 dwellings*

1.4 Study Aims and Objectives

The aim of the study is to identify the potential impact of flows from the proposed development on the public sewer network. This will be achieved through undertaking hydraulic computer modelling of the proposed development and assessing the impact at key points on the sewer network. Where capacity improvements are likely to be required to accommodate flows from the development, the preferred notional solution is provided.

2 Sewer Capacity Assessment

2.1 Methodology

Hydraulic modelling has been used to assess the impacts of the proposed development. The methodology is summarised below:

- The best available model for the area was used as the 'baseline model'. A review of the model was undertaken to ensure that it is suitable to inform the assessment.
- Development has been added to the existing baseline model in two phases. Phase 1 has been added with 118 dwellings and has been added as a gravity connection, draining directly to SJ96409601 in the absence of proposed sewer record data. Phase 2 has been added with 132 dwellings and has had a sewage pumping station (SPS) added to simulate the proposed drainage method. The modelled pump link has also been connected directly to MH9601 on Uttoxeter Road in the absence of proposed sewer record data.
- Details of proposed development flows used in the assessment are included in Section 2.2.
- The 'baseline model' and 'proposed model' were run for dry weather flow analysis and the 20 and 40 year return period events for a suite of storm durations. The results for the critical storm duration are reported throughout this report.
- The model results were analysed to determine the impact of the additional flows on network performance and identify whether capacity improvements are required.

2.2 Proposed Development Flows

Foul flows arising from the proposed development have been derived using Severn Trent Water standard guidance. Phase 1 has been added with 118 dwellings and an estimated population of 331 (using an occupancy factor of 2.8). Phase 1 has been added as a gravity connection, draining directly to SJ96409601 in the absence of proposed sewer record data. Phase 2 has been added with 132 dwellings and an estimated population of 370 (using an occupancy factor of 2.8). This phase has had a sewage pumping station (SPS) added to simulate the proposed drainage method. In the absence of any pumping station information the SPS has been given a diameter of 1.8m, a pump rate of 8l/s and an operating envelope of 0.2m. These values were calculated to fit in with the best practice guidance in the SCA procedure, to give between 6 and 15 starts per hour. The modelled pump link has also been connected directly to MH9601 on Uttoxeter Road in the absence of proposed sewer record data. A value of 145 litres per head per day has been used, which fits in with adjacent catchments in the area. Surface water flows are being controlled and disposed of on site and will not enter the current public sewer system.

2.3 Impact of Proposed Development on Sewer Capacity

The impact of the proposed development on sewer flooding is summarised in Table 2-1. The impact at each location is assigned an 'Impact Risk Level', which considers whether a change in performance as a result of the development is acceptable based on the risk of sewer flooding.

Table 2-1: Predicted impact on sewer flooding for modelled scenarios – Phase 1 only (baseline and post-development)

Location		Baseline performance			Post-development impact			Impact Risk Level
Road	Manhole reference	DWF	20 year event	40 year event	DWF	20 year event	40 year event	
Cresswell Lane	SJ97408001	No surcharge	Known external flooding (Garden E-B)	Known external flooding (Garden E-B)	No surcharge	No increase in flood volume	No increase in flood volume	Low
Uttoxeter Road	SJ98403001	No surcharge	Known internal flooding (I-E)	Known internal flooding (I-E)	No surcharge	No increase in flood volume	No increase in flood volume	Medium
Field off A50	SJ97399602	No surcharge	96.1	114	No surcharge	Minor increase in flood volume (<20m3)	Minor increase in flood volume (<20m3)	Low
Field off A50	SJ97399701	No surcharge	8.7	11.9	No surcharge	Minor increase in flood volume (<20m3)	Minor increase in flood volume (<20m3)	Low
Uttoxeter Road	SJ97401501	No surcharge	No flooding	0.1	No surcharge	No flooding	Minor increase in flood volume (<20m3)	Low
Uttoxeter Road	SJ97402301	No surcharge	38.8	50.3	No surcharge	Minor increase in flood volume (<20m3)	Minor increase in flood volume (<20m3)	Low

Uttoxeter Road	SJ97402401	No surcharge	No flooding	1.3	No surcharge	No flooding	Minor increase in flood volume (<20m3)	Low
Uttoxeter Road	SJ97402403	No surcharge	No flooding	1.2	No surcharge	No flooding	Minor increase in flood volume (<20m3)	Low
Uttoxeter Road	SJ97403302	No surcharge	10	15.1	No surcharge	Minor increase in flood volume (<20m3)	Minor increase in flood volume (<20m3)	Low
Uttoxeter Road	SJ97403401	No surcharge	21.8	31.8	No surcharge	Minor increase in flood volume (<20m3)	Minor increase in flood volume (<20m3)	Low
Draycott Road	SJ97405301	No surcharge	12.6	15.5	No surcharge	No increase in flood volume	No increase in flood volume	Low
Field off Uttoxeter Road	SJ97406001	No surcharge	52.5	68.3	No surcharge	Minor increase in flood volume (<20m3)	Minor increase in flood volume (<20m3)	Low
Field off Uttoxeter Road	SJ98391901	No surcharge	151.4	177.3	No surcharge	Minor increase in flood volume (<20m3)	Minor increase in flood volume (<20m3)	Low

Table 2-3: Predicted impact on sewer flooding for modelled scenarios – Phase 1 & 2 (baseline and post-development)

Location		Baseline performance			Post-development impact			Impact Risk Level
Road	Manhole reference	DWF	20 year event	40 year event	DWF	20 year event	40 year event	
Cresswell Lane	SJ97408001	No surcharge	Known external flooding (Garden E20)	Known external flooding (Garden E20)	No surcharge	No flooding	No increase in flood volume	Low
Uttoxeter Road	SJ98403001	No surcharge	Known internal flooding (I20)	Known internal flooding (I20)	No surcharge	No flooding	No increase in flood volume	Low
Field off A50	SJ97399602	No surcharge	96.1	114	No surcharge	Minor increase in flood volume (<20m3)	Minor increase in flood volume (<20m3)	Low
Field off A50	SJ97399701	No surcharge	8.7	11.9	No surcharge	Minor increase in flood volume (<20m3)	Minor increase in flood volume (<20m3)	Low
Uttoxeter Road	SJ97401501	No surcharge	0	0.1	No surcharge	Minor increase in flood volume (<20m3)	Minor increase in flood volume (<20m3)	Low
Uttoxeter Road	SJ97402301	No surcharge	38.8	50.3	No surcharge	Minor increase in flood volume (<20m3)	Minor increase in flood volume (<20m3)	Low

Uttoxeter Road	SJ97402401	No surcharge	0	1.3	No surcharge	Minor increase in flood volume (<20m3)	Minor increase in flood volume (<20m3)	Low
Uttoxeter Road	SJ97402403	No surcharge	0	1.2	No surcharge	Minor increase in flood volume (<20m3)	Minor increase in flood volume (<20m3)	Low
Uttoxeter Road	SJ97403302	No surcharge	10	15.1	No surcharge	Minor increase in flood volume (<20m3)	Minor increase in flood volume (<20m3)	Low
Uttoxeter Road	SJ97403401	No surcharge	21.8	31.8	No surcharge	Minor increase in flood volume (<20m3)	Minor increase in flood volume (<20m3)	Low
Draycott Road	SJ97405301	No surcharge	12.6	15.5	No surcharge	No increase in flood volume	No increase in flood volume	Low
Field off Uttoxeter Road	SJ97406001	No surcharge	52.5	68.3	No surcharge	Minor increase in flood volume (<20m3)	Minor increase in flood volume (<20m3)	Low
Field off Uttoxeter Road	SJ98391901	No surcharge	151.4	177.3	No surcharge	Minor increase in flood volume (<20m3)	Minor increase in flood volume (<20m3)	Low

2.4 Capacity Improvement Requirements

The overall impact of the development is low, based on the results shown from phase 1 and phase 2. The results from tables 2-2 and 2-3 show that there are some increases in predicted flooding at some locations, but all appear to be low (<20m3). The two reported flooding locations in the vicinity do not show any increase in predicted flood risk post development. Capacity improvements are not likely to be required to accommodate flows from the entire development.

3 Conclusions and Recommendations

3.1 Conclusions

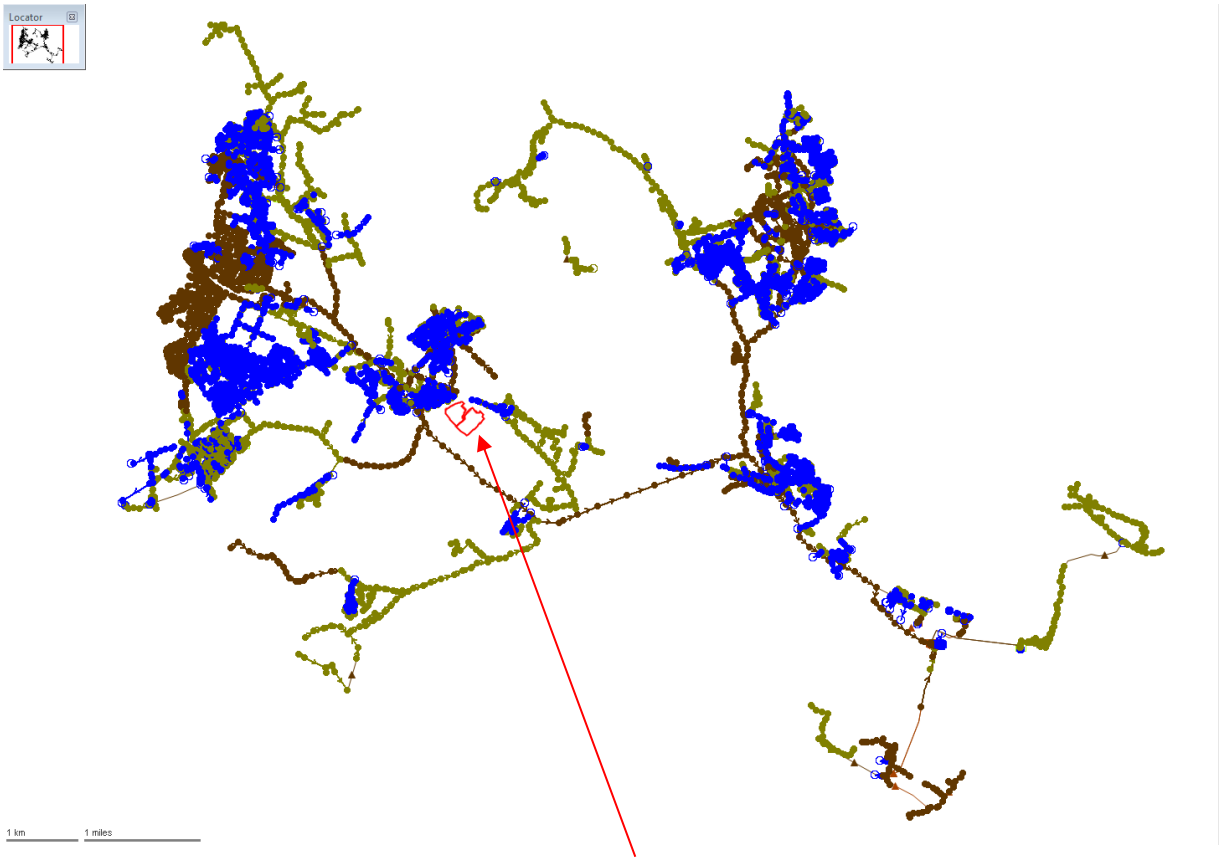
- The impact of foul flows arising from the proposed development at Uttoxeter Road, Blythe Bridge, Staffordshire on the sewer network have been assessed using hydraulic modelling.
- The proposed development is predicted to have the following impacts:
    - Sewer Flooding: Low
- It is envisaged that capacity improvements are not likely to be required to accommodate foul flows from the entire proposed development.

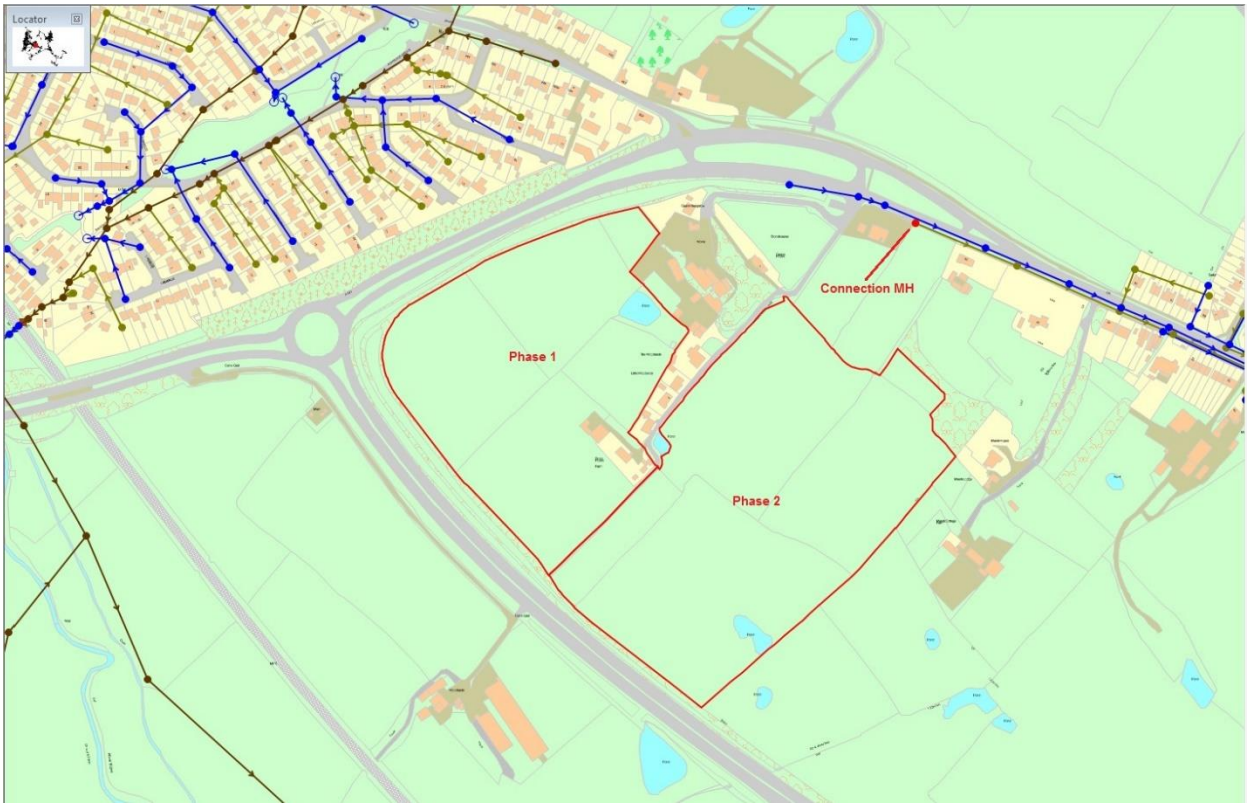
3.2 Recommendations

N/A

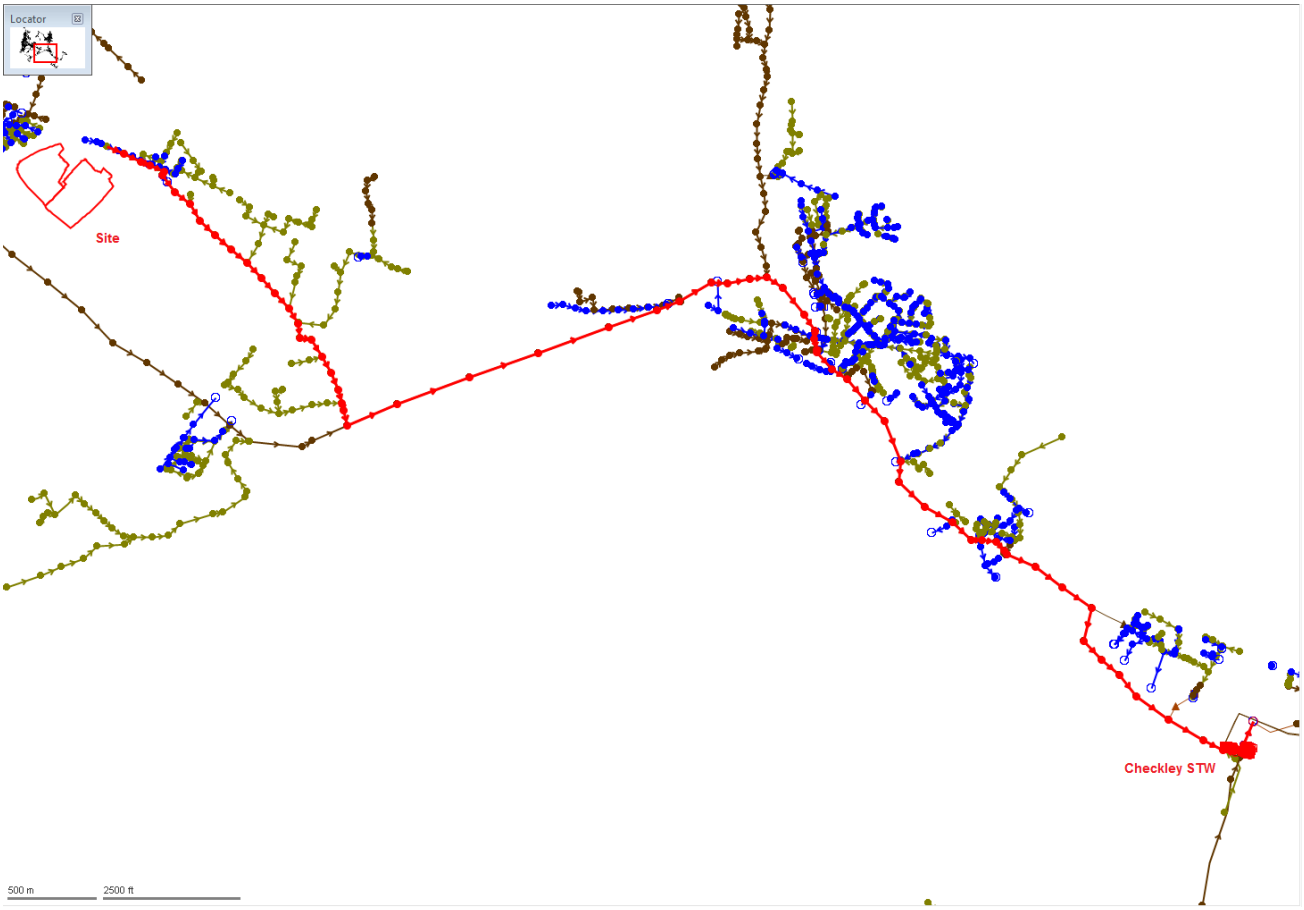
Appendix A: Site and Development Information

- Figure A-1: Site location plan





- Figure A-2: Local sewerage network and critical assets



- Figure A-3: Developer Site Plan – Phase 1 plots