



Severn Trent Water Ltd



Flood Risk Assessment

Proposed developments within Alton Sewage Treatment Works

September 2021



ADAS GENERAL NOTES

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EXECUTIVE SUMMARY

Severn Trent Water Ltd propose to construct new structures at Alton Sewage Treatment Works, Alton, Stoke-On-Trent, ST10 4BY. The area to be developed is currently half paved and half woodland.

The total proposed development includes an area of around 51 m² for the proposed new structures. As the proposed development falls within Flood Zone 3 a Flood Risk Assessment (FRA) in accordance with National Planning Policy Framework (NPPF) is required. The FRA is to evaluate the risks from flooding as a result of the proposed development, including the potential implications of surface water runoff.

The findings of the Flood Risk Assessment for the proposed development are:

- The application site lies within Flood Zone 3 of the Environment Agency's Flood Maps. This zone has a high probability of flooding, however there are no alternative areas within the ownership that are suitable.
- Development in Flood Zone 3 is classified as *less vulnerable* for *waste treatment* facilities. This type of development qualifies in NPPF as 'appropriate development' for this flood zone.
- East Staffordshire Strategic Flood Risk Assessment states there are no historic records of flooding at the site.
- The volume of potentially displaced floodwater in Flood Zone 3 will be negligible and therefore not result in increased levels of risk to the neighbouring or other areas.
- Any non-water-resistant essential infrastructure within the extended building should be installed at a height consistent with the client's requirements for flood resilience to maintain security of supply.

Therefore, the proposed development will meet the NPPF requirements to be 'safe for its lifetime, taking into account its users, without increasing flood risk elsewhere.

This report does not cover the full details of any foul or dirty water systems nor fuel or chemical handling and storage requirements.

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1 INTRODUCTION

Severn Trent Water Ltd propose the construction of new structures at Alton Sewage Treatment Works, Alton, Stoke-On-Trent, ST10 4BY. The development includes two kiosks.

The proposed development site covers around 48 m² and is located within Environment Agency Flood Zone 3 (see Appendix 2).

The National Planning Policy Framework (NPPF) requires a site-specific Flood Risk Assessment (FRA) for all proposed developments on land that:

- covers an area of 1 ha or more
- fall within Flood Zones 2 or 3,
- has been identified by the Environment Agency as having critical drainage problems;
- has been identified in a strategic flood risk assessment as being at increased flood risk in future; or
- may be subject to other sources of flooding, where its development would introduce a more vulnerable use.

The aim of the FRA is to help steer new development, where possible, towards areas at the lowest risk of flooding, and to ensure that the potential impact and frequency of flooding is minimized. Where it is not possible to steer new developments towards areas at the lowest risk of flooding, the FRA should identify measures that will be used to manage the residual risks.

This Flood Risk Assessment has identified and assessed the risks of all forms of flooding to and from the proposed development, and demonstrated how these risks will be managed, taking climate change into account.

This flood risk assessment considers:

- Existing site drainage
- Risk of flooding to the proposed development
- Risk of flooding to the surrounding area
- Peak storm water runoff and sustainable drainage systems for the proposed development

2 PROPOSED DEVELOPMENT

The proposed development involves the construction of 2 new structures on the site. These are two kiosks approximately 19 m² and approximately 32 m² (see appendix 6).

3 SITE DESCRIPTION AND EXISTING SITE DRAINAGE

The application site at Alton Sewage Treatment Works (Grid Ref SK 07 4426) is located approximately 97 m above ordnance datum (AOD) in a rural area about 0.45 km to the north of Alton (see appendix 1). The average annual rainfall at the site is 904mm.

Access to the site will be via the access track off Farley Lane. The access track will be extended and resurfaced to allow access to the plant by road vehicles. The existing sewage treatment works is bordered by woodland to the north and south. The river Churnet runs directly north of the site. Rural fields border the existing sewage treatment works to the west and the east.

The River Churnet flows to the north of the proposed development at approximately 43 m away.

There are no historic records of flooding at the application site in the East Staffordshire Council Strategic Flood Risk Assessment.

3.1 Soils & Geology

The soils have been mapped by the Soil Survey of England and Wales as Delamere soil association. These soils are well drained sandy soils.

The bedrock in the area is mapped by the British Geology Survey as being Chester formation – sandstone and conglomerate, interbedded.

There is a Principal (bedrock) aquifer underlying the site; these are layers of rock with high fracture permeability, formerly classified as major aquifers. They are capable of supporting water supplies at a strategic scale. There is also a Secondary A (superficial) aquifer under the site.

The groundwater vulnerability maps show the level of risk of discharged surface water pollutants entering the groundwater. This site is in the high and medium-high categories.

4 FLOOD RISK ASSESSMENT

4.1 Flood Risk from Rivers and Sea

The nearest watercourse to the application site is the River Churnet which flows to the north of the site.

The entire site is located within Environment Agency Flood Zone 3 (see appendix 2). This zone is deemed to be at high risk of flooding from rivers or sea, with a 1 in 100 or greater annual probability of river flooding (see appendix 3).

The Technical Guidance to the National Planning Policy Framework defines which types of development are appropriate or not for each flood zone, or whether a further Exemption Test is required.

The findings of the sequential test are summarised in Table 1.

Table 1: Sequential test summary

EA Flood Zone	Alternative lower flood risk site available	Flood Risk Vulnerability Classification	Development 'Compatibility'
3 – High probability of flooding	Not available	Less Vulnerable	Development is appropriate

4.2 Flood Risk from Local Catchment

The Environment Agency surface water flood risk map (see appendix 3) shows low to very low risk of flooding from surface water in the area.

4.3 Flood Risk from Groundwater

East Staffordshire Council Strategic Flood Risk Assessment states there is little risk of groundwater flooding in this area. Two historic borehole records measured Alton Sewage Treatment Works measured groundwater level between 4.50 m to 2.20 m below ground level (see appendix 4-5).

4.4 Managing Residual Flood Risk

4.4.1 Staff & Visitor Safety

The site will be manned by members of staff during normal working hours. Other personnel will be present during periodic operations, such as deliveries and maintenance. The proposed developments will not result in any increased numbers of regular operation staff. Therefore, there are no specific staff flood evacuation measures required.

4.5 Flood Resilience

Any non-water-resistant essential infrastructure within the extended building should be installed at a height consistent with the client's requirements for flood resilience to maintain security of supply.

The Environment Agency's hydraulic assessment has predicted peak flood levels for a range of flood events. Normal recommendation would be to construct any non-water-resistant infrastructure 0.6 m above the 1 in 100 events plus an allowance for climate change. The EA model did not include any allowances for climate change. Therefore, to avoid remodelling the river flows, it is recommended that the 1 in 1000 year flood level of 98.01 m AOD is used instead of the 1 in 100 year plus climate change.

4.6 Flood Risk to Surrounding Areas

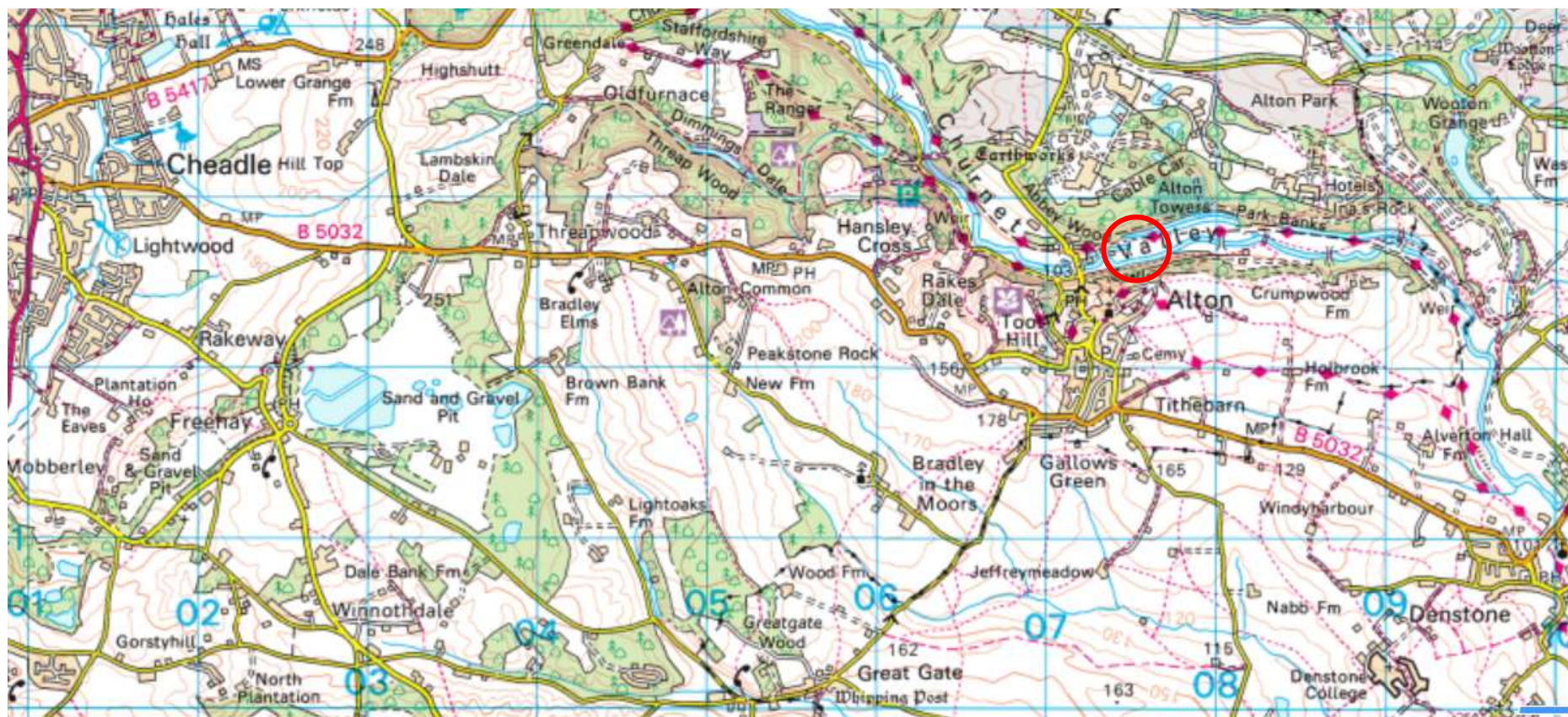
4.6.1 Loss of Floodplain

The proposed development falls within Flood Zone 3 and some loss of flood storage areas will occur from the structures. However, the development is of negligible size within the total Flood Zone area (approximately 51 m²).

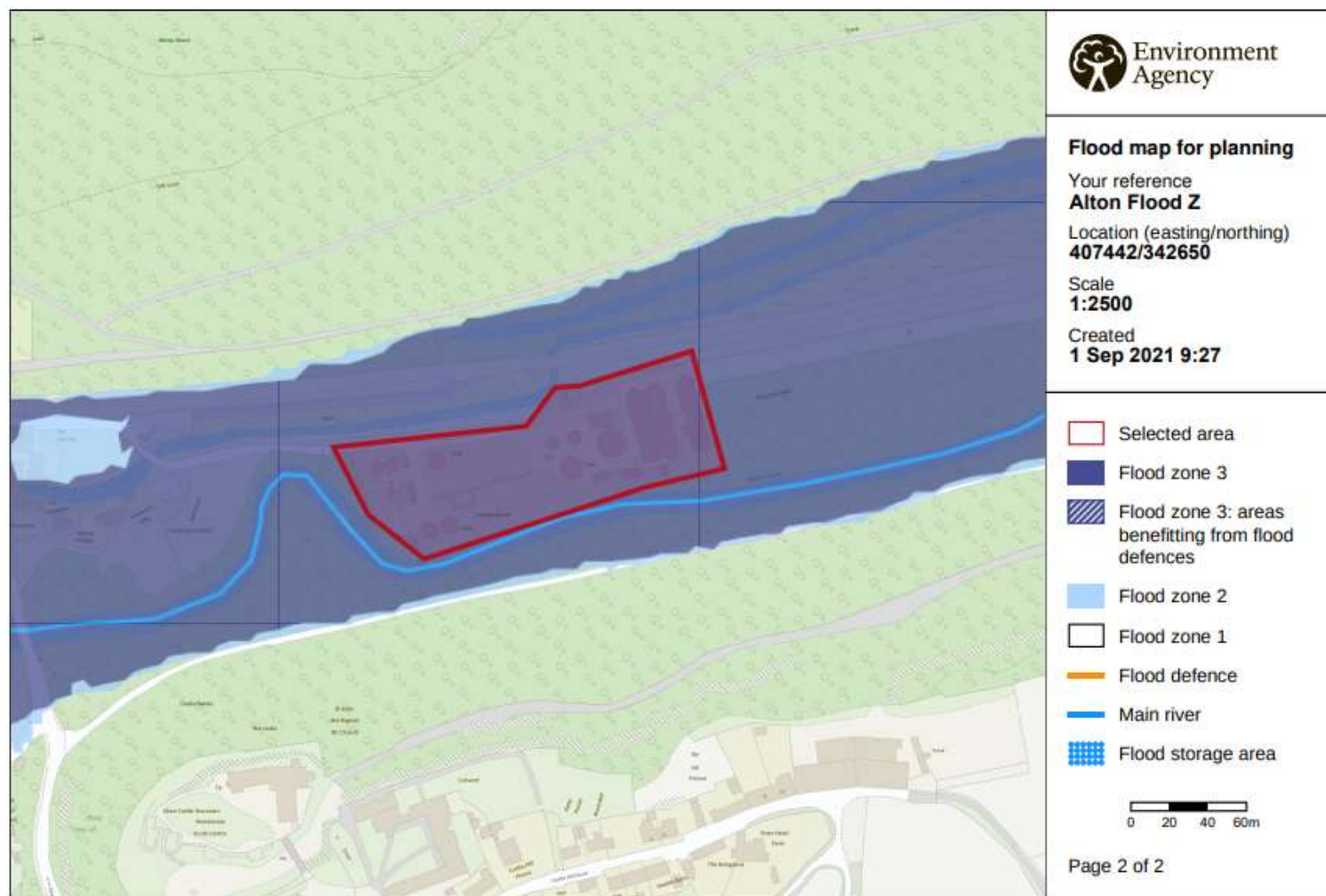
4.6.2 Surface Water Runoff

There are no nearby sites that would be directly at risk of flooding from the development. The change of land cover from woodland to impermeable surfaces will result in increased peak flood flow rates during storms if nothing is done to attenuate the flows. The change in land cover will also increase the volume of runoff, due to the reduced soil surfaces available for infiltration of rainfall. However, the size of the area that will change from soil to impermeable surfaces is negligible. Furthermore, the soils mapped at the site are freely draining and surface run-off from the kiosk will dissipate in the surrounding rough grassland verge.

APPENDIX 1 – LOCATION PLAN



APPENDIX 2 – ENVIRONMENT AGENCY FLOOD MAP

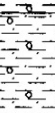


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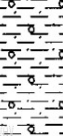
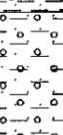
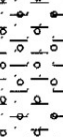
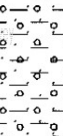
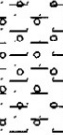
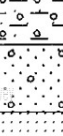
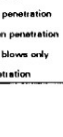
APPENDIX 3 – ENVIRONMENT AGENCY FLOOD MAP



APPENDIX 4 – HISTORIC BOREHOLE LOG

 Norwest Holst Soil Engineering Ltd. <i>SK0456</i>				BOREHOLE LOG		Borehole No. 2	
Contract No. F9633 Location Croft House, Alton		Method Cable Percussion		Sheet 1 of 1		32	
Client Staffordshire Moorlands D.C.		Borehole Diam (mm) 150		Coords <i>0734. 4265.</i>		British Geological Survey	
Consultant		Date 07/10/92		Ground Level		British Geological Survey	
Description of Strata	Legend	Depth Below G.L. (m)	O.D. Level (m)	Sampling & Insitu Testing		Ground Water	Piezometer / Standpipe
				Depth (m)	TCR SCR RQD		
MADE GROUND: Red, black, brown and orangish brown mottled very silty clayey fine to coarse sand and gravel. Gravel is fine to coarse angular to subrounded sandstone, quartzite, mudstone, brick, clinker and various igneous lithologies.				BC 1.00	1.50	*13"	
		1.80		BS 2.00	2.50	*7"	
Soft reddish brown and black mottled sandy CLAY with occasional medium subangular gravel of quartzite and sandstone, and with much plant debris.				BS 3.00	3.50	*5"	
				W 3.20			1
(ALLUVIUM)		4.00		BC 4.00	4.50	*20"	
Firm to stiff dark grey sandy CLAY with occasional to some fine and medium subangular to rounded gravel of sandstone, quartzite, mudstone and various igneous lithologies.							
(ALLUVIUM)		5.00					
Borehole complete at 5.00m							
Daily Progress				Hard Strata		Comments	
Date 7/10/92				Final Depth (m) of:		Logged by: M.R.	
Borehole 5.00				Water 3.20		Casing 4.50	
Depth (m)				Time		Drilled by T.W. Groundwater encountered at 4.50m, rising in 5 minute intervals 3.70m, 3.40m, 3.20m, 3.20m, casing at 4.50m.	
Sample and Test Key				Casing maintained just above base of borehole unless stated		Ground Water	
J Small Disturbed Sample B Bulk Disturbed Sample U Undisturbed U100 Sample W Water Sample N.R. No Recovery				S Standard Penetration Test C Cone Penetration Test V Insitu Vane Test PR Piezometer Test K Permeability Test B Blows to drive U100		S.P.T. "N" for full or C.P.T. 300mm penetration .1200 For given penetration .125" Seating blow only N.P. No Penetration	
Rotary Core Run				T.C.R. Total Core Recovery (%) S.C.R. Solid Core Recovery (%) R.Q.D. Rock Quality Designation (%)		1 → First Water Strike 2 → Subsequent Water Strike — ampip Standing Level — Level 20mins after strike II Casing Depth	
Piezometer				Upper Seal Sand Cell Piezometer Tip Lower Seal Grout		1 → First Water Strike 2 → Subsequent Water Strike — ampip Standing Level — Level 20mins after strike II Casing Depth	

APPENDIX 5 – HISTORIC BOREHOLE LOG

 Norwest Holst Soil Engineering Ltd. SK04SE					BOREHOLE LOG		Borehole No. 1	
Contract No. F9633 Location Croft House, Alton			Method Cable Percussion Borehole Diam (mm) 150			Sheet 1 of 2 Coords 0726 4263		
Client Staffordshire Moorlands D.C. Consultant			Date 06/10/92			Ground Level		
Description of Strata	Legend	Depth Below G.L. (m)	O.D. Level (m)	Sampling & Insitu Testing		Ground Water	Piezometer/ Standpipe	
				Depth (m)	TCR			
MADE GROUND: Brown and orange brown mottled occasionally black mottled sandy occasionally gravelly clay, with occasional plant detritus. Gravel is fine and medium, occasionally coarse angular to rounded sandstone, quartzite, mudstone, brick and various igneous lithologies. Driller notes "concrete".								
		1.40		BC 1.00	1.50	"17"		
Firm to stiff brown and orange brown mottled sandy occasionally gravelly CLAY, with interlamination of fine to coarse subangular to rounded sandy gravel of sandstone, quartzite, mudstone and various igneous lithologies.				BC 2.00 W 2.20	2.50	"21"	6/10am 2.20	
(ALLUVIUM/ALLUVIAL SAND AND GRAVELS)		3.00		BC 3.00	3.50	"20"		
Medium dense becoming dense reddish brown fine to coarse subangular to rounded slightly clayey silty very sandy GRAVEL of quartzite, sandstone, mudstone and occasional igneous lithologies with occasional cobbles.				BC 4.00	4.50	"28"		
				BC 5.00	5.50	"22"		
6.00m slightly silty sandy				BC 6.00	6.50	"25"		
				BC 7.00	7.50	"29"		
8.00m, becoming dense				BC 8.00	8.50	"34"		
(ALLUVIAL SANDS AND GRAVELS)		8.00						
Red silty sand and sandstone fragments. (Drillers Description)								
(HIGHLY TO COMPLETELY WEATHERED SANDSTONE)		9.60		S 9.50		"75/150mm"		
Reddish brown, occasional light grey and black mottled fine and medium grained highly weathered silty SANDSTONE, weak. (HAWKSMOOR FORMATION)								
Daily Progress				Hard Strata		Comments		
Date	Final Depth (m) of:			Depth (m)	Time	Logged by: M.R.		
6/10/92	Borehole 10.30	Water 2.20	Casing 9.20	9.60-10.30	1hr	Drilled by T.W. Groundwater encountered at and standing at 2.20m		
Casing maintained just above base of borehole unless stated								
Sample and Test Key	J Small Disturbed Sample	S Standard Penetration Test	S.P.T. 1" N for full	Rotary Core Run		Ground Water		Piezometer
	B Bulk Disturbed Sample	C Cone Penetration Test	C.P.T. 300mm penetration	T.C.R. Total Core Recovery (%)		1 → First Water Strike		Upper Seal
U Undisturbed U100 Sample	V Vane Test	V. 200 For given penetration	S.C.R. Solid Core Recovery (%)		2 → Subsequent Water Strike		Sand Cell	
W Water Sample	PR Pressuremeter Test	PR 25" Sealing blows only	R.O.D. Rock Quality Designation (%)		Level 20mins after strike		Piezometer Tip	
N.R. No Recovery	D Blows to drive U100	N.P. No Penetration			Casing Depth		Lower Seal	

APPENDIX 6 – SITE PLAN (SUPPLIED BY SEVERN TRENT WATER LTD)
