

High Speed Rail (West Midlands - Crewe)

Environmental Statement

Volume 5: Map book

Water Resources and Flood Risk (WR-01, WR-02, WR-03, WR-05, WR-06)

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Department
for Transport

High Speed Two (HS2) Limited has been tasked by the Department for Transport (DfT) with managing the delivery of a new national high speed rail network. It is a non-departmental public body wholly owned by the DfT.

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A report prepared for High Speed Two (HS2) Limited:

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Map series name	WR-01 - Surface Water Baseline	WR-02 - Groundwater Baseline	WR-03 - Water Framework Directive	WR-05 - Modelled Baseline and Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding	WR-06 - Modelled Baseline and Post Development Flood Extent 1 in 20 (5%) Annual Probability of River Flooding
Map series description	<i>This map series shows surface water features such as rivers, streams, ponds, canals and reservoirs, flood zones, and surface water abstractions as referred to in the ES. All points where the alignment crosses a watercourse are also shown and labelled with their reference in the text. These are shown as "Surface Water Crossings (SWC)".</i>	<i>These maps show geology and hydrogeological features such as aquifers and groundwater abstractions that are referred to in the Environmental Impact Assessment (EIA).</i>	<i>This map series shows water bodies, their Water Framework Directive current status and associated ecological features.</i>	<i>The map shows the output from hydraulic modelling of specific crossing locations and the effect the scheme has on flood extent at 1 in 100 years inclusive of climate change (20%) return period.</i>	<i>The map shows the output from hydraulic modelling of specific crossing locations and the effect the scheme has on flood extent at 1 in 20 year return period.</i>
Community Area name					
CA1 Fradley to Colton	✓	✓	✓	✓	✓
CA2 Colwich to Yarlet	✓	✓	✓	✓	✓
CA3 Stone and Sywnnerton	✓	✓	✓	✓	✓
CA4 Whitmore Heath to Madeley	✓	✓	✓	✓	✓
CA5 South Cheshire	✓	✓	✓	✓	✓

Mapping explanatory notes

Structure of the HS2 Phase 2a Environmental Statement

This map book is part of the suite of documents that make up the Environmental Statement (ES) for Phase 2a of the proposed High Speed Two (HS2) rail network between the West Midlands and Crewe (the Proposed Scheme).

The ES documentation comprises the following:

- Non-technical summary. This provides: a summary in non-technical language of the Proposed Scheme and the reasonable alternatives studied; the likely significant effects of the Proposed Scheme; the means to avoid, prevent or reduce the likely significant environmental effects; and an outline of the monitoring measures to manage the effects of construction and the effectiveness of mitigation post construction, as well as appropriate operational phase monitoring.
- Glossary of terms and list of abbreviations. This contains terms and abbreviations, including units of measurement used throughout the ES documentation.
- Volume 1: Introduction and methodology. This provides: a description of HS2, the EIA process and the approach to consultation and engagement; details of the permanent features of the Proposed Scheme and general construction techniques; a summary of the scope and methodology for the environmental topics; an outline of the general approach to mitigation; an outline of the approach to monitoring, including measures to manage the effects of construction, the effectiveness of mitigation post construction, as well as the approach to operational phase monitoring; and a summary of the reasonable alternatives studied (including local alternatives studied prior to the November 2015 route announcement). Local alternatives studied post November 2015 are discussed in the relevant Volume 2 community area reports.
- Volume 2: Community area reports and map books. These cover the following community areas: 1 Fradley to Colton; 2 Colwich to Yarlet; 3 Stone and Swynnerton; 4 Whitmore Heath to Madeley; and 5 South Cheshire. The reports provide the following for each area: an overview of the area; a description of the construction and operation of the Proposed Scheme within the area; a summary of the local alternatives studied since November 2015; a description of the environmental baseline; a description of the likely significant environmental effects of the Proposed Scheme; the proposed means to avoid, prevent or reduce the likely significant environmental effects; and the proposals for monitoring, including measures during and post construction, and during the operational phase.
The maps relevant to each community area are provided in separate Volume 2 map books. These maps should be read in conjunction with the relevant community area report. These maps include the location of the key environmental features (Map Series CT-10), key construction features (Map Series CT-05) and key operation features (Map Series CT-06) of the Proposed Scheme. There are also specific maps showing viewpoint and photomontage locations (Map Series LV, to be read in conjunction with Section 11, Landscape and visual of the Volume 2: community area reports) and noise contours (Map Series SV, to be read in conjunction with Section 13, Sound, noise and vibration of the Volume 2: community area reports).
- Volume 3: Route-wide effects. This describes the likely significant environmental effects that are likely to occur at a geographical scale greater than the community areas described in Volume 2.
- Volume 4: Off-route effects. This provides an assessment of the likely significant environmental effects of the Proposed Scheme at locations beyond the Phase 2a route corridor and its associated local environment. The maps relevant to the assessment of off-route effects are provided in a separate map book.
- Volume 5: Appendices and map books. This contains supporting technical information and associated map books to be read in conjunction with the other volumes of the ES.

Copyright statements

Copyright statements are presented in the Data dictionary and definitions section at the front of the map book, due to limited space to include this on the individual maps themselves.

Ordnance Survey data

All maps produced as part of the ES contain Ordnance Survey (OS) data. HS2 Ltd use the most up to date mapping available, where possible, supplied by the OS and as such, we cannot be held responsible for any inaccuracies within this data.

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Chainage

Most of the maps presented as part of the ES have a chainage value shown next to the alignment. Chainage is presented on the maps in black font, in the form of XX+YYY. E.g. 192+000 or 239+500.

Chainage (known as reference chainage) is referenced from Euston Station, which is 0+000, and the value presented is in metres. E.g. 192+000 refers to the point, 192,000m, or 192km, from Euston Station. Chainage values increase in intervals dependant on the map scale. For maps at 1:50,000 scale chainage is shown at 5km intervals. For maps at 1:25,000 scale chainage is shown at 2km intervals. For maps at 1:20,000, 1:10,000, 1:5,000 and 1:2,500 scales, chainage is shown at 1km intervals.

Chainage has been included on the maps as a useful tool for comparing different map sets showing the different environmental themes or engineering plans, due to map sets having different scales and therefore showing differing amounts of alignment on the map.

Map orientation

The majority of the maps presented in these map books are presented with the railway alignment running horizontally across the page. The direction of travel to London would be following the alignment to the right hand side of the page, and Crewe to the left.

The exception to this, are map series LV-02, LV-03, LV-04, LV-07 and LV-08, which present the alignment running from bottom to top of the page. This is to allow more of the modelled outputs to be shown at the appropriate map scale. In this instance, the direction of travel to London would be to the bottom of the page, and Crewe to the top. Map series TR-08 is orientated north.

Map books

In total there are 22 map books which make up the ES, spread across volumes 2, 4 and 5. A list of the titles is provided below for reference.

Name	Name
Volume 2: Map book – CA1: Fradley to Colton	Volume 5: Map book – Land Quality (LQ-01)
Volume 2: Map book – CA2: Colwich to Yarlet	Volume 5: Map book – CA1: Fradley to Colton - Landscape and visual (LV-00, LV-02, LV-07, LV-08, LV-17)
Volume 2: Map book – CA3: Stone and Swynnerton	Volume 5: Map book – CA2: Colwich to Yarlet - Landscape and visual (LV-00, LV-02, LV-07, LV-08, LV-17)
Volume 2: Map book – CA4: Whitmore Heath to Madeley	Volume 5: Map book – CA3: Stone and Swynnerton - Landscape and visual (LV-00, LV-02, LV-07, LV-08, LV-17)
Volume 2: Map book – CA5: South Cheshire	Volume 5: Map book – CA4: Whitmore Heath to Madeley - Landscape and visual (LV-00, LV-02, LV-07, LV-08, LV-17)
Volume 4: Map book – Off-route effects	Volume 5: Map book – CA5: South Cheshire - Landscape and visual (LV-00, LV-02, LV-07, LV-08, LV-17)
Volume 5: Map book – Agriculture, forestry and soils (AG-01, AG-02 & AG-04)	Volume 5: Map book – Planning Data/Committed Development (CT-13)
Volume 5: Map book – Air quality (AQ-01)	Volume 5: Map book – Socio-Economics (SE-01)
Volume 5: Map book – Community (CM-01)	Volume 5: Map book – Sound, Noise and Vibration (SV-01, SV-02, SV-03 & SV-04)
Volume 5: Map book – Cultural Heritage (CH-01, CH-02, CH-03)	Volume 5: Map book – Traffic and Transport (TR-03, TR-04 & TR-08)
Volume 5: Map book – Ecology - designated sites (EC-01)	Volume 5: Map book – Water Resources and Flood Risk (WR-01, WR-02, WR-03, WR-05, WR-06)

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High Speed Rail (West Midlands-Crewe)
Environmental Statement
Data dictionary and definitions

Data dictionary and definitions

Legend features	Definition	Source	Copyright
Bedrock geology	Soils or rocks older than Quaternary deposits. The data that comprises the geological theme of 'Bedrock' as depicted on the 1:50000 published map DiGMapGB-50. The legend on the full geological legend page (WR-02 - Legend) comprises the LEX_RCS (a unique abbreviation to identify the rock), the rock name and its aquifer status.	British Geological Survey (BGS)	Reproduced with the permission of the British Geological Survey ©NERC. All rights Reserved
Community area boundary	The Environmental Statement has been split into 5 sections called Community Areas.	High Speed Two (HS2) Ltd	© Crown copyright. Reproduced by permission of Ordnance Survey Licence Number 100049190. Year of Publication 2017.
Consented discharge to groundwater	A discharge to groundwater under permit regulations (the Environmental Permitting, England and Wales Regulations, 2010 (EPR)).	Environment Agency	© Environment Agency copyright and/or database right 2017. All rights reserved.
Consented discharge to surface water	A discharge to surface water e.g. a river or lake under permit regulations (the Environmental Permitting, England and Wales Regulations, 2010 (EPR)). A permit is required for the discharge of treated effluent to surface water under the Environmental Permitting (England and Wales) Regulations, 2010 (EPR).	Environment Agency	© Environment Agency copyright and/or database right 2017. All rights reserved.
County boundary	County boundaries from Ordnance Survey boundary mapping.	Ordnance Survey	© Crown copyright. Reproduced by permission of Ordnance Survey Licence Number 100049190. Year of Publication 2017.
Depot, station, headhouse or portal building	Extends to cover operational footprint of each depot and station and the footprint of each tunnel vent shaft and headhouse at surface level. Excludes any ancillary buildings associated with these structures.	High Speed Two (HS2) Ltd	
District/Borough boundary	Ordnance Survey local authority boundary mapping.	Ordnance Survey	© Crown copyright. Reproduced by permission of Ordnance Survey Licence Number 100049190. Year of Publication 2017.
Flood Zone 2	National Flood Zone 2 (FZ2). Land assessed, ignoring the presence of flood defences, as having between a 1% and 0.1% annual probability of river flooding.	Environment Agency	© Environment Agency copyright and/or database right 2017. All rights reserved.
Flood Zone 3	National Flood Zone 3 (FZ3). Land assessed, ignoring the presence of flood defences, as having a 1% or greater annual probability of river flooding.	Environment Agency	© Environment Agency copyright and/or database right 2017. All rights reserved.
Geological fault line	The surface of a fault fracture along which the rocks have been displaced. The data that comprises the geological theme of 'Linear' as depicted on the 1:50000 published map DiGMapGB-50.	British Geological Survey (BGS)	Collins English Dictionary – Complete and Unabridged © HarperCollins Publishers 1991, 1994, 1998, 2000, 2003 Reproduced with the permission of the British Geological Survey ©NERC. All rights Reserved
Groundwater source protection zone	Source Protection Zones (SPZs) have been defined for approximately two thousand groundwater sources such as wells, boreholes and springs used for public drinking water supply. These zones show the risk of contamination from any activities that might cause pollution in the area. The closer the activity, the greater the risk. The maps show three main zones; SPZ1 - inner, SPZ2 - outer and SPZ3 - total catchment.	Environment Agency	© Environment Agency copyright and/or database right 2017. All rights reserved.
Historic flooding area	Historic Flood Map is the maximum extent of all recorded individual Historic Flood Events Outlines from river, the sea and groundwater springs and shows areas of land that have previously been subject to flooding in England & Wales.	Environment Agency	© Environment Agency copyright and/or database right 2017. All rights reserved.

Legend features	Definition	Source	Copyright
Lakes & Reservoirs	A body of water such as a lake or pond forming a geographical feature. Based on Ordnance Survey Vector Map District.	Ordnance Survey	Copyright © 2017 Oxford University Press. All rights reserved. © Crown copyright. Reproduced by permission of Ordnance Survey Licence Number 100049190. Year of Publication 2017.
Land potentially required during construction	Boundary defining the maximum possible extent of construction works required to build HS2 as far as the current level of design allows. This only covers surface works and includes all tunnel portals, vent shafts and headhouses, but does not apply to wholly tunnelled sections or to air rights. It also encompasses associated highway, access, drainage and utility works.	High Speed Two (HS2) Ltd	
Licensed groundwater abstraction (excluding public water supplies)	A groundwater abstraction licence issued by the Environment Agency, which abstracts more than 20 cubic metres a day. Data supplied as spreadsheet. Digitised within 2km. Excludes the precise location of public water supplies in order to comply with Security and Environmental Measures Direction 1998.	Environment Agency	© Environment Agency copyright and/or database right 2017. All rights reserved.
Licensed surface water abstraction (excluding public water supplies)	A surface water abstraction licence issued by the Environment Agency, which abstracts more than 20 cubic metres a day. Data supplied as spreadsheet. Digitised within 2km. Excludes the precise location of public water supplies in order to comply with Security and Environmental Measures Direction 1998.	Environment Agency	© Environment Agency copyright and/or database right 2017. All rights reserved.
Modelled Baseline Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding	The area covered by flooding of the river as a result of an event that is expected to occur with a probability of 1% in any one year under baseline conditions. (Also known as a 1 in 100 annual probability).	High Speed Two (HS2) Ltd	
Modelled Baseline Flood Extent 1 in 20 (5%) Annual Probability of River Flooding	The area covered by flooding of the river as a result of an event that is expected to occur with a probability of 5% in any one year under baseline conditions. (Also known as a 1 in 20 annual probability).	High Speed Two (HS2) Ltd	
Modelled Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding	The area covered by flooding of the river as a result of an event that is expected to occur with a probability of 1% in any one year under post-development conditions. (Also known as a 1 in 100 annual probability).	High Speed Two (HS2) Ltd	
Modelled Post Development Flood Extent 1 in 20 (5%) Annual Probability of River Flooding	The area covered by flooding of the river as a result of an event that is expected to occur with a probability of 5% in any one year under post-development conditions. (Also known as a 1 in 20 annual probability).	High Speed Two (HS2) Ltd	
Open water	A body of water such as a lake or pond forming a geographical feature. Based on Ordnance Survey Vector Map District.	Ordnance Survey	Copyright © 2017 Oxford University Press. All rights reserved. © Crown copyright. Reproduced by permission of Ordnance Survey Licence Number 100049190. Year of Publication 2017.
Registered Park and Garden	Parks and Gardens of special historic interest. Supplied by Historic England. Of the 1,590 Registered Parks and Gardens, over 91% were captured against the 1:10,000 Ordnance Survey Raster product. 135 records are potentially subject to movement under Positional Accuracy Improvement (PAI) improvements.	Historic England	© Historic England 2017. Contains Ordnance Survey data © Crown copyright and database right 2017 The Historic England GIS Data contained in this material was obtained on 25 January 2017. The most publicly available up to date Historic England GIS Data can be obtained from HistoricEngland.org.uk .
Risk of Flooding from Surface Water	The risk of flooding from surface water that hasn't yet entered a watercourse.	Environment Agency	© Environment Agency copyright and/or database right 2017. All rights reserved.

Legend features	Definition	Source	Copyright
Route in tunnel Route on surface	Represents the proposed route of HS2, split into route on surface and tunnelled sections.	High Speed Two (HS2) Ltd	
Sites of Special Scientific Interest (SSSI)	A Site of Special Scientific Interest (SSSI) is the land notified as an SSSI under the Wildlife and Countryside Act (1981), as amended.	Natural England	© Natural England copyright. Contains Ordnance Survey data © Crown copyright and database right 2017
Special Area of Conservation (SAC)	A Special Area of Conservation (SAC) is the land designated under Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora.	Natural England	© Natural England copyright 2017
Spring	A surface expression of a groundwater body.	Environment Agency	© Environment Agency copyright and/or database right 2017. All rights reserved.
Superficial deposits	A geological deposit that was laid down during the Quaternary period. Such deposits were largely formed by river and glacial processes but may also include wind-blown deposits known as loess. The data that comprises the geological theme of 'Superficial' as depicted on the 1:50000 published map DiGMapGB-50. The legend on the full geological legend page (WR-02-LEGEND) comprises the LEX_RCS (a unique abbreviation to identify the rock), the rock name and its aquifer status.	British Geological Survey (BGS)	Reproduced with the permission of the British Geological Survey ©NERC. All rights Reserved
Unlicensed private groundwater abstraction (or private surface water abstractions)	A private water supply from either a groundwater or a surface water source, which abstracts less than 20 cubic metres a day. Local authorities currently hold a register of private water supplies. The local authorities are required in accordance with The Private Water Supplies Regulations 2009, to ensure that unlicensed abstractions meet certain quality standards. Data supplied as spreadsheet. Digitised within 2km.	Environment Agency	© Environment Agency copyright and/or database right 2017. All rights reserved.
Watercourse	Any channel through which water flows, can be natural or manmade. They are split into two categories (main rivers or ordinary watercourses) in England and Wales for regulation purposes.	Environment Agency	© Environment Agency copyright and/or database right 2017. All rights reserved.
WFD groundwater bodies	A distinct volume of groundwater within one or more aquifers, identified by the Environment Agency and reported on maps in RBMP.	Environment Agency	© Environment Agency copyright and/or database right 2017. All rights reserved.
WFD Lakes	Data is a combination of two datasets: WFD - Lake Waterbodies. The dataset contains the extents of waterbodies identified as "lakes" under the Water Framework Directive. Based on River Basin Characterisation 2 (RBC2) data. and Water Framework Directive – Surface Water Classification Status and Objectives (2013) An ecological classification comprises: - the condition of biological elements, for example fish - concentrations of supporting physio-chemical elements, for example oxygen or ammonia - concentrations of specific pollutants, for example copper and for high status, - largely undisturbed hydromorphology Ecological status class is recorded on the scale of high, good, moderate, poor or bad. 'High' denotes largely undisturbed conditions and the other classes represent increasing deviation from this undisturbed, or reference, condition. The ecological status classification for the water body is determined by the worst scoring quality element.	Environment Agency	© Environment Agency copyright and/or database right 2017. All rights reserved.
WFD Surface Water Bodies	A discrete and significant element of surface water, identified by the Environment Agency and reported on maps in RBMP. Water Framework Directive – Surface Water Classification Status and Objectives (2013) An ecological classification comprises: - the condition of biological elements, for example fish	Environment Agency	© Environment Agency copyright and/or database right 2017. All rights reserved.

Legend features	Definition	Source	Copyright
	<ul style="list-style-type: none"> - concentrations of supporting physio-chemical elements, for example oxygen or ammonia - concentrations of specific pollutants, for example copper <p>and for high status,</p> <ul style="list-style-type: none"> - largely undisturbed hydromorphology <p>Ecological status class is recorded on the scale of high, good, moderate, poor or bad. 'High' denotes largely undisturbed conditions and the other classes represent increasing deviation from this undisturbed, or reference, condition. The ecological status classification for the water body is determined by the worst scoring quality element.</p>		

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High Speed Rail (West Midlands-Crewe)

Environmental Statement

CA1 Fradley to Colton

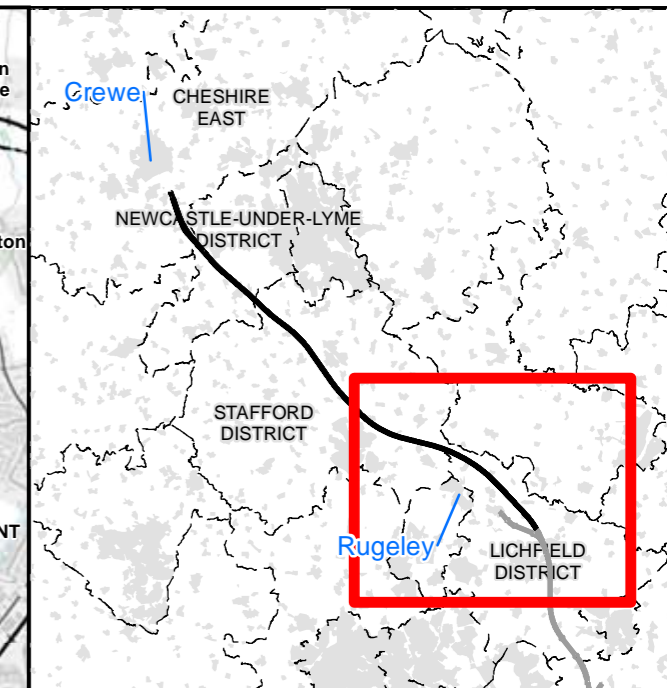
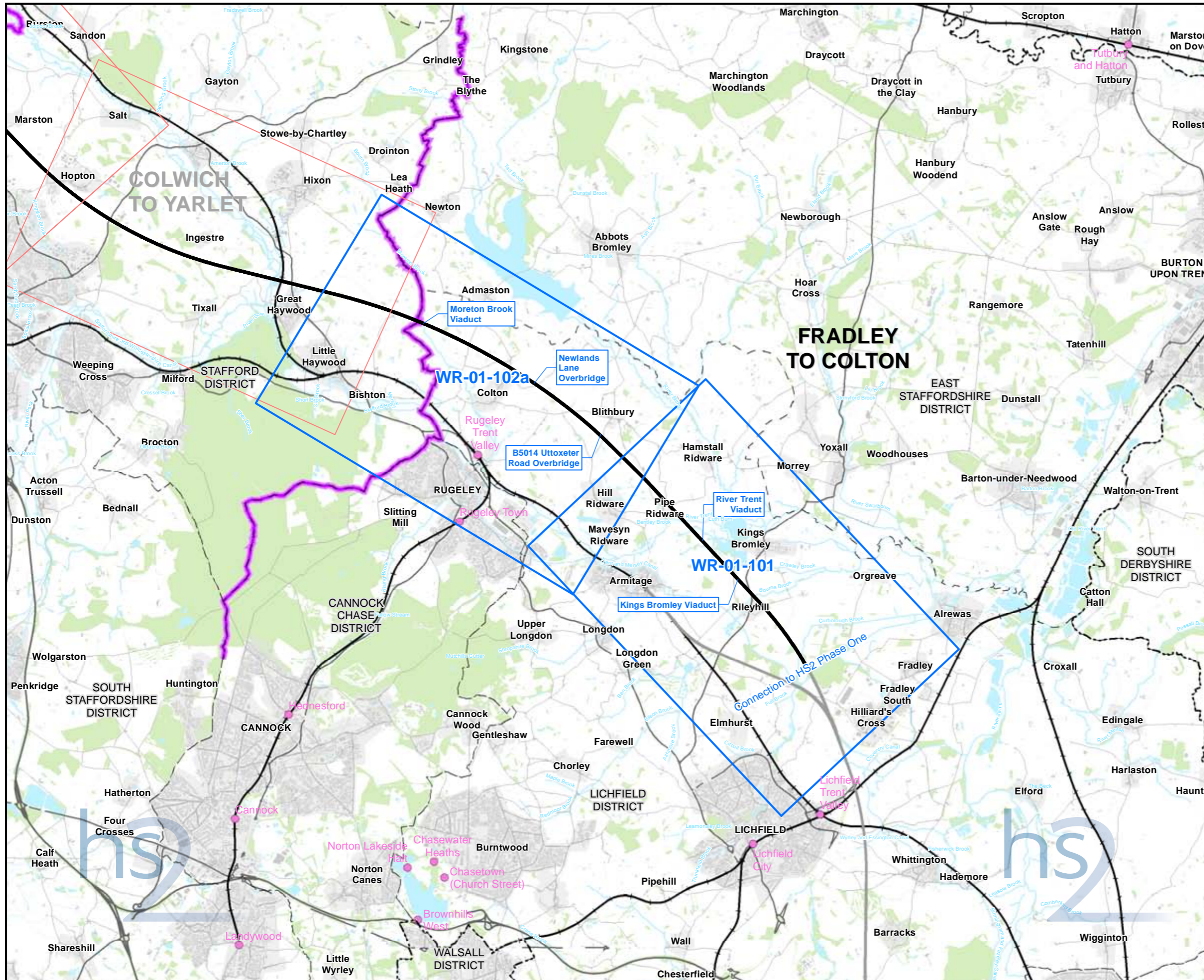
WR-01 - Surface Water Baseline

WR-02 - Groundwater Baseline

WR-03 - Water Framework Directive

**WR-05 - Modelled Baseline and Post Development Flood
Extent 1 in 100 (1%+CC) including Climate Change
Annual Probability of River Flooding**

**WR-06 - Modelled Baseline and Post Development Flood
Extent 1 in 20 (5%) Annual Probability of River Flooding**



Map Series Information:

This map series shows surface water features such as rivers, streams, ponds, canals and reservoirs, flood zones, and surface water abstractions as referred to in the ES.

All points where the alignment crosses a watercourse are also shown and labelled with their reference in the text. These are shown as "Surface Water Crossings (SWC)".

The design of the Proposed Scheme will be informed through stakeholder engagement and further engineering and environmental studies

Main Map Legend	
	Route in tunnel
	Route on surface
	Depot, station, headhouse or portal building
	Community area boundary
	Existing railway station
	County boundary
	District/Borough boundary
	Map sheets included in this community area
	Map sheets not included in this community area

Map Number	WR-01-INDEX-CA1
Map Name	Index Map of: Surface Water Baseline
Community Area 1:	Fradley to Colton

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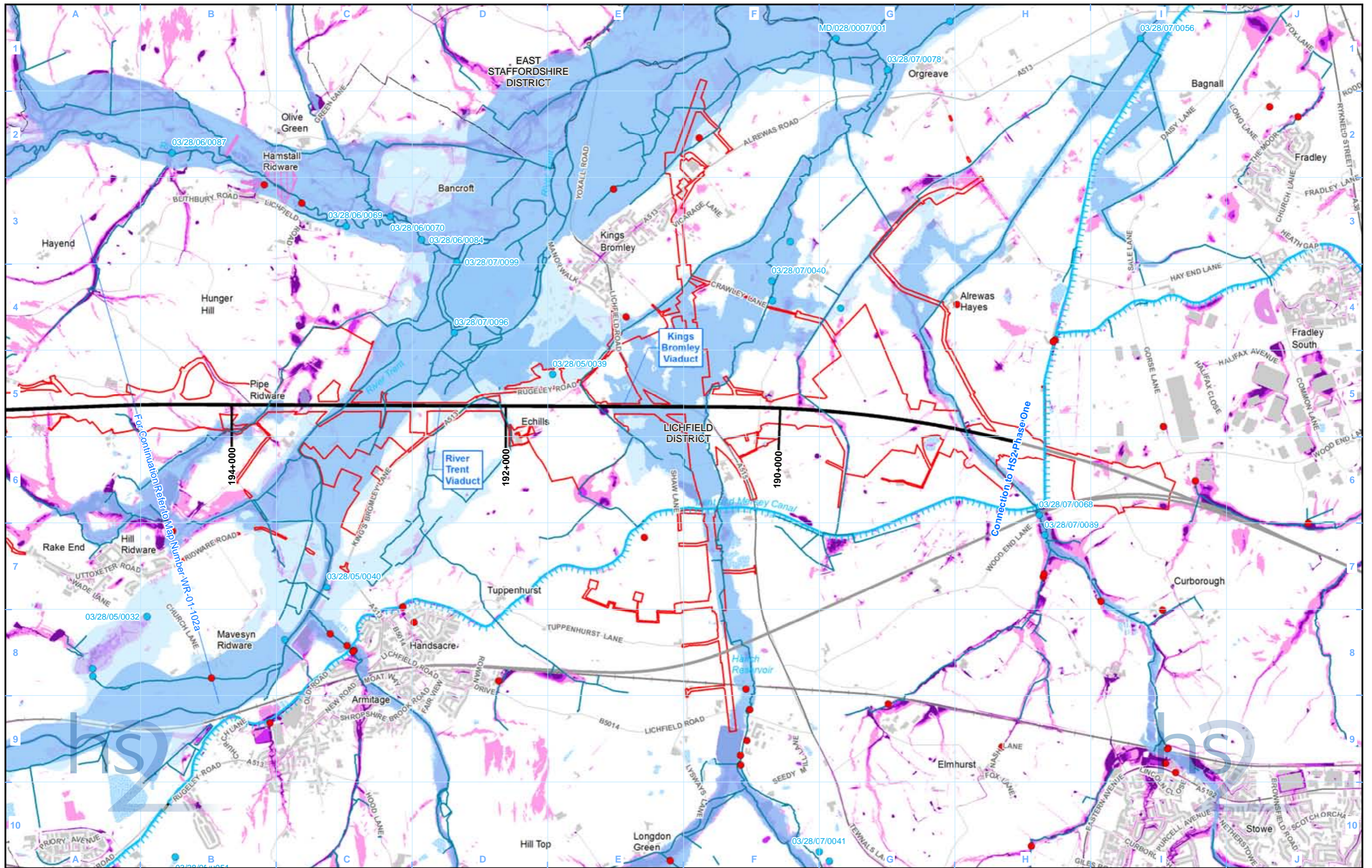
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Doc Number: C861-ARP-EV-MAP-000-151001-P04

Date: 14/06/17



Legend

Route in bored tunnel	District/Borough boundary	Canal	High - chance of flooding greater than 1 in 30 (3.33%)
Route on surface	Licensed surface water abstraction (excluding public water supplies)	Canal tunnel	Medium - chance of flooding between 1 in 100 (1%) and 1 in 30 (3.33%)
Depot, station, headhouse or portal building	Unlicensed private surface water abstractions	Lakes & Reservoirs	Low - chance of flooding between 1 in 1000 (0.1%) and 1 in 100 (1%)
Land potentially required during construction	Consented discharge to surface water	Historic flooding area	
Community area boundary	Watercourse	Flood Zone 2	
County boundary	Culverted watercourse	Flood Zone 3	

Map Number: **WR-01-101**

Map Name: **Surface Water Baseline**

Community Area 1:
Fradley to Colton

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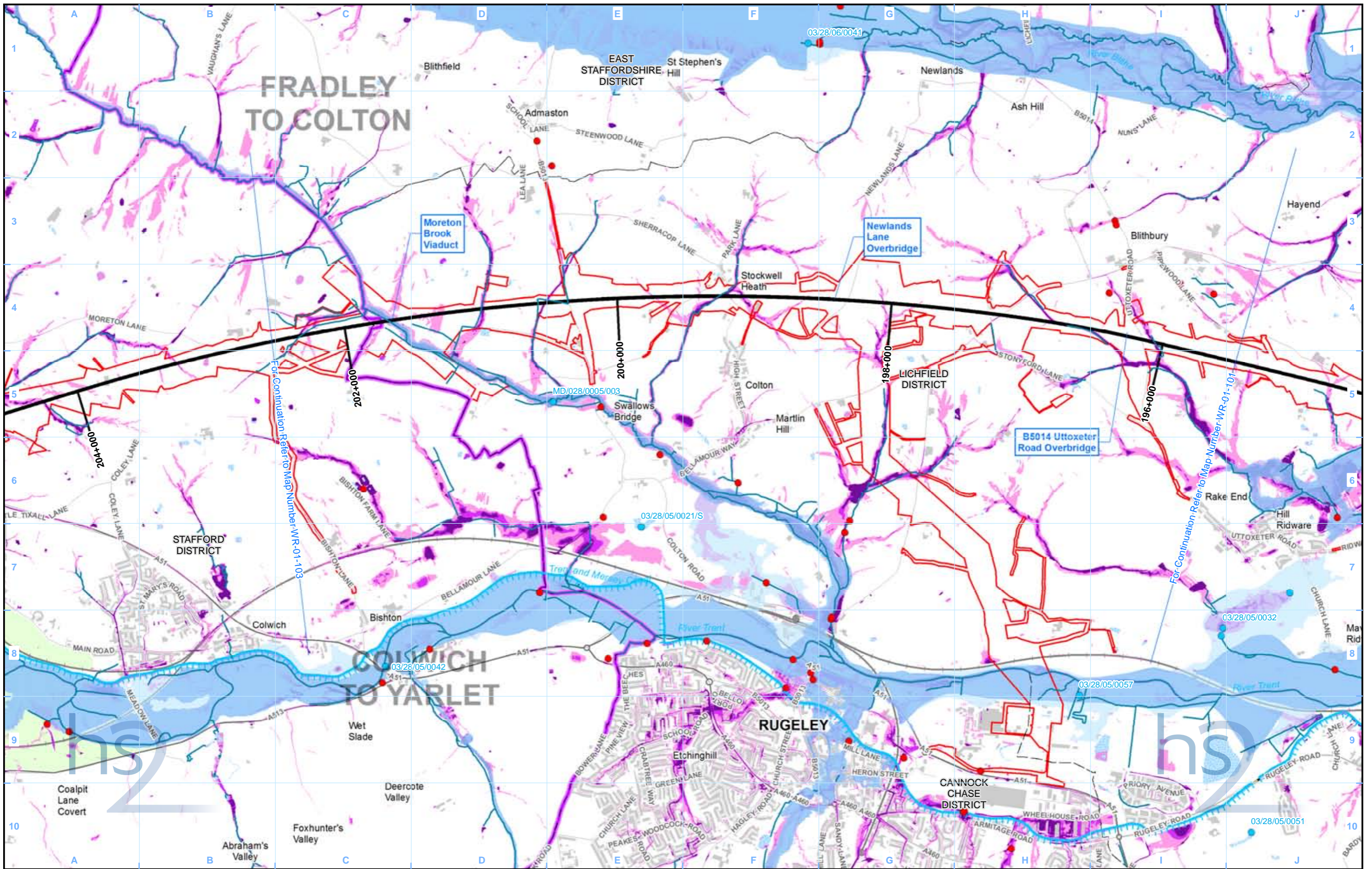
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Date: 14/06/17



Legend

<ul style="list-style-type: none"> Route in bored tunnel Route on surface Depot, station, headhouse or portal building Land potentially required during construction Community area boundary County boundary 	<ul style="list-style-type: none"> District/Borough boundary Licensed surface water abstraction (excluding public water supplies) Unlicensed private surface water abstractions Consented discharge to surface water Watercourse Culverted watercourse 	<ul style="list-style-type: none"> Canal Canal tunnel Lakes & Reservoirs Historic flooding area Flood Zone 2 Flood Zone 3 	<ul style="list-style-type: none"> High - chance of flooding greater than 1 in 30 (3.33%) Medium - chance of flooding between 1 in 100 (1%) and 1 in 30 (3.33%) Low - chance of flooding between 1 in 1000 (0.1%) and 1 in 100 (1%)
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Map Number: WR-01-102a

Map Name: Surface Water Baseline

Community Area 1: Fradley to Colton

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Date: 14/06/17

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Superficial Deposits


- Alluvium [ALV-CZPS] (Secondary A)
- Alluvium [ALV-XCZSV] (Secondary A)
- River terrace deposits, 1 to 2 [T1T2-XSV] (Secondary A)
- Enfield silt member [ESI-XCZ] (Non-Productive)
- Glaciofluvial deposits, devensian [GFDUD-XSV] (Secondary A)
- Glaciolacustrine deposits, devensian [GLDD-XCZ] (Non-Productive)
- Kempton park gravel formation [KPGR-XSV] (Secondary A)
- Langley silt member [LASI-XCZ] (Non-Productive)
- Shepperton gravel member [SHGR-XSV] (Principal)
- Till, devensian [TILLD-DMTN] (Non-Productive)
- Till, devensian [TILLD-XDSV] (Non-Productive)
- Finsbury gravel member [FIGR-XSV] (Secondary A)
- Hackney gravel member [HAGR-XSV] (Secondary A)
- Lynch hill gravel member [LHGR-XSV] (Secondary A)
- Taplow gravel formation [TPGR-XSV] (Principal/ Secondary A)
- Boyn hill gravel member [BHT-XSV] (Secondary A)
- Bosworth clay member [BOSW-XCZ] (Non-Productive)
- Black park gravel member [BPGR-XSV] (Secondary A)
- Dunsmore gravel [DMG-XSV] (Secondary A)
- Lowestoft formation [LOFT-DMTN] (Non-Productive)
- Oadby member [ODT-DMTN] (Non-Productive)
- Thrusington member [THT-DMTN] (Non-Productive)
- Winter hill gravel (lacustrine deposits) [WHGLD-XSV] (Secondary A)
- Winter hill gravel [WHG-XSV] (Secondary A)
- Westmill gravel member [WLGR-XSV] (Secondary A)
- Dollis hill gravel member [DHGR-XSV] (Secondary A)
- Gerrards cross gravel [GCGR-XSV] (Secondary A)
- Glaciofluvial deposits, mid pleistocene [GFDMP-XSV] (Secondary A)
- Glaciofluvial sheet deposits, mid pleistocene [GFSMP-XSV] (Secondary A)
- Glaciofluvial terrace deposits, mid pleistocene [GFTMP-XSV] (Secondary A)
- Glaciolacustrine deposits, mid pleistocene [GLLMP-XCZ] (Non-Productive)
- Till, mid pleistocene [TILMP-DMTN] (Non-Productive)
- Beaconsfield gravel [BDGR-XSV] (Secondary A)
- Baginton sand and gravel formation [BGSG-XSV] (Secondary A)
- Chorleywood gravel formation [CWGR-XSV] (Secondary A)
- Glacial deposits [GDU-XCZS] ()
- Glaciolacustrine deposits [GLLD-XCZ] (Non-Productive)
- Holme pierrepoint sand and gravel member [HPSG-XSV] (Secondary A)
- Interglacial lacustrine deposits [IGLD-XCZ] (Non-Productive)
- Kesgrave catchment subgroup [KGCX-XSV] ()
- Princes risborough sand and gravel [PRSG-XSV] ()
- Stanmore gravel formation [STGR-XSV] (Secondary A)
- Wasperton sand and gravel member [WAT-XSV] (Secondary A)
- Westland green gravel [WGGR-XSV] (Secondary A)
- Alluvial fan deposits [ALF-V] (Secondary A)
- Glaciofluvial deposits [GFDU-XSV] (Secondary A)
- Head [HEAD-V] (Secondary (Undifferentiated))
- Head [HEAD-XCZ] (Secondary (Undifferentiated))
- Head [HEAD-XCZSV] (Secondary (Undifferentiated))
- Head, 1 [HEAD1-XCZSV] (Secondary (Undifferentiated))
- Lacustrine deposits [LDE-XCZS] (Non-Productive)
- Peat [PEAT-P] (N/A Aquifer)
- River terrace deposits, 1 [RTD1-XSV] (Secondary A)
- River terrace deposits, 2 [RTD2-XSV] (Secondary A)
- River terrace deposits, 3 [RTD3-XSV] (Secondary A)
- River terrace deposits, 4 [RTD4-XSV] (Secondary A)
- River terrace deposits (undifferentiated) [RTDU-XSV] (Secondary A)
- Sand and gravel of uncertain age and origin [SGAO-XSV] (Secondary A)
- Tufa [TUFA-CATUFA] (Aquifer)
- Wolston sand and gravel [WOSG-XSV] (Secondary A)
- Clay-with-flints formation [CWF-XCZSV] (Non-Productive)

Bedrock Geology

- Bagshot formation - sand [BGS-SANDU] (Secondary A)
- Claygate member - clay, silt and sand [CLGB-CLSISA] (Secondary A)
- Claygate member - sand, silt and clay [CLGB-SSCL] (Secondary A)
- London clay formation - clay and silt [LC-CLSI] (Non-Productive)
- London clay formation - clay, silt and sand [LC-CLSISA] (Non-Productive)
- Thanet formation - sand [TAB-SANDU] (Secondary A)
- Lambeth group - clay, silt and sand [LMBE-CLSISA] (Secondary A)
- Seaford chalk formation and newhaven chalk formation (undifferentiated) - chalk [SNCK-CHLK] (Principal)
- Chalk rock member - chalk [CKR-CHLK] (Principal)
- Lewes nodular chalk formation - chalk [LECH-CHLK] (Principal)
- Lewes nodular chalk formation and seaford chalk formation (undifferentiated) - chalk [LESE-CHLK] (Principal)
- Lewes nodular chalk formation and newhaven chalk formation (undifferentiated) - chalk [LSNCK-CHLK] (Principal)
- New pit chalk formation - chalk [NPCH-CHLK] (Principal)
- Glauconitic marl member - sandstone, glauconitic [GLML-GLSST] (Principal)
- Holywell nodular chalk formation - chalk [HCK-CHLK] (Principal)
- Holywell nodular chalk formation and new pit chalk formation (undifferentiated) - chalk [HNCK-CHLK] (Principal)
- Melbourn rock member - chalk [MR-CHLK] (Principal)
- Totterhoe stone member - chalk [TTST-CHLK] (Principal)
- West melbury marly chalk formation - chalk [WMCH-CHLK] (Principal)
- West melbury marly chalk formation and zig zag chalk formation (undifferentiated) - chalk [WZCK-CHLK] (Principal)
- Zig zag chalk formation - chalk [ZZCH-CHLK] (Principal)
- Gault formation - mudstone [GLT-MDST] (Non-Productive)
- Gault formation and upper greensand formation (undifferentiated) - mudstone, siltstone and sandstone [GUGS-MDSS] (Non-Productive)
- Upper greensand formation - siltstone and sandstone [UGS-SISD] (Non-Productive)
- Lower greensand group - sandstone [LGS-SDST] (Secondary A)
- Whitchurch sand formation - mudstone [WHS-MDST] (Secondary A)
- Whitchurch sand formation - sandstone [WHS-SDST] (Secondary A)
- Purbeck group - limestone and [subequal/subordinate] argillaceous rocks, interbedded [PB-LMAR] (Principal)
- Portland group - limestone and calcareous sandstone [PL-LMCS] (Principal)
- Portland sand formation - sandstone, calcareous [POSA-CALSST] (Secondary A)
- Portland sand formation - limestone and calcareous sandstone [POSA-LMCS] (Secondary A)
- Portland stone formation - limestone [POST-LMST] (Principal)
- Kimmeridge clay formation - mudstone [KC-MDST] (Non-Productive)
- Kimmeridge clay formation - siltstone and sandstone [KC-SISD] (Non-Productive)
- Amgrove spiculite member - sandstone [AGSP-SDST] (Secondary A)
- Amphill clay formation - mudstone [AMC-MDST] (Non-Productive)
- Oakley member - limestone and mudstone, interbedded [OKLY-LMSD] (Secondary A)
- Weymouth member - mudstone [WEY-MDST] (Non-Productive)
- West walton formation and amphill clay formation (undifferentiated) - mudstone [WWAC-MDST] (Non-Productive)
- West walton formation - limestone and [subequal/subordinate] argillaceous rocks, interbedded [WWB-LMAR] (Non-Productive)
- West walton formation - mudstone [WWB-MDST] (Non-Productive)
- Kellaways formation - sandstone, siltstone and mudstone [KLB-SDSM] (Secondary A)
- Kellaways clay member - mudstone [KLC-MDST] (Secondary A)
- Kellaways sand member - sandstone and siltstone, interbedded [KLS-SDSL] (Secondary A)
- Peterborough member - mudstone [PET-MDST] (Non-Productive)
- Stewartby member - mudstone [SBY-MDST] (Non-Productive)
- Bladon member - limestone [BLAD-LMST] (Principal)
- Bladon member - mudstone and limestone, interbedded [BLAD-MDLM] (Principal)
- Blisworth clay formation - mudstone [BWC-MDST] (Principal)
- Blisworth limestone formation - limestone [BWL-LMST] (Principal)
- Combrash formation - limestone [CB-LMST] (Secondary A)
- Forest marble formation - limestone [FMB-LMST] (Secondary A)
- Forest marble formation - limestone and mudstone, interbedded [FMB-LMSD] (Secondary A)
- Great oolite group - limestone and [subequal/subordinate] argillaceous rocks, interbedded [GOG-LMAR] (Principal To Secondary B)
- Sharp's hill formation - argillaceous rocks with subordinate sandstone and limestone [SHHB-ARSL] (Secondary A)
- Taynton limestone formation - limestone, ooidal [TY-LMOOL] (Principal)
- Wellingborough limestone member - limestone [WBRO-LMST] (Secondary A)
- White limestone formation - limestone [WHL-LMST] (Principal)
- Horsehay sand formation - sandstone [HYSA-SDST] (Secondary A)
- Rutland formation - mudstone [RLD-MDST] (Secondary B)
- Stamford member - sandstone and siltstone, interbedded [STAM-SDSL] (Secondary A)
- Northampton sand formation - sandstone, limestone and ironstone [NS-SDLI] (Secondary A)
- Whitby mudstone formation - mudstone [WHM-MDST] (Non-Productive)
- Dyrham formation - siltstone and mudstone, interbedded [DYS-SIMD] (Secondary (Undifferentiated))
- Marlstone rock formation - ferruginous limestone and ironstone [MRB-FLIR] (Secondary A)
- Marlstone rock formation - limestone, ferruginous [MRB-FLMST] (Secondary A)
- Charmouth mudstone formation - limestone [CHAM-LMST] (Secondary (Undifferentiated))
- Charmouth mudstone formation - mudstone [CHAM-MDST] (Non-Productive)
- Rugby limestone member - mudstone and limestone, interbedded [RLS-MDLM] (Secondary A)
- Langport member - limestone [LPMB-LMST] (Secondary (Undifferentiated))
- Penarth group - argillaceous rock and [subequal/subordinate] limestone, interbedded [PNG-AROCLS] (Secondary B)
- Penarth group - mudstone [PNG-MDST] (Secondary B)
- Salford shale member - limestone [SASH-LMST] (Secondary B)

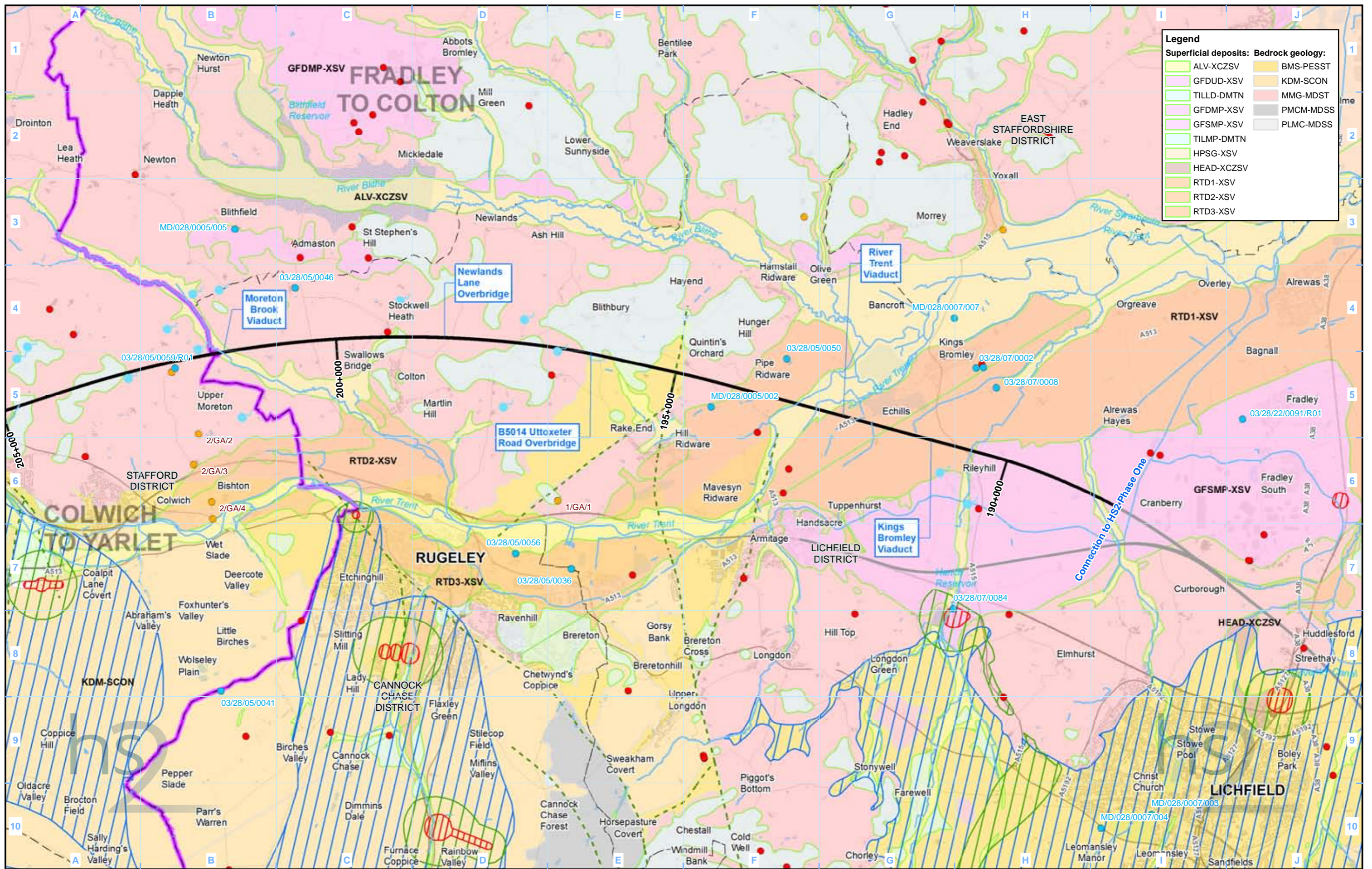
- Salford shale member - mudstone [SASH-MDST] (Secondary B)
- Westbury formation - mudstone [WBY-MDST] (Secondary (Undifferentiated))
- Westbury formation - sandstone [WBY-SDST] (Secondary (Undifferentiated))
- Wilmcote limestone member - mudstone and limestone, interbedded [WCT-MDLM] (Secondary (Undifferentiated))
- Blue anchor formation - mudstone and siltstone [BAN-MDSI] (Secondary (Undifferentiated))
- Blue anchor formation - mudstone [BAN-MDST] (Secondary (Undifferentiated))
- Arden sandstone formation - mudstone [AS-MDST] (Secondary (Undifferentiated))
- Arden sandstone formation - sandstone, siltstone and mudstone [AS-SDSM] (Secondary A)
- Arden sandstone formation - siltstone and sandstone [AS-SISD] (Secondary A)
- Weatheroak sandstone member - sandstone [WKS-SDST] ()
- Gunthorpe member - siltstone, dolomitic [GUN-DLST] ()
- Gunthorpe member - mudstone [GUN-MDST] ()
- Tarporley siltstone formation - siltstone, mudstone and sandstone [TPSF-SIMS] (Secondary B)
- Bromsgrove sandstone formation - mudstone [BMS-MDST] (Principal)
- Bromsgrove sandstone formation - sandstone, pebbly (gravelly) [BMS-PESST] (Principal)
- Bromsgrove sandstone formation - sandstone [BMS-SDST] (Principal)
- Kidderminster formation - conglomerate [KDM-CONG] (Principal)
- Kidderminster formation - mudstone [KDM-MDST] (Principal)
- Kidderminster formation - sandstone and conglomerate, interbedded [KDM-SCON] (Principal)
- Mercia mudstone group - siltstone, dolomitic [MMG-DLST] (Secondary (Undifferentiated))
- Mercia mudstone group - mudstone [MMG-MDST] (Secondary B)
- Wildmoor sandstone formation - sandstone [WRS-SDST] (Principal)
- Ashow formation - mudstone and sandstone [AW-MDSD] (Principal)
- Ashow formation - sandstone [AW-SDST] (Principal)
- Clent formation - argillaceous rocks and [subequal/subordinate] breccia, interbedded [CLT-ARBR] (Secondary A)
- Gibbet hill conglomerate bed - conglomerate [GHC-CONG] (Principal)
- Hopwas breccia formation - breccia [HPBR-BREC] (Principal)
- Hopwas breccia formation - breccia and sandstone, interbedded [HPBR-BRSS] (Principal)
- Kenilworth sandstone formation - breccia [KHS-BREC] (Principal)
- Kenilworth sandstone formation - mudstone [KHS-MDST] (Principal)
- Kenilworth sandstone formation - sandstone [KHS-SDST] (Principal)
- Alveley member - limestone [ALY-LMST] (Secondary A)
- Alveley member - mudstone and sandstone [ALY-MDSD] (Secondary A)
- Alveley member - mudstone [ALY-MDST] (Secondary A)
- Alveley member - sandstone [ALY-SDST] (Secondary A)
- Alveley member - sandstone and mudstone [ALY-STMD] (Secondary A)
- Allesley member - argillaceous rocks and [subordinate/subequal] sandstone and conglomerate, interbedded [ASY-ARSC] (Principal)
- Allesley member - conglomerate [ASY-CONG] (Principal)
- Allesley member - sandstone [ASY-SDST] (Principal)
- Enville member - conglomerate [EN-CONG] (Secondary A)
- Enville member - sandstone, conglomerate and [subordinate] argillaceous rocks [EN-SCAR] (Secondary A)
- Enville member - sandstone with subordinate conglomerate, siltstone and mudstone [EN-SCSM] (Secondary A)
- Enville member - sandstone [EN-SDST] (Secondary A)
- Halesowen formation - limestone [HA-LMST] (Secondary A)
- Halesowen formation - mudstone, siltstone and sandstone [HA-MDSS] (Secondary A)
- Halesowen formation - sandstone [HA-SDST] (Secondary A)
- Keresley member - argillaceous rocks and [subordinate/subequal] sandstone and conglomerate, interbedded [KRS-ARSC] (Principal)
- Keresley member - conglomerate [KRS-CONG] (Principal)
- Keresley member - limestone [KRS-LMST] (Principal)
- Keresley member - sandstone [KRS-SDST] (Principal)
- Tile hill mudstone formation - argillaceous rocks and [subequal/subordinate] sandstone, interbedded [TLM-ARSD] (Principal)
- Tile hill mudstone formation - sandstone [TLM-SDST] (Principal)
- Whitacre member - conglomerate [WIT-CONG] (Principal)
- Whitacre member - limestone [WIT-LMST] (Principal)
- Whitacre member - mudstone and sandstone [WIT-MDSD] (Principal)
- Whitacre member - sandstone [WIT-SDST] (Principal)
- Pennine middle coal measures formation - mudstone, siltstone and sandstone [PMCM-MDSS] (Secondary A)
- Pennine middle coal measures formation - sandstone [PMCM-SDST] (Secondary A)
- Thick coal (south staffordshire) - coal [THIC-COAL] (Secondary A)
- Pennine lower coal measures formation - mudstone, siltstone and sandstone [PLCM-MDSS] (Secondary A)
- Pennine lower coal measures formation - sandstone [PLCM-SDST] (Secondary A)
- Pennine lower coal measures formation and pennine middle coal measures formation (undifferentiated) - mudstone, siltstone and sandstone [PLMC-MDSS] (Secondary A Aquifer)
- Etruria formation - conglomerate [ETM-CONG] (Secondary A)
- Etruria formation - mudstone, sandstone and conglomerate [ETM-MDSC] (Secondary A)
- Etruria formation - sandstone [ETM-SDST] (Secondary A)
- Unnamed igneous intrusion, westphalian - microgabro [UICW-MCGB] ()
- Rough rock - sandstone [RR-SDST] ()
- Millstone grit group [see also migr] - mudstone, siltstone and sandstone [MG-MDSS] ()
- Millstone grit group [see also migr] - sandstone [MG-SDST] ()
- Coalbrookdale formation - mudstone [CBRD-MDST] (Secondary B)
- Rubery sandstone member - sandstone [RBS-SDST] (Secondary B)
- Midlands minor intrusive suite - lamprophyres [MMI-LMPY] ()
- Monks park shale formation - mudstone [MPSH-MDST] (Secondary B)
- Merevale shale formation - mudstone [MVSH-MDST] (Secondary B)

Map Number	WR-02 - Legend
Map Name	WR-02 - Full Geological Legend with Rock Unit Names and Aquifer Status

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Legend

Superficial deposits:		Bedrock geology:	
ALV-XCZSV	GFDUD-XSV	BMS-PESST	KDM-SCON
TILLD-DMTN	GFDMP-XSV	MMG-MDST	PMCM-MDSS
TILMP-DMTN	GFSMP-XSV	PLMC-MDSS	
HPSG-XSV			
HEAD-XCZSV			
RTD1-XSV			
RTD2-XSV			
RTD3-XSV			

Legend

- Route in tunnel
- Route on surface
- Depot, station, headhouse or portal building
- Community area boundary
- County boundary
- District/Borough boundary
- Lakes & Reservoirs
- Geological fault line
- Licensed groundwater abstraction (excluding public water supplies)
- Unlicensed private groundwater abstraction
- Consented discharge to groundwater
- Spring

Groundwater source protection zone:

- Zone 1
- Zone 2
- Zone 3

For full geological legend including strata names and aquifer status please refer to WR-02 - Legend

Map Number: WR-02-201

Map Name: Groundwater Baseline

Community Area 1: Fradley to Colton

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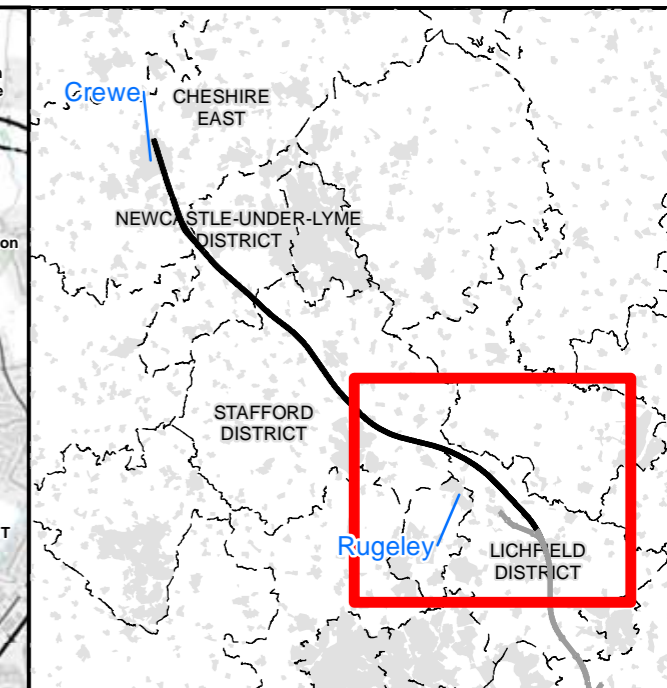
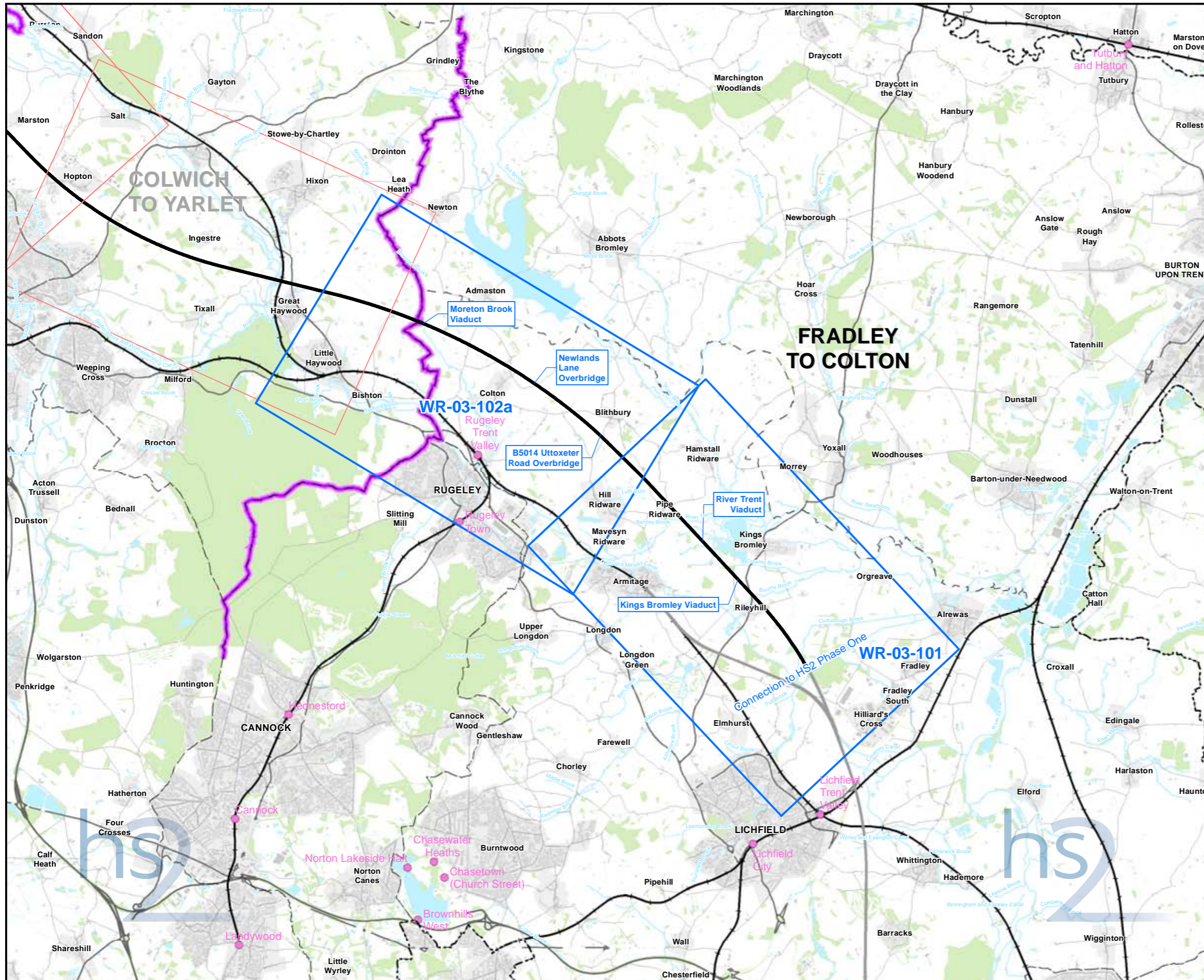
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Doc Number: C861-ARP-EV-MAP-000-152201-P04

Date: 14/06/17



Map Series Information:

This map series shows water bodies, their Water Framework Directive current status and associated ecological features.

- Main Map Legend**
- Route in tunnel
 - Route on surface
 - Depot, station, headhouse or portal building
 - Community area boundary
 - Existing railway station
 - County boundary
 - District/Borough boundary
 - Map sheets included in this community area
 - Map sheets not included in this community area

Map Number **WR-03-INDEX-CA1**

Map Name **Index Map of:
Water Framework Directive**

Community Area 1:
Fradley to Colton

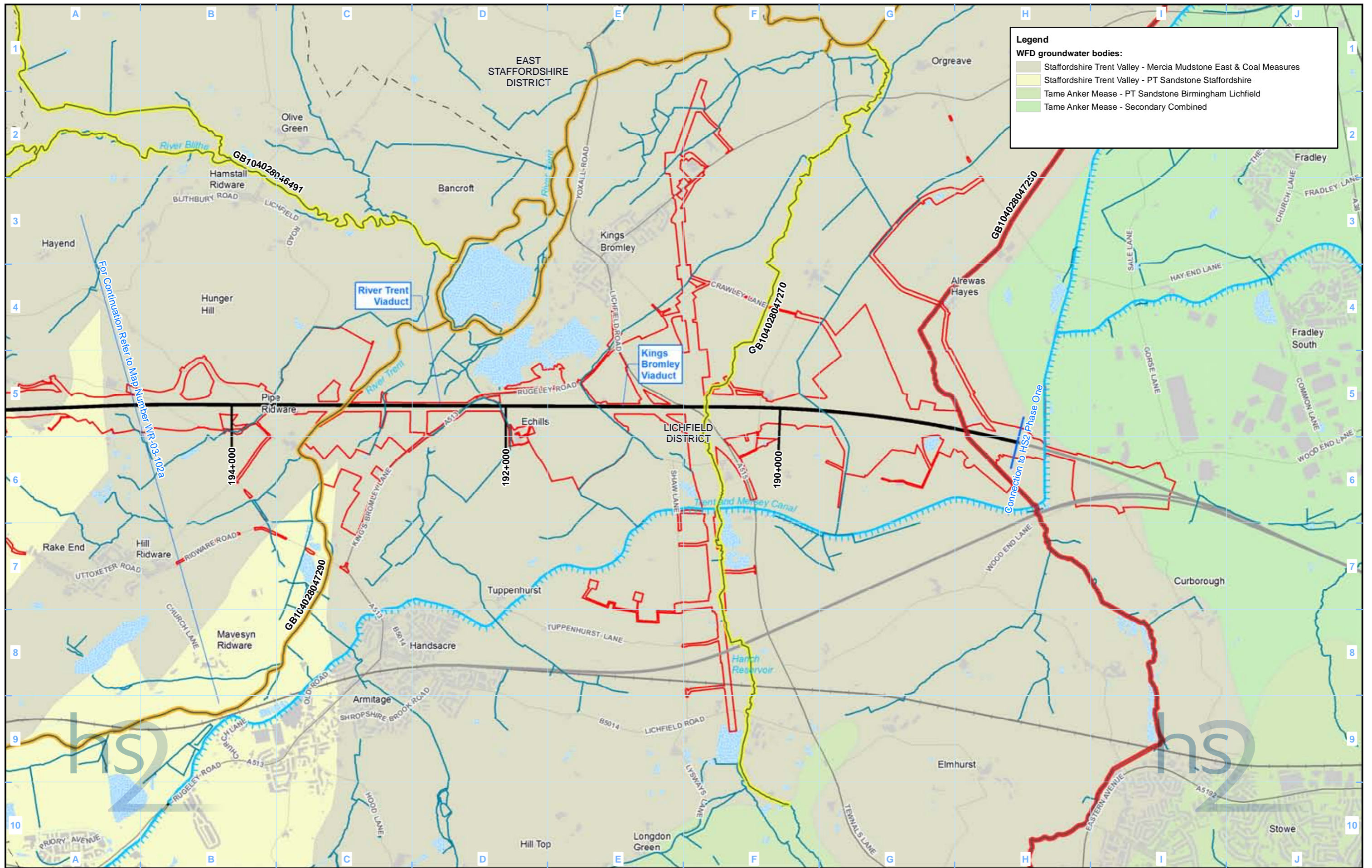
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Doc Number: C861-ARP-EV-MAP-000-151001-P04 **Date: 14/06/17**



Legend

WFD groundwater bodies:

- Staffordshire Trent Valley - Mercia Mudstone East & Coal Measures
- Staffordshire Trent Valley - PT Sandstone Staffordshire
- Tame Anker Mease - PT Sandstone Birmingham Lichfield
- Tame Anker Mease - Secondary Combined

Legend

- Route in tunnel
- Route on surface
- Depot, station, headhouse or portal building
- Land potentially required during construction
- Community area boundary
- County boundary
- District/Borough boundary
- Canal
- Canal tunnel
- Watercourse
- Culverted watercourse
- Open water

WFD Surface Water Bodies Overall Status Classification (2015 RBMP Cycle 2)

- Good
- Moderate
- Poor
- Bad

WFD Lakes Overall Status

- Good
- Moderate
- Poor
- Bad

Special Area of Conservation (SAC)

- Sites of Special Scientific Interest (SSSI)

Map Number: **WR-03-101**

Map Name: **Water Framework Directive**

Community Area 1:
Fradley to Colton

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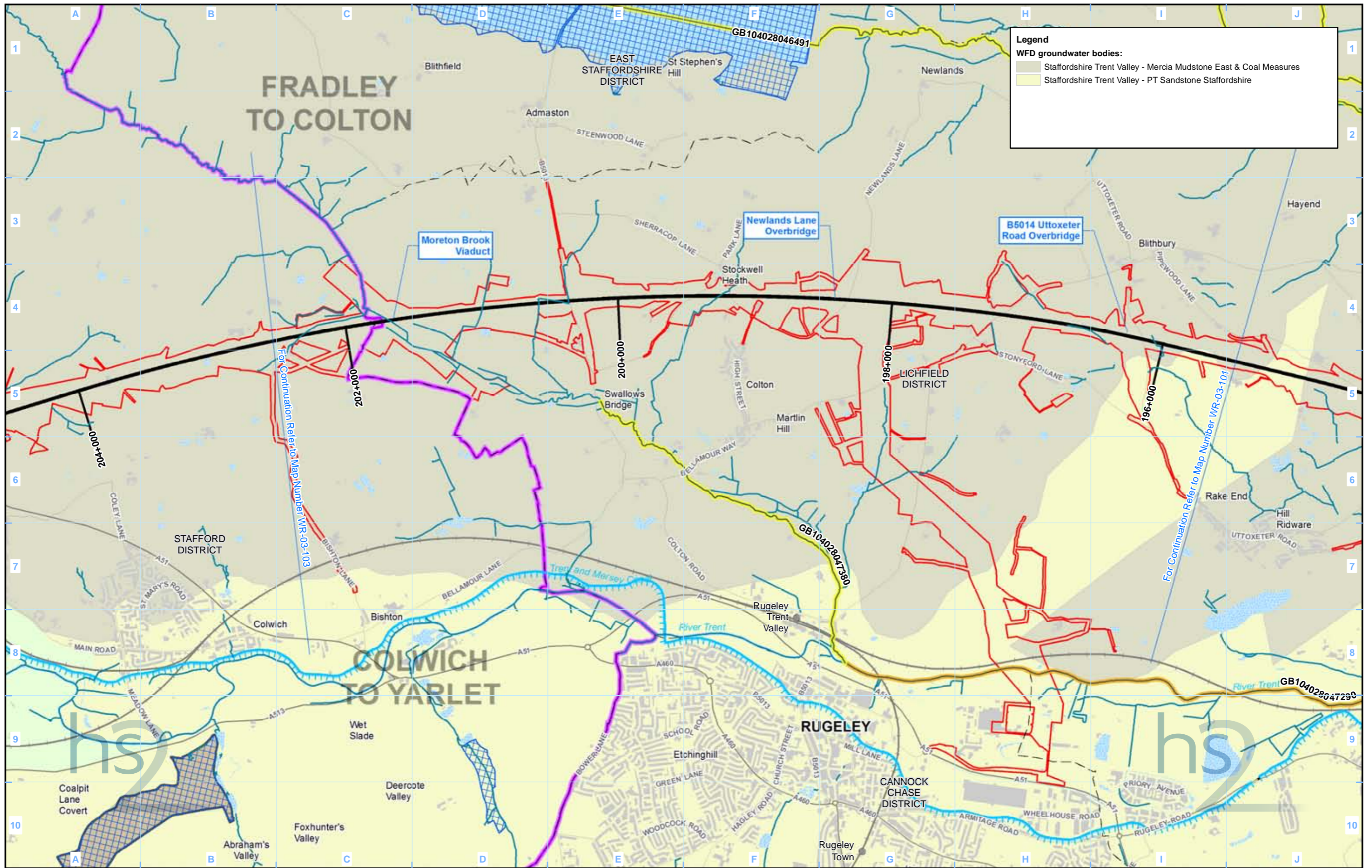
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Doc Number: C861-ARP-EV-MAP-000-153201-P04

Date: 14/06/17

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Legend

WFD groundwater bodies:

- Staffordshire Trent Valley - Mercia Mudstone East & Coal Measures
- Staffordshire Trent Valley - PT Sandstone Staffordshire

Legend

- Route in tunnel
- Route on surface
- Depot, station, headhouse or portal building
- Land potentially required during construction
- Community area boundary
- County boundary
- District/Borough boundary

WFD Surface Water Bodies

- Canal
- Canal tunnel
- Watercourse
- Culverted watercourse
- Open water

Overall Status Classification (2015 RBMP Cycle 2)

- Good
- Moderate
- Poor
- Bad

WFD Lakes

- Overall Status
- Good
- Moderate
- Poor
- Bad

Special Area of Conservation (SAC)

- Sites of Special Scientific Interest (SSSI)

Map Number: WR-03-102a

Map Name: Water Framework Directive

Community Area 1: Fradley to Colton

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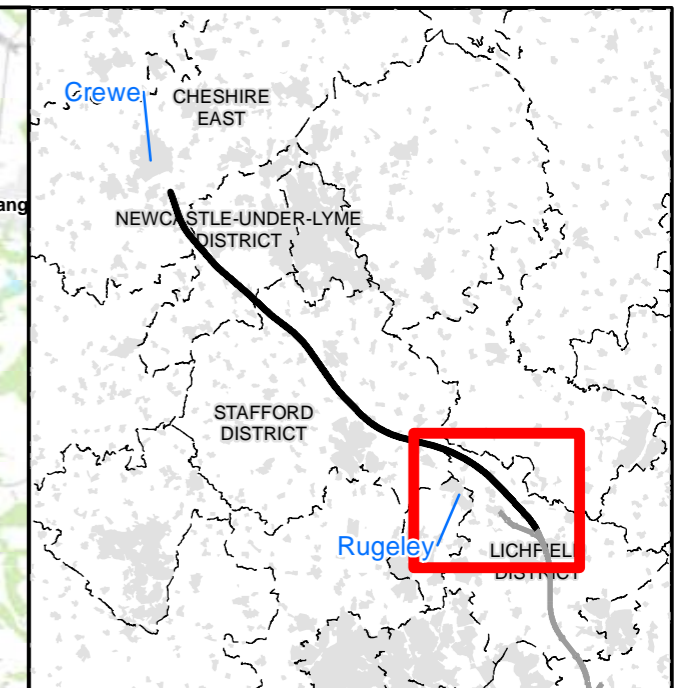
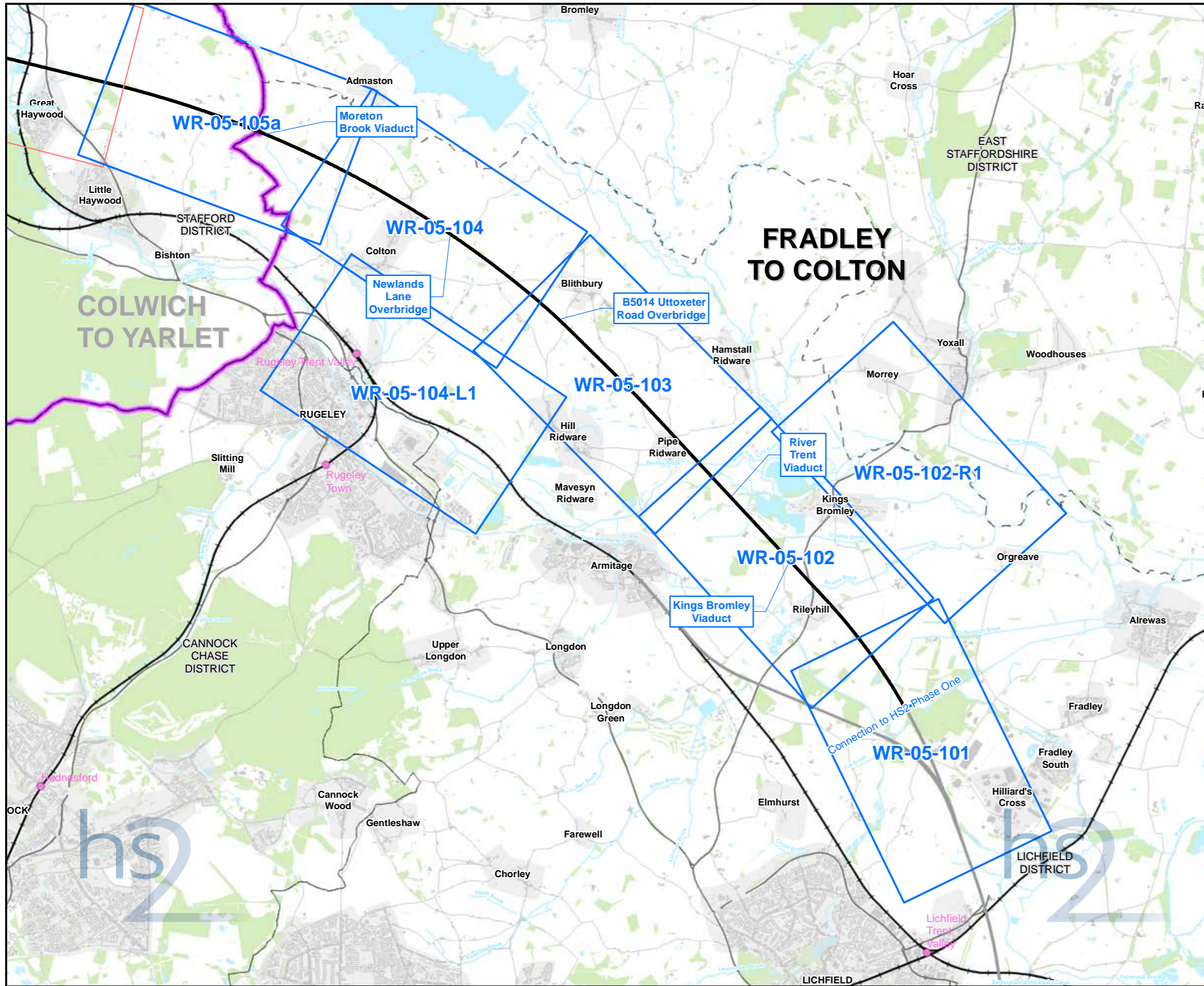
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Date: 14/06/17

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Metres

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Map Series Information:

The map shows the output from hydraulic modelling of specific crossing locations and the effect the scheme has on flood extent at 1 in 100 years inclusive of climate change (20%) return period.

Main Map Legend

- Route in tunnel
- Route on surface
- Depot, station, headhouse or portal building
- Community area boundary
- Existing railway station
- County boundary
- District/Borough boundary
- Map sheets included in this community area
- Map sheets not included in this community area

Map Number **WR-05-INDEX-CA1**

Map Name
**Index Map of:
 Modelled Baseline and Post Development Flood
 Extent 1 in 100 (1%+CC) including Climate Change
 Annual Probability of River Flooding**

Community Area 1:
Fradley to Colton

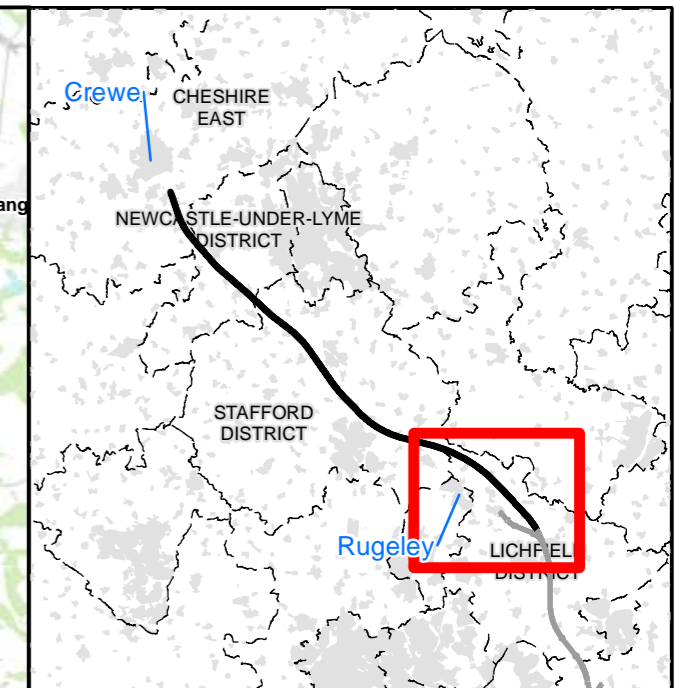
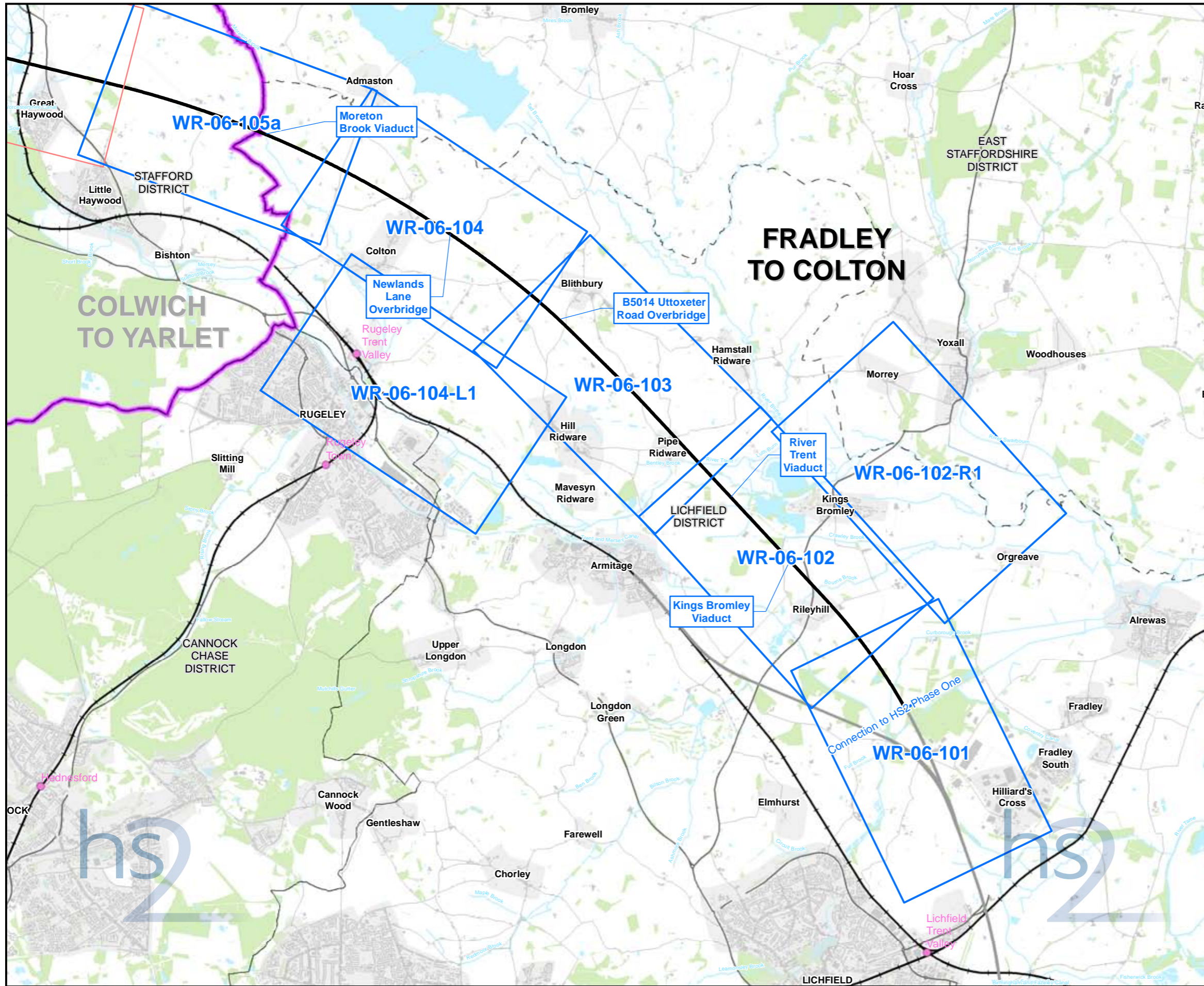
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Doc Number: C861-ARP-EV-MAP-000-155001-P04 **Date: 14/06/17**



Map Series Information:

The map shows the output from hydraulic modelling of specific crossing locations and the effect the scheme has on flood extent at 1 in 20 year return period.

- Main Map Legend**
- Route in tunnel
 - Route on surface
 - Depot, station, headhouse or portal building
 - Community area boundary
 - Existing railway station
 - County boundary
 - District/Borough boundary
 - Map sheets included in this community area
 - Map sheets not included in this community area

Map Number	WR-06-INDEX-CA1
Map Name	Index Map of: Modelled Baseline and Post Development Flood Extent 1 in 20 (5%) Annual Probability of River Flooding
Community Area 1: Fradley to Colton	

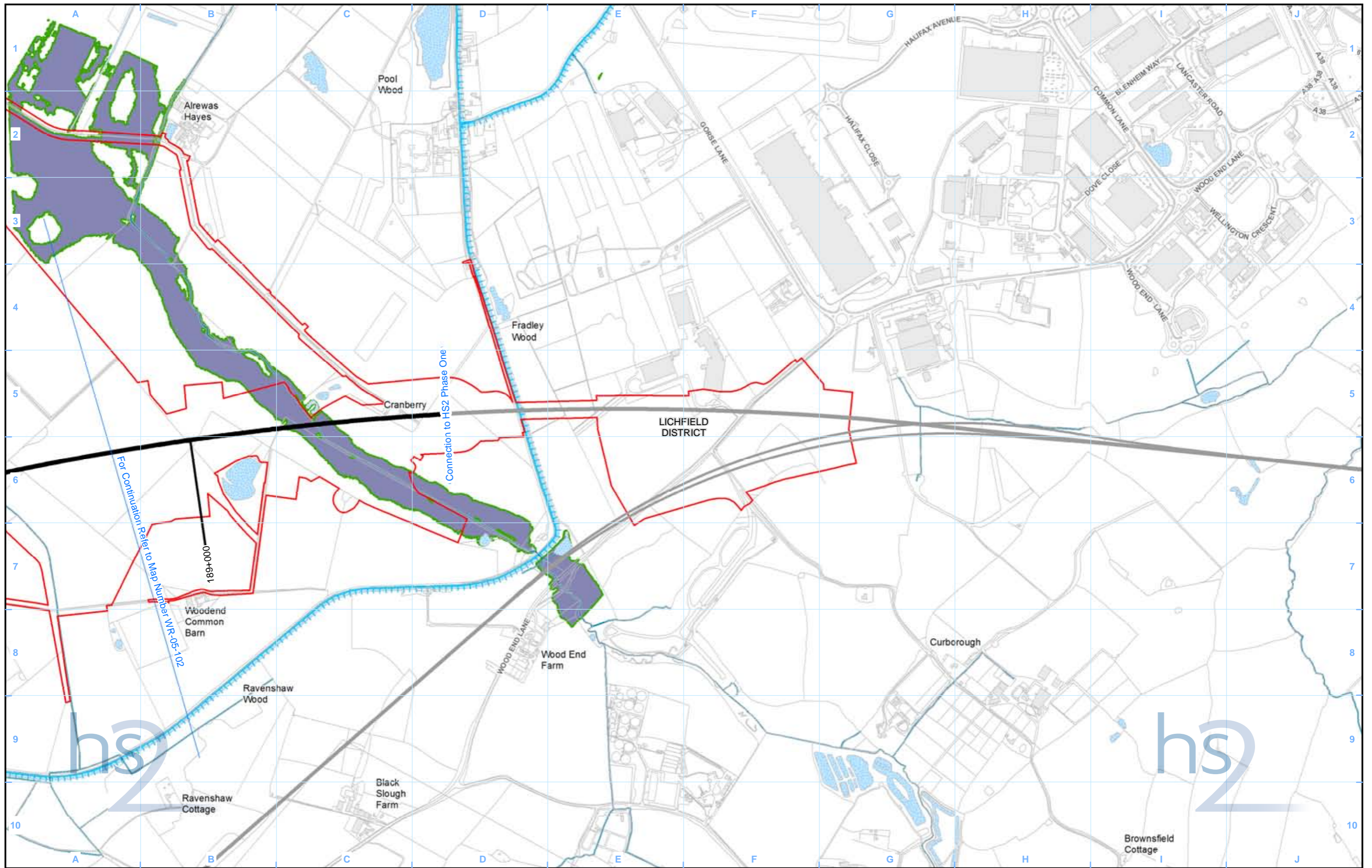
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- Legend**
- Route in tunnel
 - Route on surface
 - Depot, station, headhouse or portal building
 - Land potentially required during construction
 - Community area boundary
 - County boundary
 - District/Borough boundary
 - Watercourse
 - Culverted watercourse
 - Canal
 - Canal tunnel
 - Open water
 - Registered Park and Garden
 - Modelled Baseline Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding
 - Modelled Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding

Map Number: WR-05-101

Map Name: Modelled Baseline and Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding

Community Area 1: Fradley to Colton

Map Number: WR-05-101

Map Name: Modelled Baseline and Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding

Community Area 1: Fradley to Colton

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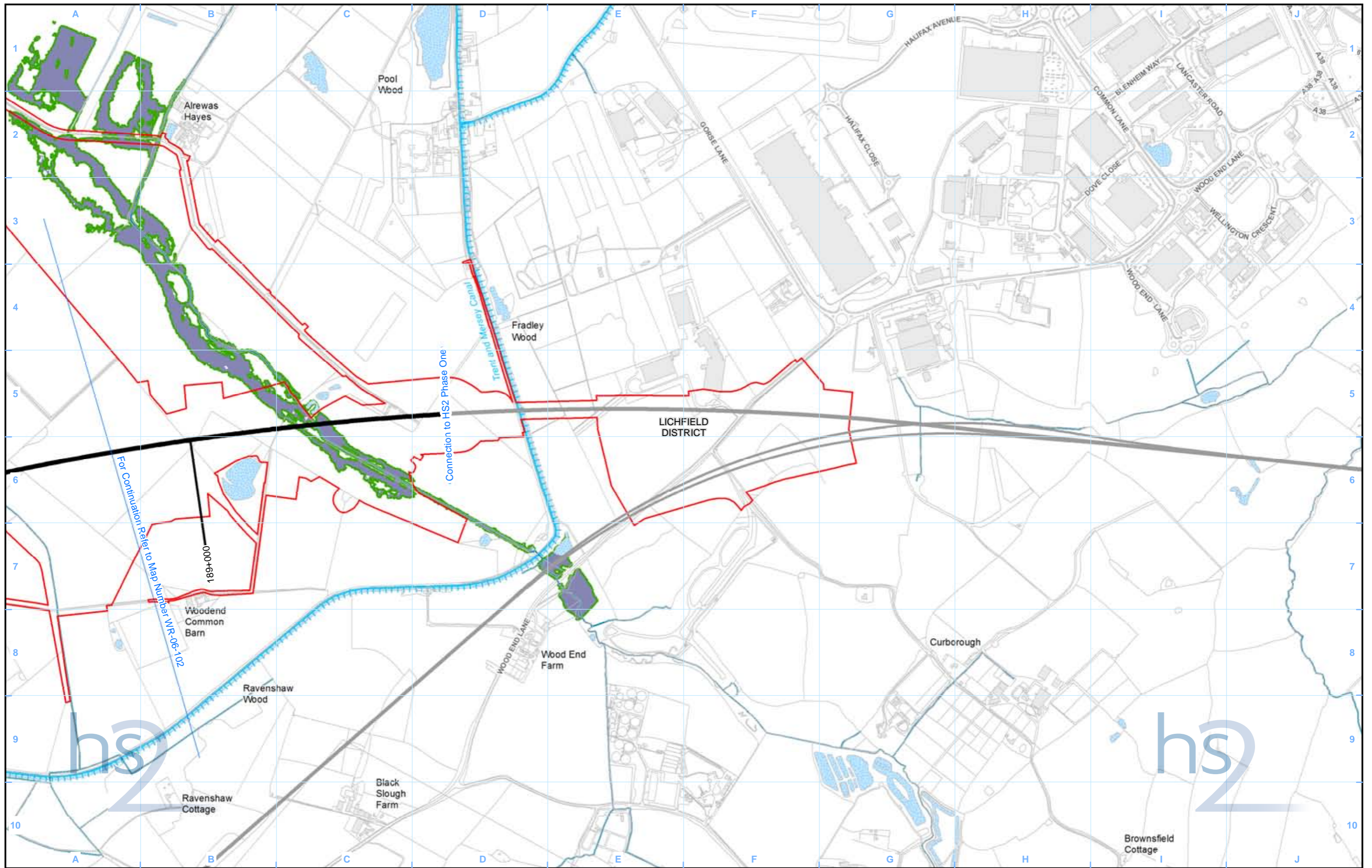
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Legend			
	Route in tunnel		District/Borough boundary
	Route on surface		Watercourse
	Depot, station, headhouse or portal building		Culverted watercourse
	Land potentially required during construction		Canal
	Community area boundary		Canal tunnel
	County boundary		Open water
			Modelled Baseline Flood Extent 1 in 20 (5%) Annual Probability of River Flooding
			Modelled Post Development Flood Extent 1 in 20 (5%) Annual Probability of River Flooding
			Registered Park and Garden

Map Number	WR-06-101
Map Name	Modelled Baseline and Post Development Flood Extent 1 in 20 (5%) Annual Probability of River Flooding
Community Area 1:	Fradley to Colton


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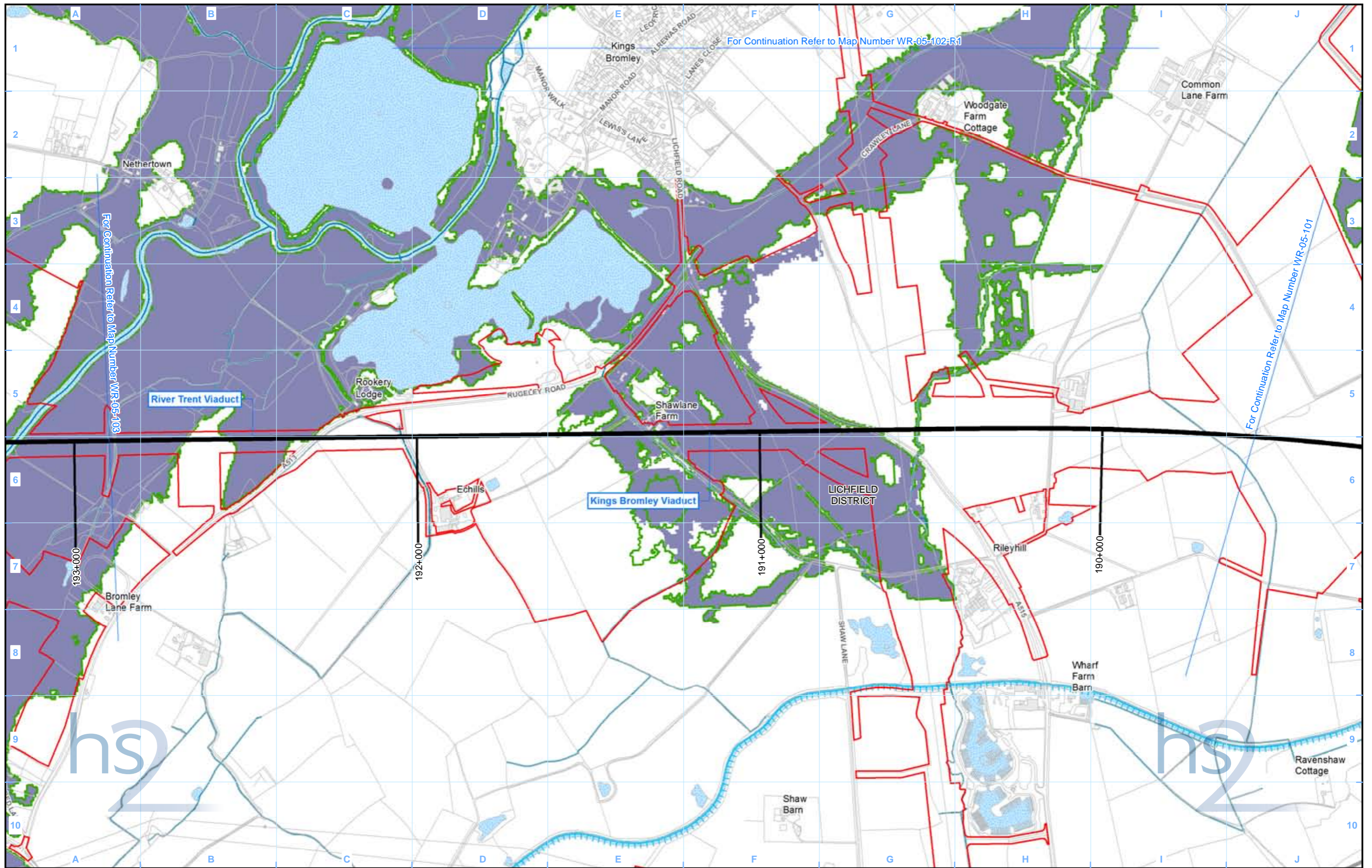
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- Legend**
- Route in tunnel
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 - Culverted watercourse
 - Canal
 - Canal tunnel
 - Open water
 - Registered Park and Garden

- Modelled Baseline Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding
- Modelled Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding

Map Number
WR-05-102

Map Name
Modelled Baseline and Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding

Community Area 1:
Fradley to Colton

hs2

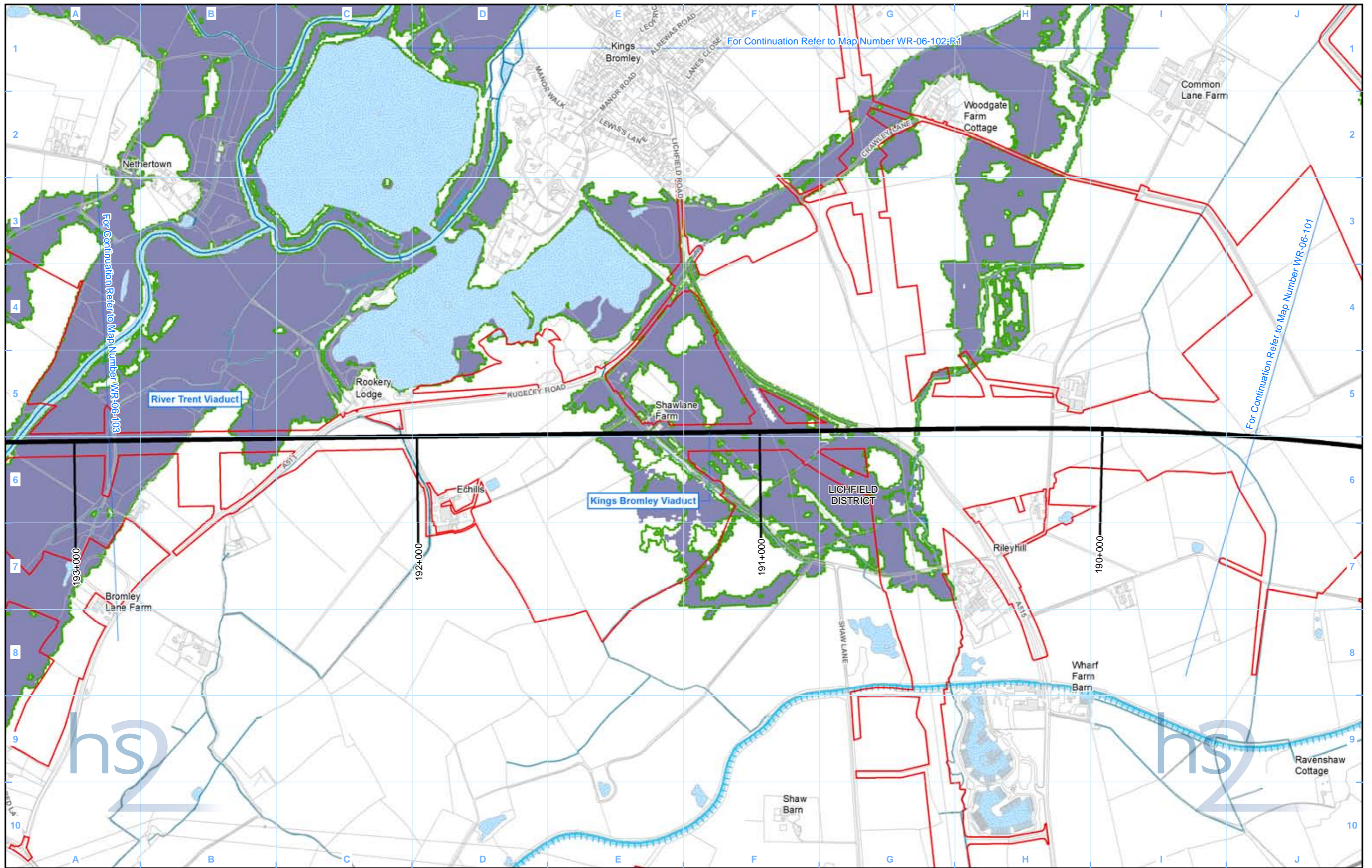
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Date: 14/06/17



Legend

Route in tunnel	District/Borough boundary	Modelled Baseline Flood Extent 1 in 20 (5%) Annual Probability of River Flooding
Route on surface	Watercourse	Modelled Post Development Flood Extent 1 in 20 (5%) Annual Probability of River Flooding
Depot, station, headhouse or portal building	Culverted watercourse	
Land potentially required during construction	Canal	
Community area boundary	Canal tunnel	
County boundary	Open water	
	Registered Park and Garden	

Map Number	WR-06-102
Map Name	Modelled Baseline and Post Development Flood Extent 1 in 20 (5%) Annual Probability of River Flooding
Community Area 1:	Fradley to Colton

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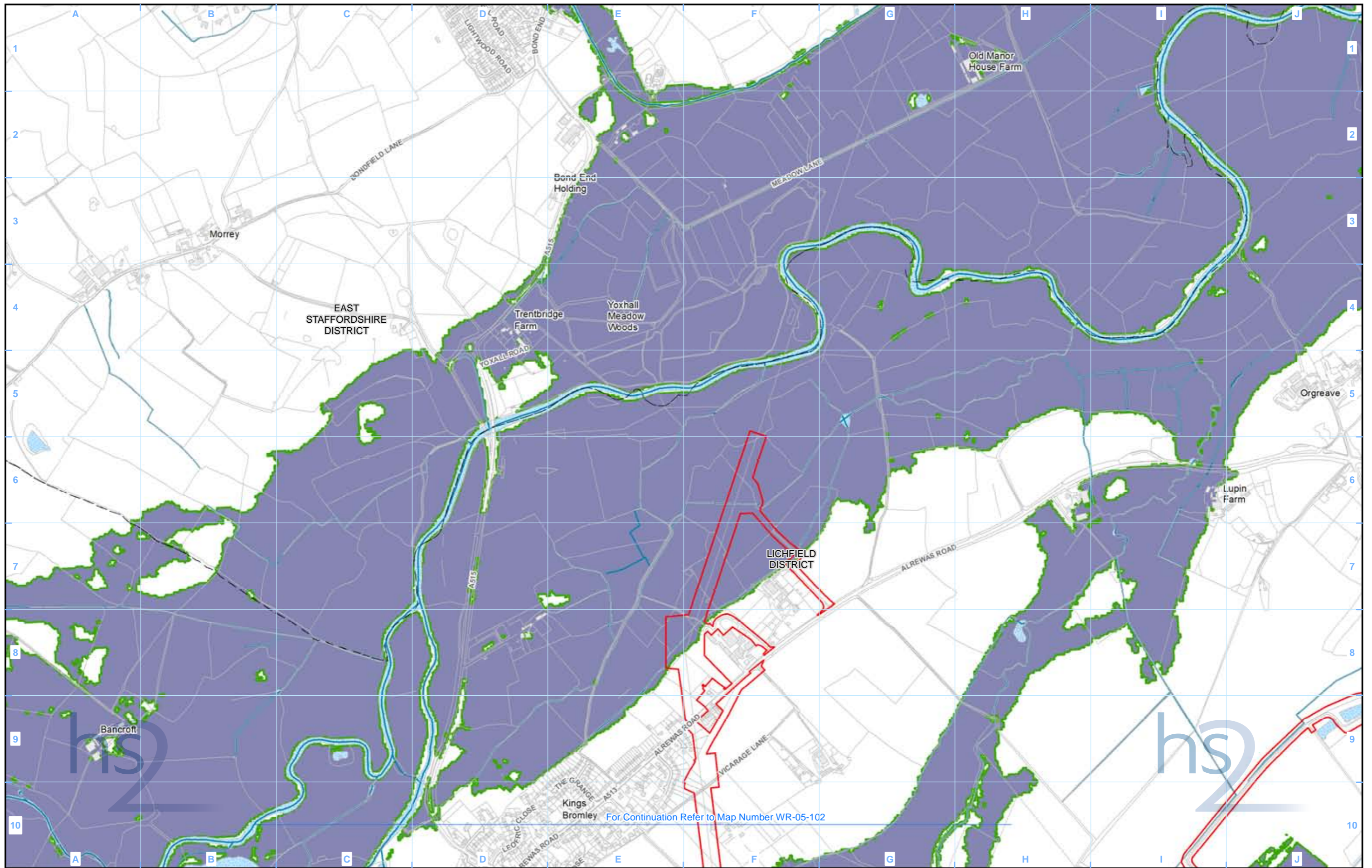
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Scale at A3: 1:10,000

Metres

Date: 14/06/17



- Legend**
- Route in tunnel
 - Route on surface
 - Depot, station, headhouse or portal building
 - Land potentially required during construction
 - Community area boundary
 - County boundary
 - District/Borough boundary
 - Watercourse
 - Culverted watercourse
 - Canal
 - Canal tunnel
 - Open water
 - Registered Park and Garden

Modelled Baseline Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding

Modelled Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding

For Continuation Refer to Map Number WR-05-102

Map Number **WR-05-102-R1**

Map Name **Modelled Baseline and Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding**

Community Area 1:
Fradley to Colton

hs2

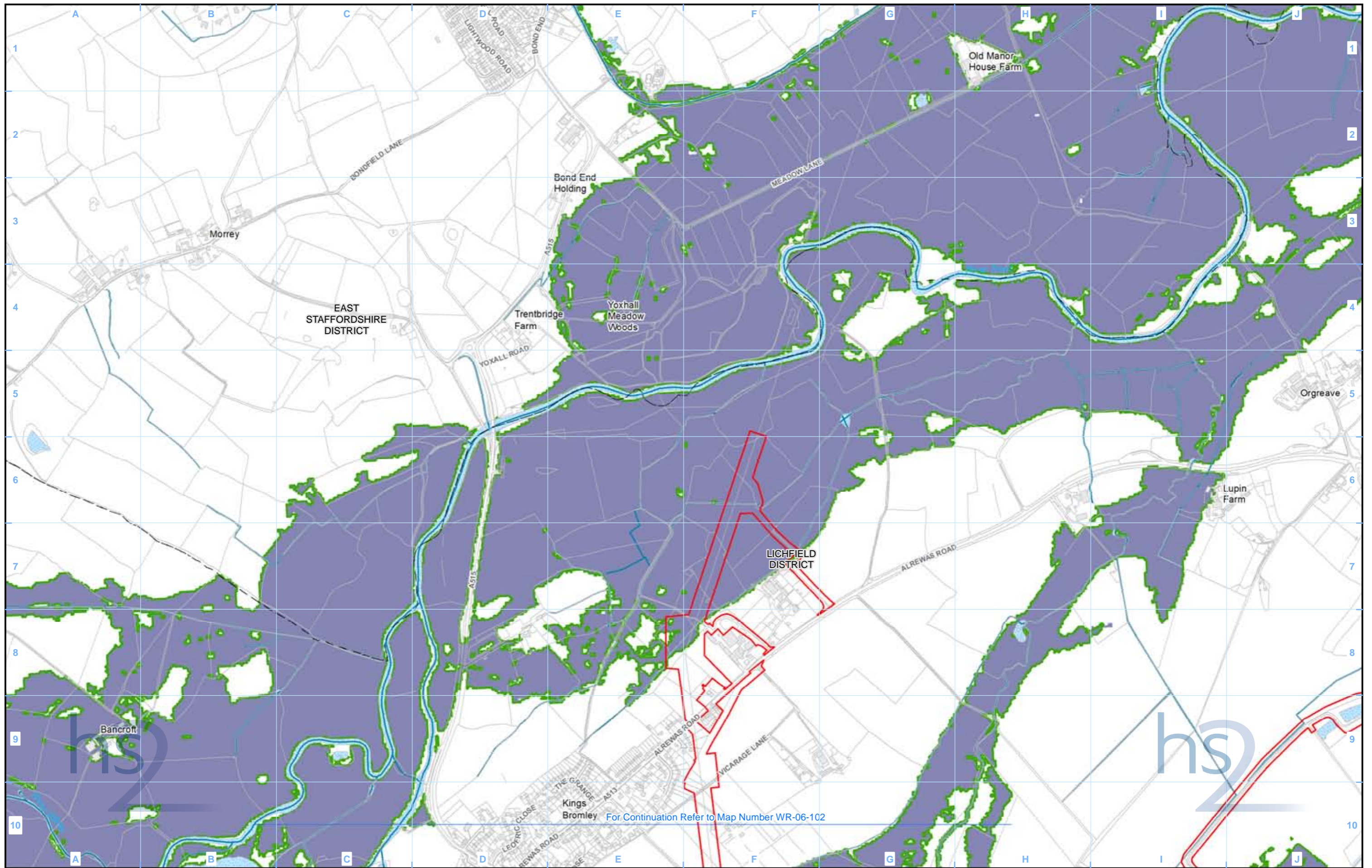
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Date: 14/06/17



Legend

Route in tunnel	District/Borough boundary	Modelled Baseline Flood Extent 1 in 20 (5%) Annual Probability of River Flooding
Route on surface	Watercourse	Modelled Post Development Flood Extent 1 in 20 (5%) Annual Probability of River Flooding
Depot, station, headhouse or portal building	Culverted watercourse	
Land potentially required during construction	Canal	
Community area boundary	Canal tunnel	
County boundary	Open water	
	Registered Park and Garden	

For Continuation Refer to Map Number WR-06-102

Map Number	WR-06-102-R1
Map Name	Modelled Baseline and Post Development Flood Extent 1 in 20 (5%) Annual Probability of River Flooding
Community Area 1:	Fradley to Colton

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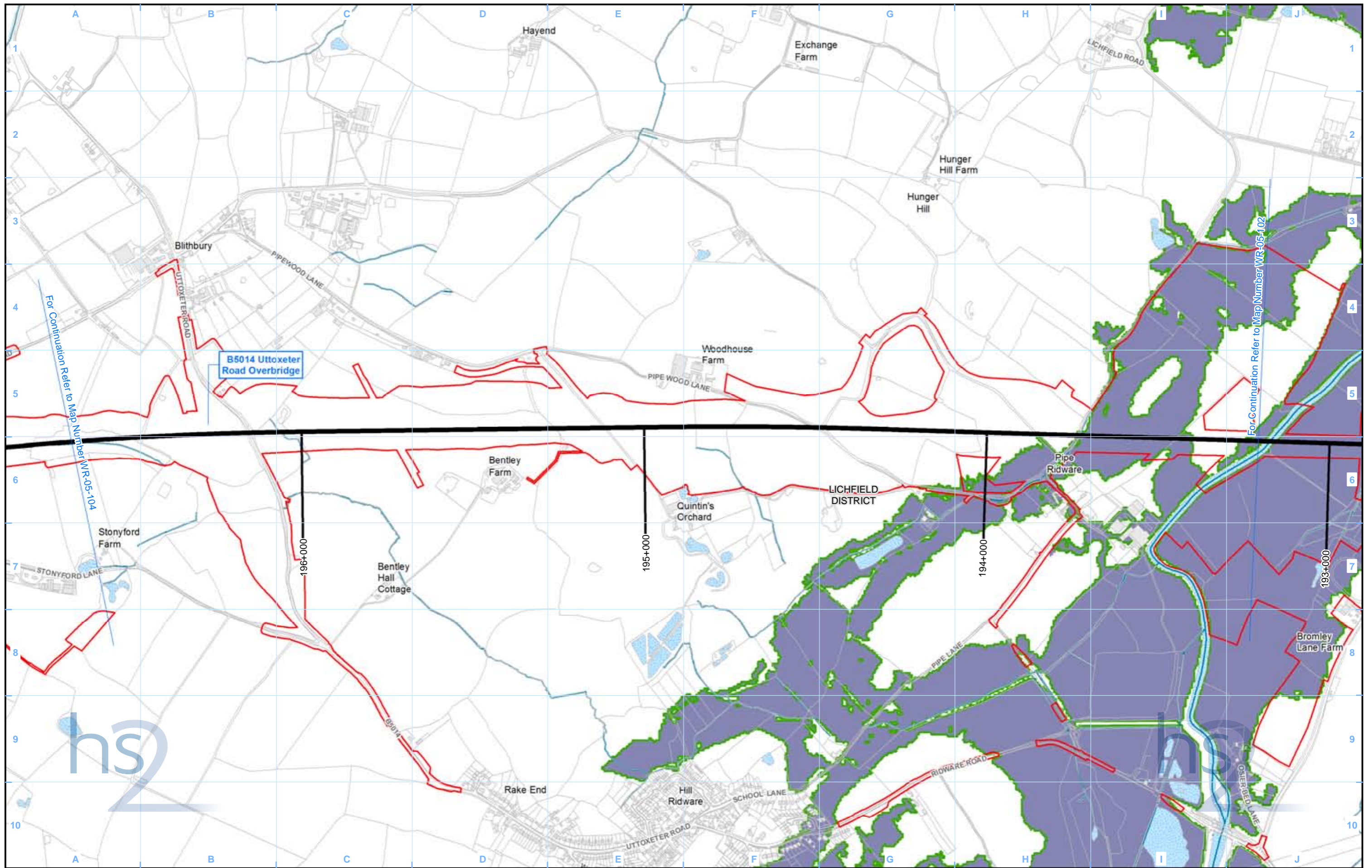
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Date: 14/06/17



Legend

Route in tunnel	District/Borough boundary	Modelled Baseline Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding
Route on surface	Watercourse	Modelled Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding
Depot, station, headhouse or portal building	Culverted watercourse	
Land potentially required during construction	Canal	
Community area boundary	Canal tunnel	
County boundary	Open water	
	Registered Park and Garden	

Map Number	WR-05-103
Map Name	Modelled Baseline and Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding
Community Area 1:	Fradley to Colton

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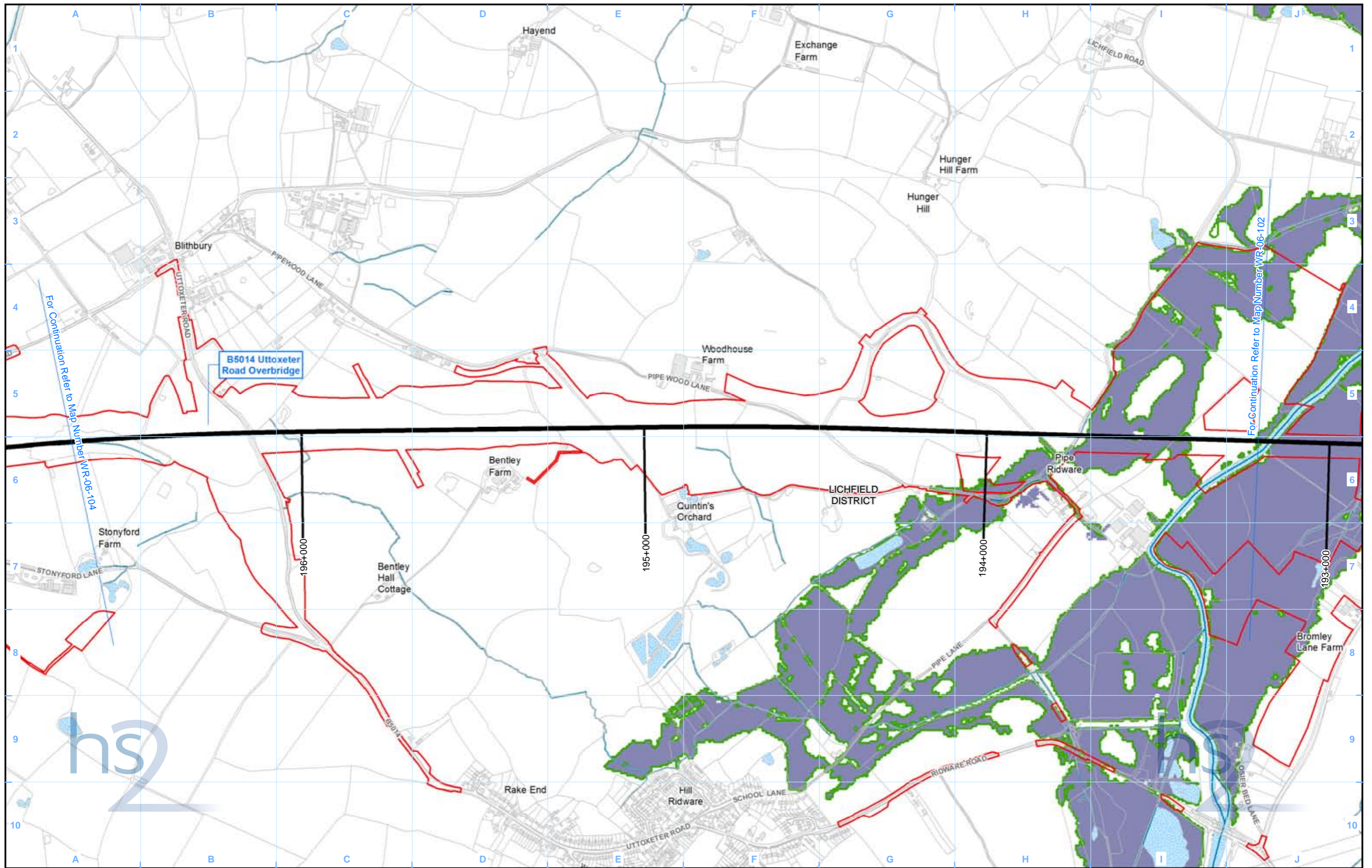
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Scale at A3: 1:10,000

Metres

Date: 14/06/17



- Legend**
- Route in tunnel
 - Route on surface
 - ▭ Depot, station, headhouse or portal building
 - ▭ Land potentially required during construction
 - ▭ Community area boundary
 - ▭ County boundary
 - ▭ District/Borough boundary
 - Watercourse
 - Culverted watercourse
 - Canal
 - Canal tunnel
 - ▭ Open water
 - ▭ Registered Park and Garden
 - ▭ Modelled Baseline Flood Extent 1 in 20 (5%) Annual Probability of River Flooding
 - ▭ Modelled Post Development Flood Extent 1 in 20 (5%) Annual Probability of River Flooding

Map Number: **WR-06-103**

Map Name: **Modelled Baseline and Post Development Flood Extent 1 in 20 (5%) Annual Probability of River Flooding**

Community Area 1: **Fradley to Colton**

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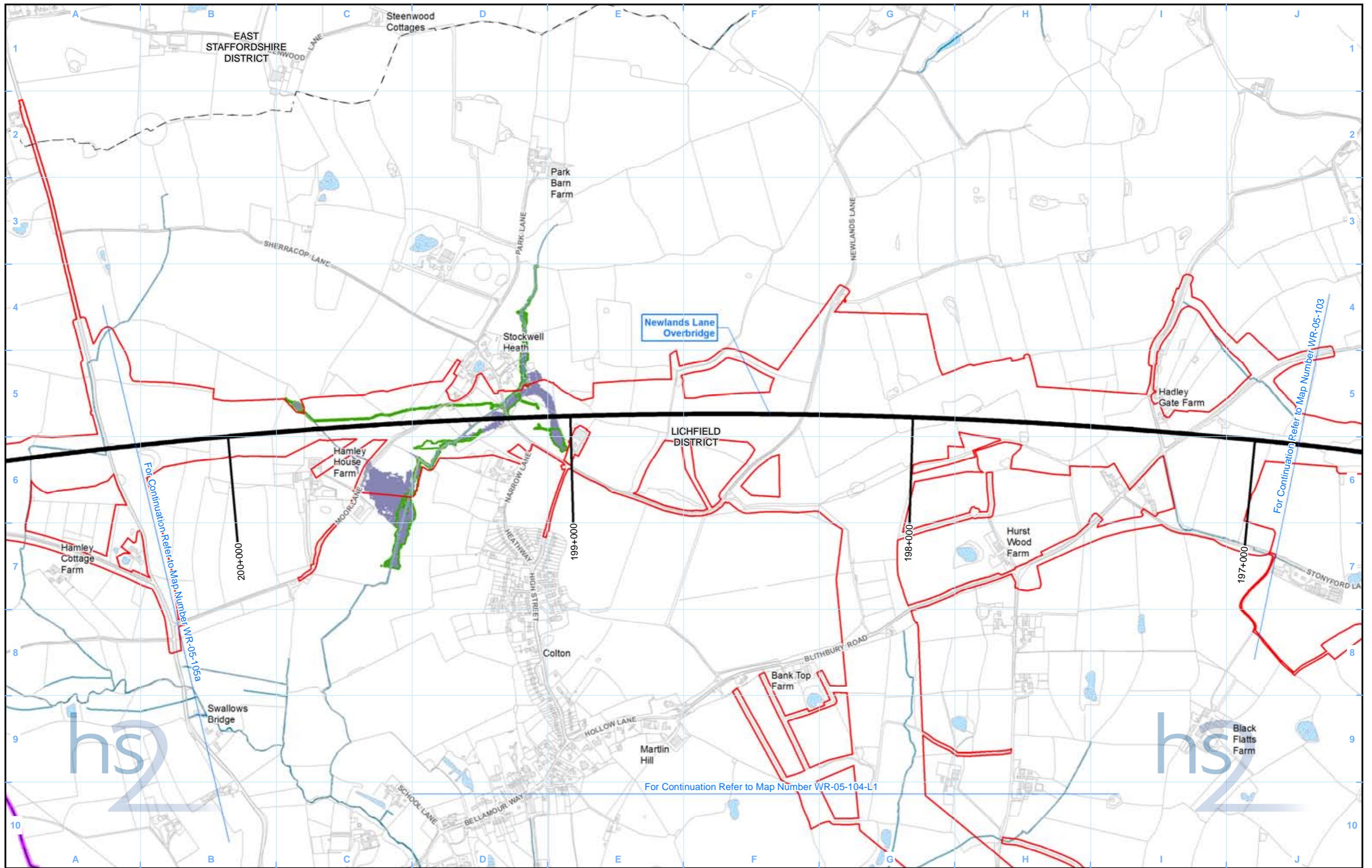
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0 100 200 300 400 Metres

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Doc Number: C861-ARP-EV-MAP-000-156203-P04

Date: 14/06/17



Legend	
	Route in tunnel
	Route on surface
	Depot, station, headhouse or portal building
	Land potentially required during construction
	Community area boundary
	County boundary
	District/Borough boundary
	Watercourse
	Culverted watercourse
	Canal
	Canal tunnel
	Open water
	Registered Park and Garden
	Modelled Baseline Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding
	Modelled Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding

Map Number	WR-05-104
Map Name	Modelled Baseline and Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding
Community Area 1:	Fradley to Colton


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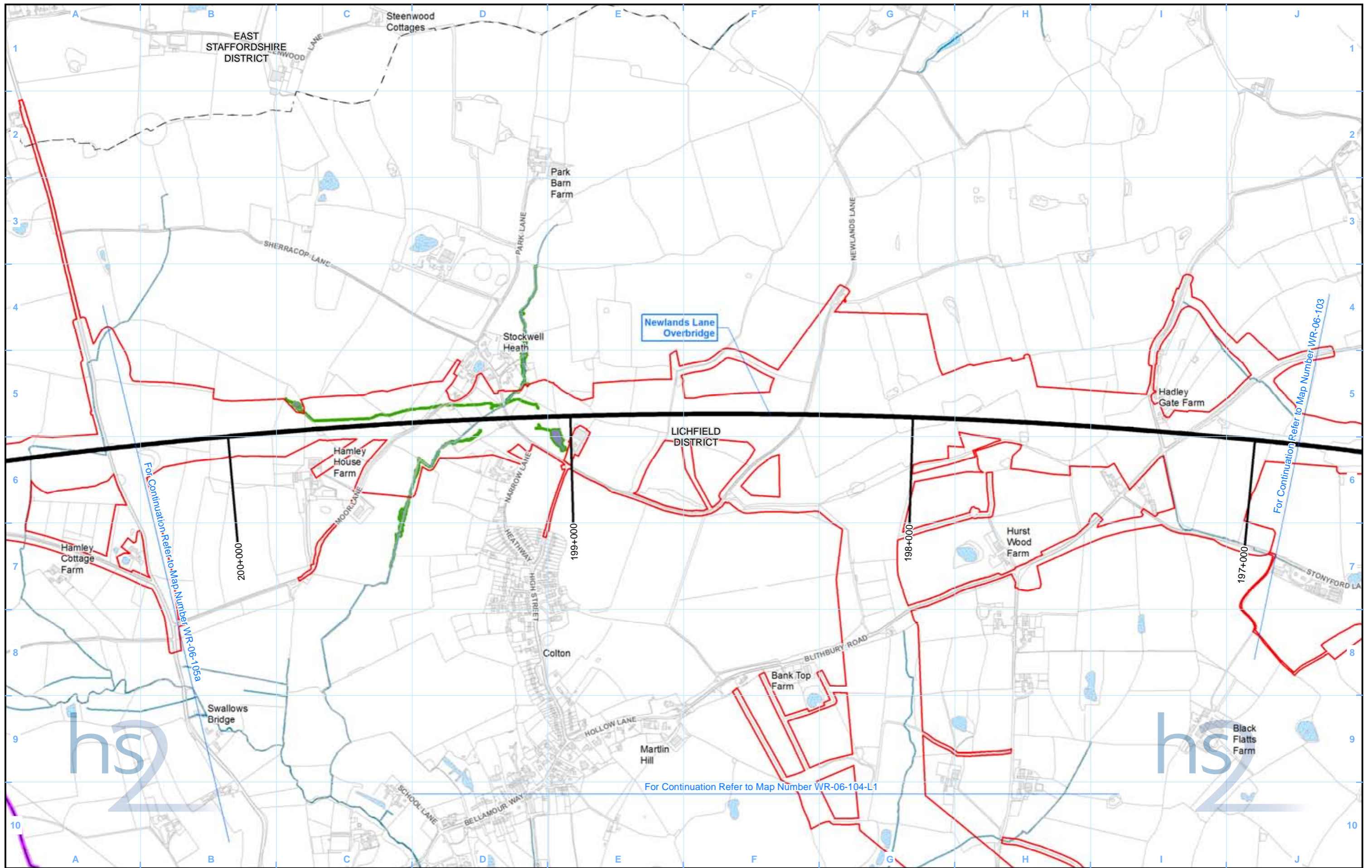
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- Legend**
- Route in tunnel
 - Route on surface
 - Depot, station, headhouse or portal building
 - Land potentially required during construction
 - Community area boundary
 - County boundary
 - District/Borough boundary
 - Watercourse
 - Culverted watercourse
 - Canal
 - Canal tunnel
 - Open water
 - Registered Park and Garden
 - Modelled Baseline Flood Extent 1 in 20 (5%) Annual Probability of River Flooding
 - Modelled Post Development Flood Extent 1 in 20 (5%) Annual Probability of River Flooding

Map Number
WR-06-104

Map Name
Modelled Baseline and Post Development Flood Extent 1 in 20 (5%) Annual Probability of River Flooding

Community Area 1:
Fradley to Colton

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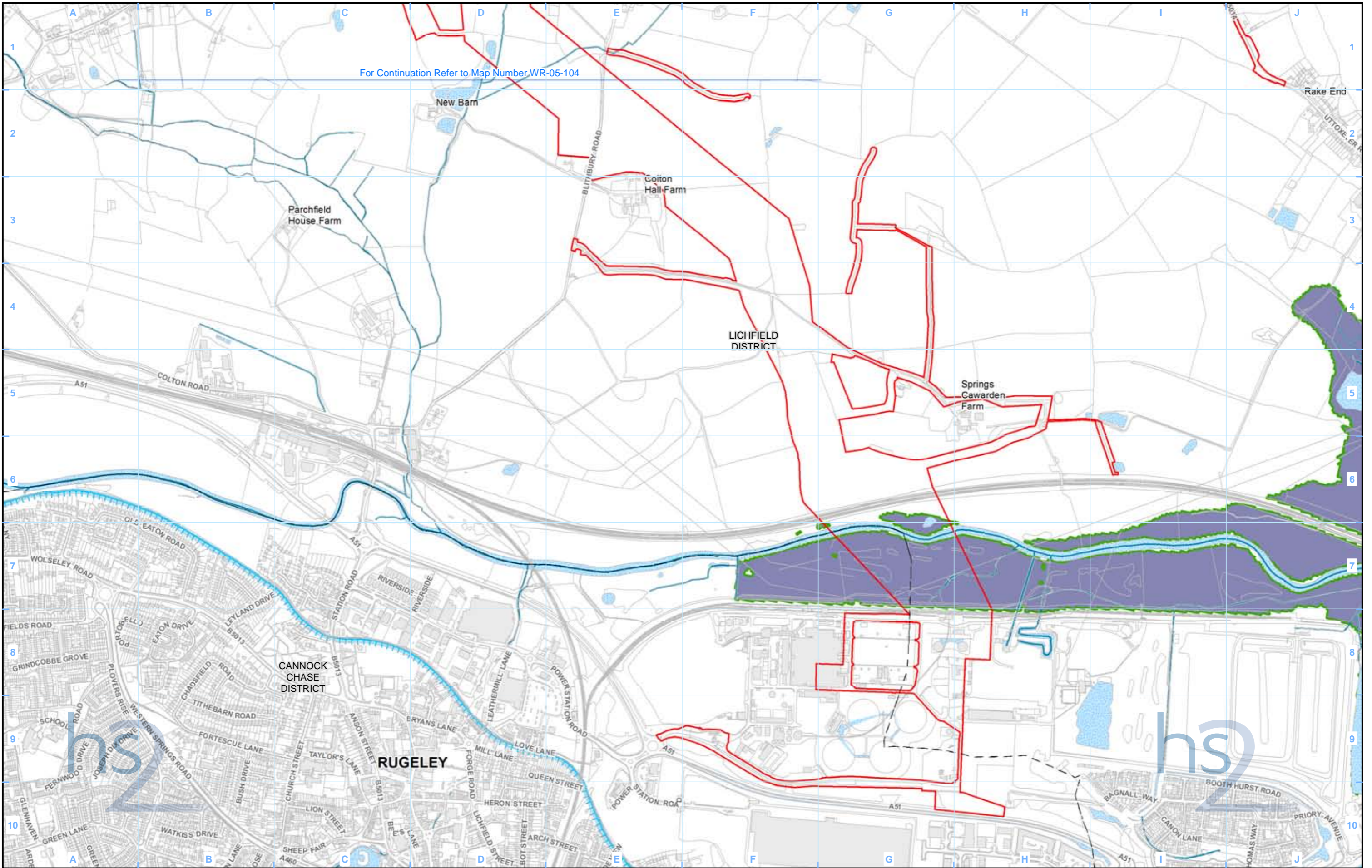
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For Continuation Refer to Map Number WR-05-104



- Legend**
- Route in tunnel
 - Route on surface
 - Depot, station, headhouse or portal building
 - Land potentially required during construction
 - Community area boundary
 - County boundary
 - District/Borough boundary
 - Watercourse
 - Culverted watercourse
 - Canal
 - Canal tunnel
 - Open water
 - Registered Park and Garden

- Modelled Baseline Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding
- Modelled Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding

Map Number **WR-05-104-L1**

Map Name
Modelled Baseline and Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding

Community Area 1:
Fradley to Colton

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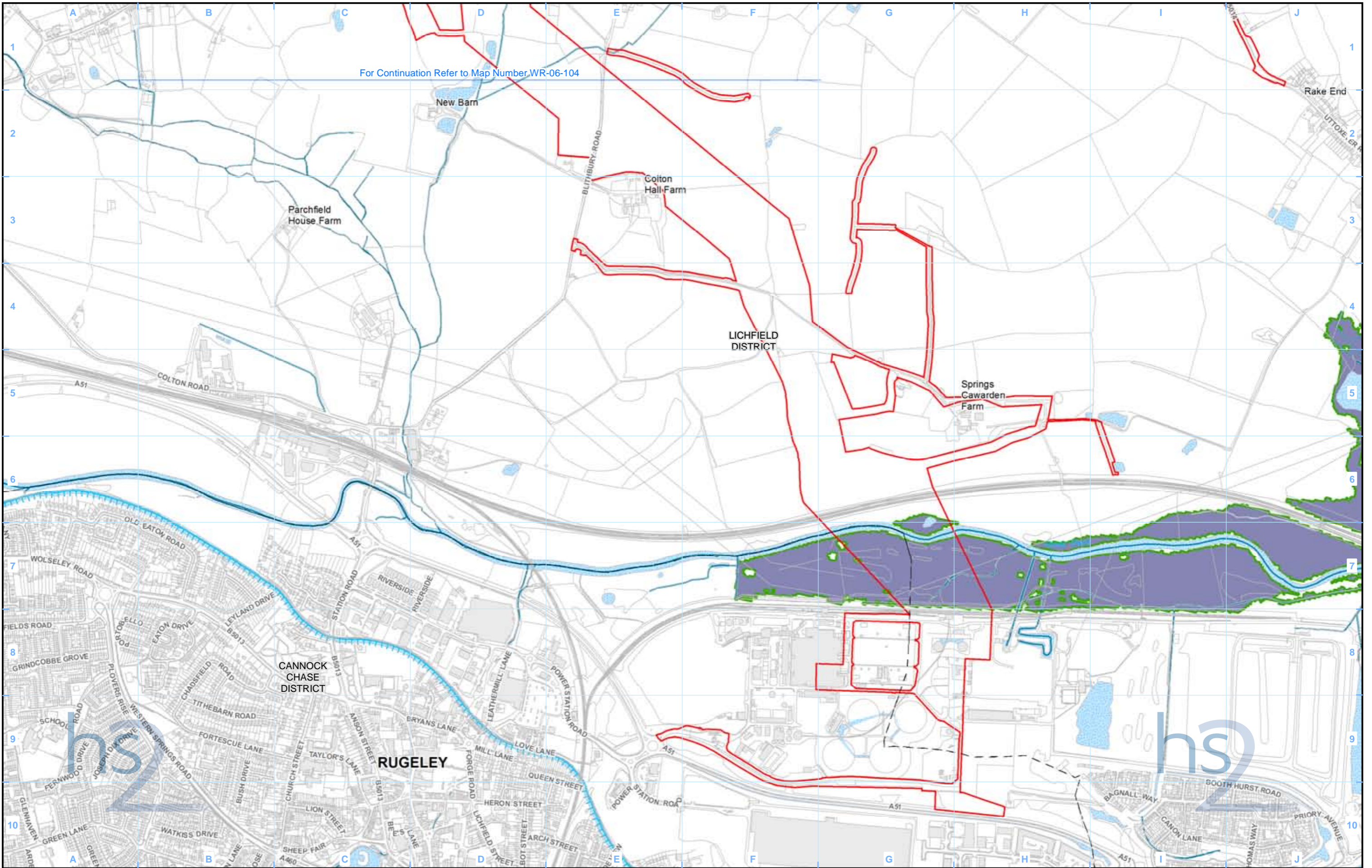
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Date: 14/06/17

For Continuation Refer to Map Number WR-06-104



- Legend**
- Route in tunnel
 - Route on surface
 - Depot, station, headhouse or portal building
 - Land potentially required during construction
 - Community area boundary
 - County boundary
 - District/Borough boundary
 - Watercourse
 - Culverted watercourse
 - Canal
 - Canal tunnel
 - Open water
 - Registered Park and Garden
 - Modelled Baseline Flood Extent 1 in 20 (5%) Annual Probability of River Flooding
 - Modelled Post Development Flood Extent 1 in 20 (5%) Annual Probability of River Flooding

Map Number **WR-06-104-L1**

Map Name
Modelled Baseline and Post Development Flood Extent 1 in 20 (5%) Annual Probability of River Flooding

Community Area 1:
Fradley to Colton

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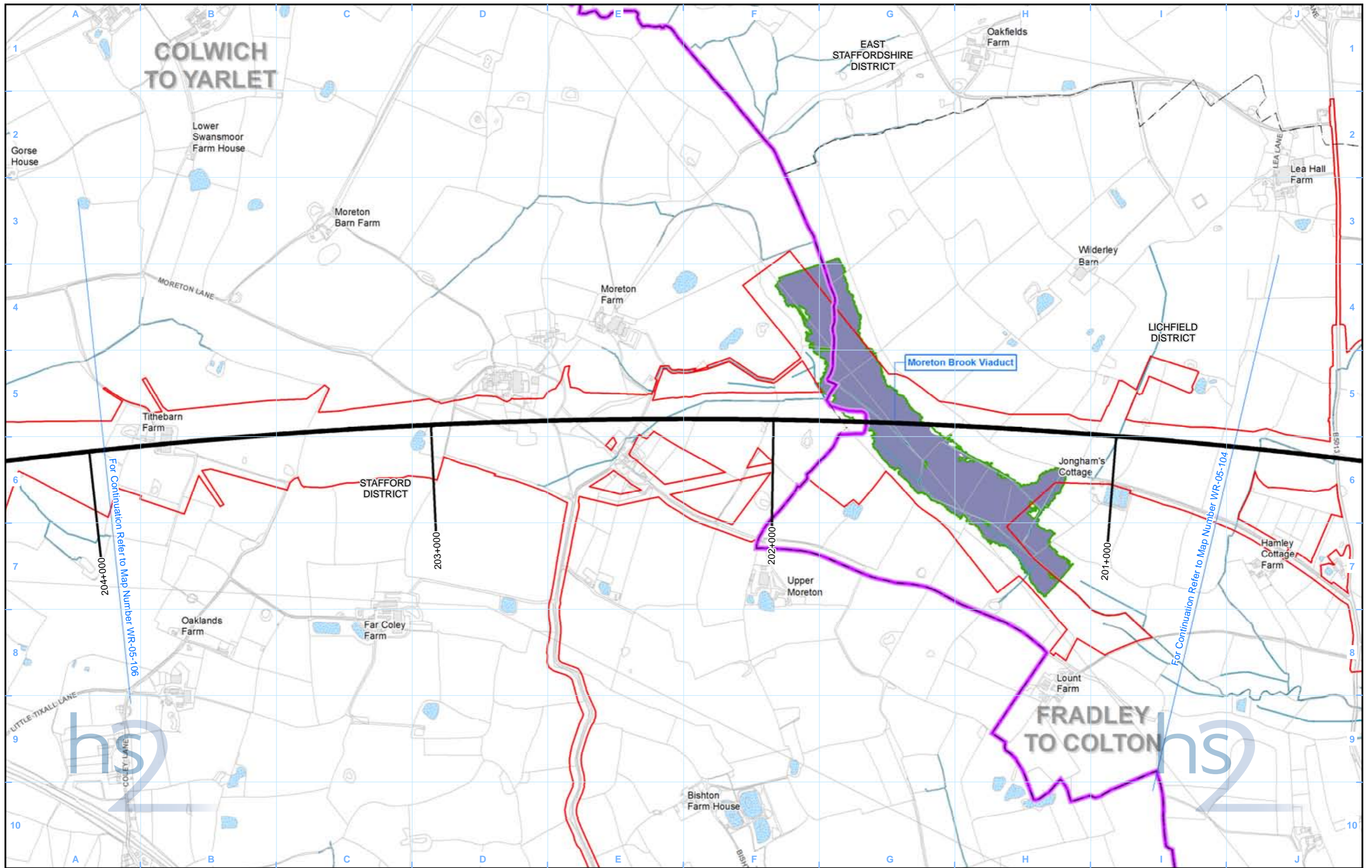
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- Legend**
- Route in tunnel
 - Route on surface
 - Depot, station, headhouse or portal building
 - Land potentially required during construction
 - Community area boundary
 - County boundary
 - District/Borough boundary
 - Watercourse
 - Culverted watercourse
 - Canal
 - Canal tunnel
 - Open water
 - Registered Park and Garden
 - Modelled Baseline Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding
 - Modelled Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding

Map Number: WR-05-105a

Map Name: Modelled Baseline and Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding

Community Area 1: Fradley to Colton

Map Number: WR-05-105a

Map Name: Modelled Baseline and Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding

Community Area 1: Fradley to Colton

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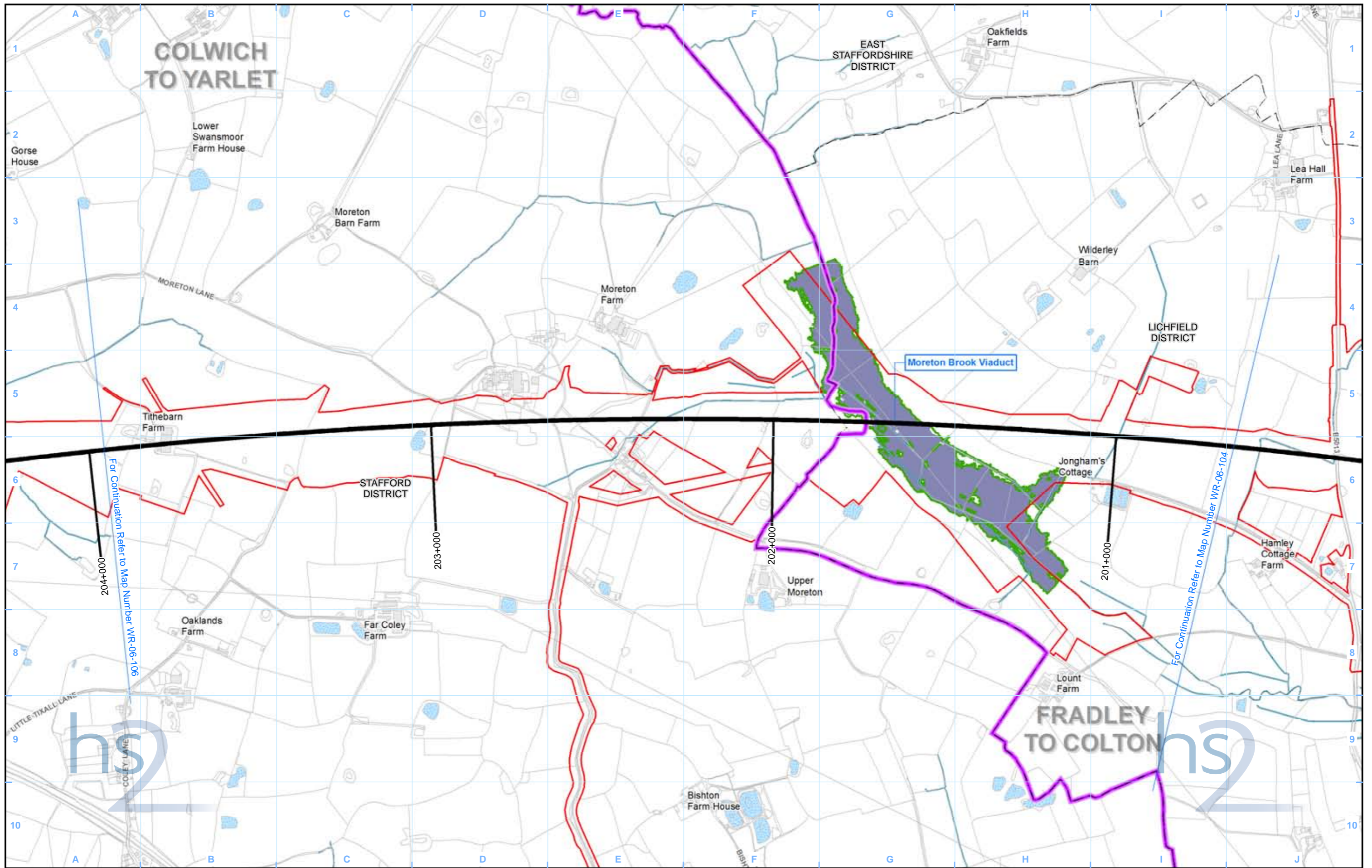
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- Legend**
- Route in tunnel
 - Route on surface
 - Depot, station, headhouse or portal building
 - Land potentially required during construction
 - Community area boundary
 - County boundary
 - District/Borough boundary
 - Watercourse
 - Culverted watercourse
 - Canal
 - Canal tunnel
 - Open water
 - Registered Park and Garden
 - Modelled Baseline Flood Extent 1 in 20 (5%) Annual Probability of River Flooding
 - Modelled Post Development Flood Extent 1 in 20 (5%) Annual Probability of River Flooding

Map Number: **WR-06-105a**

Map Name: **Modelled Baseline and Post Development Flood Extent 1 in 20 (5%) Annual Probability of River Flooding**

Community Area 1:
Fradley to Colton

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High Speed Rail (West Midlands-Crewe)

Environmental Statement

CA2 Colwich to Yarlet

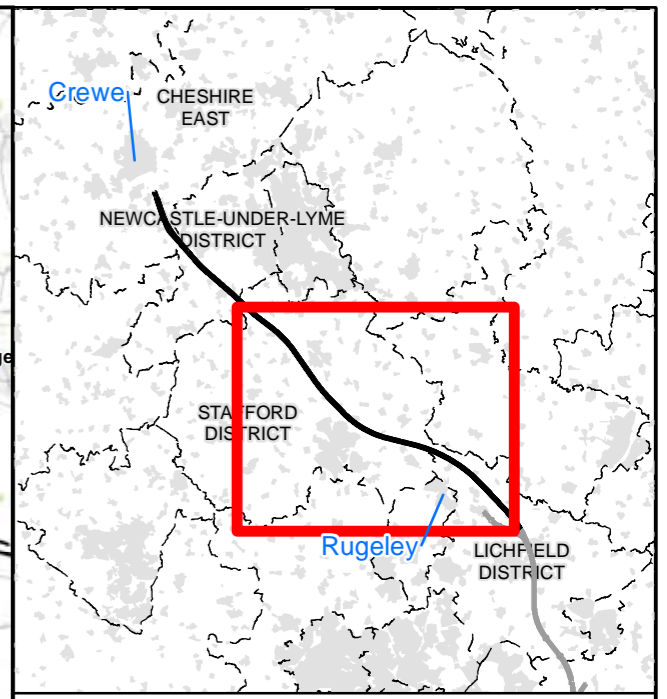
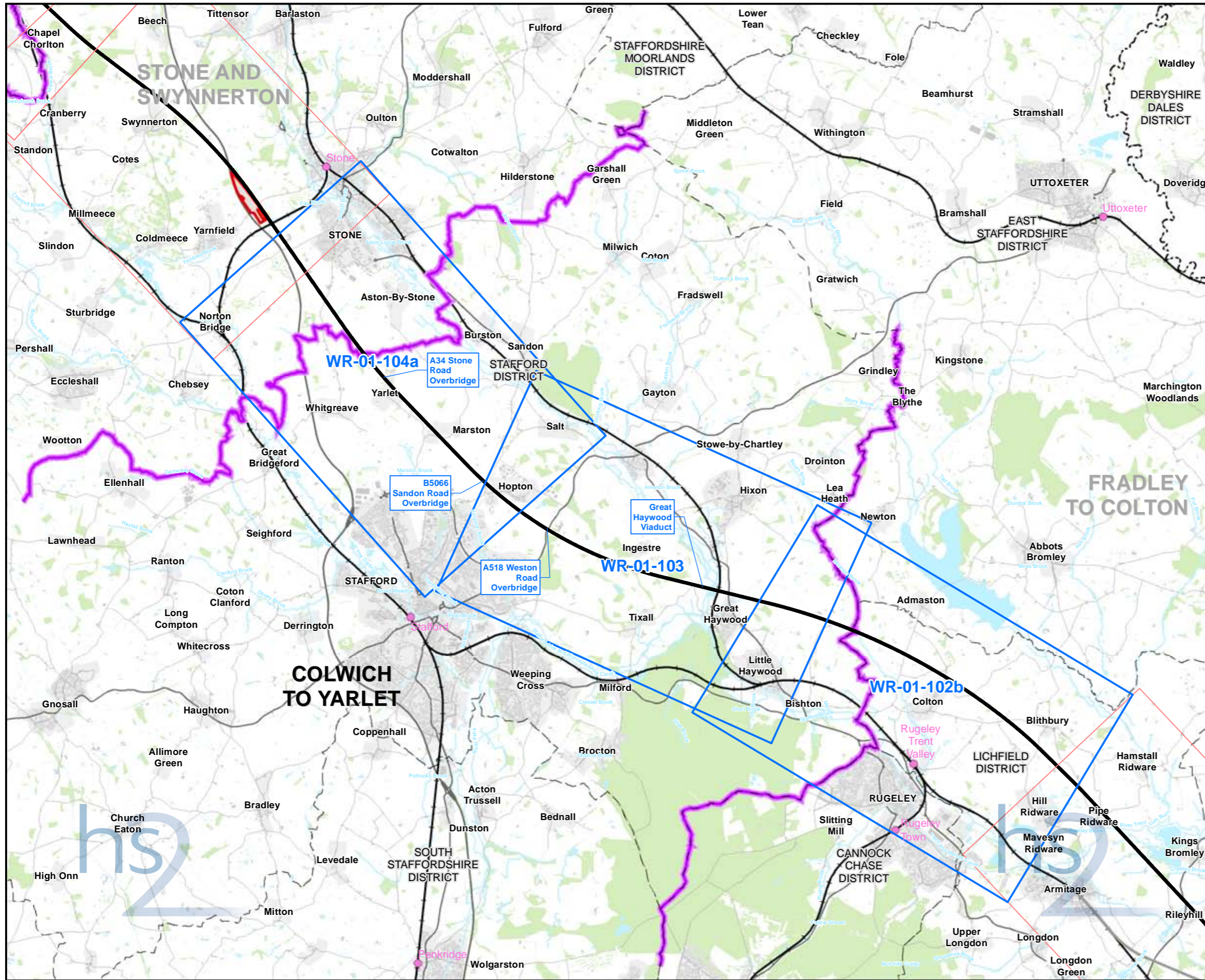
WR-01 - Surface Water Baseline

WR-02 - Groundwater Baseline

WR-03 - Water Framework Directive

**WR-05 - Modelled Baseline and Post Development Flood
Extent 1 in 100 (1%+CC) including Climate Change
Annual Probability of River Flooding**

**WR-06 - Modelled Baseline and Post Development Flood
Extent 1 in 20 (5%) Annual Probability of River Flooding**



Map Series Information:

This map series shows surface water features such as rivers, streams, ponds, canals and reservoirs, flood zones, and surface water abstractions as referred to in the ES.

All points where the alignment crosses a watercourse are also shown and labelled with their reference in the text. These are shown as "Surface Water Crossings (SWC)".

The design of the Proposed Scheme will be informed through stakeholder engagement and further engineering and environmental studies

Main Map Legend

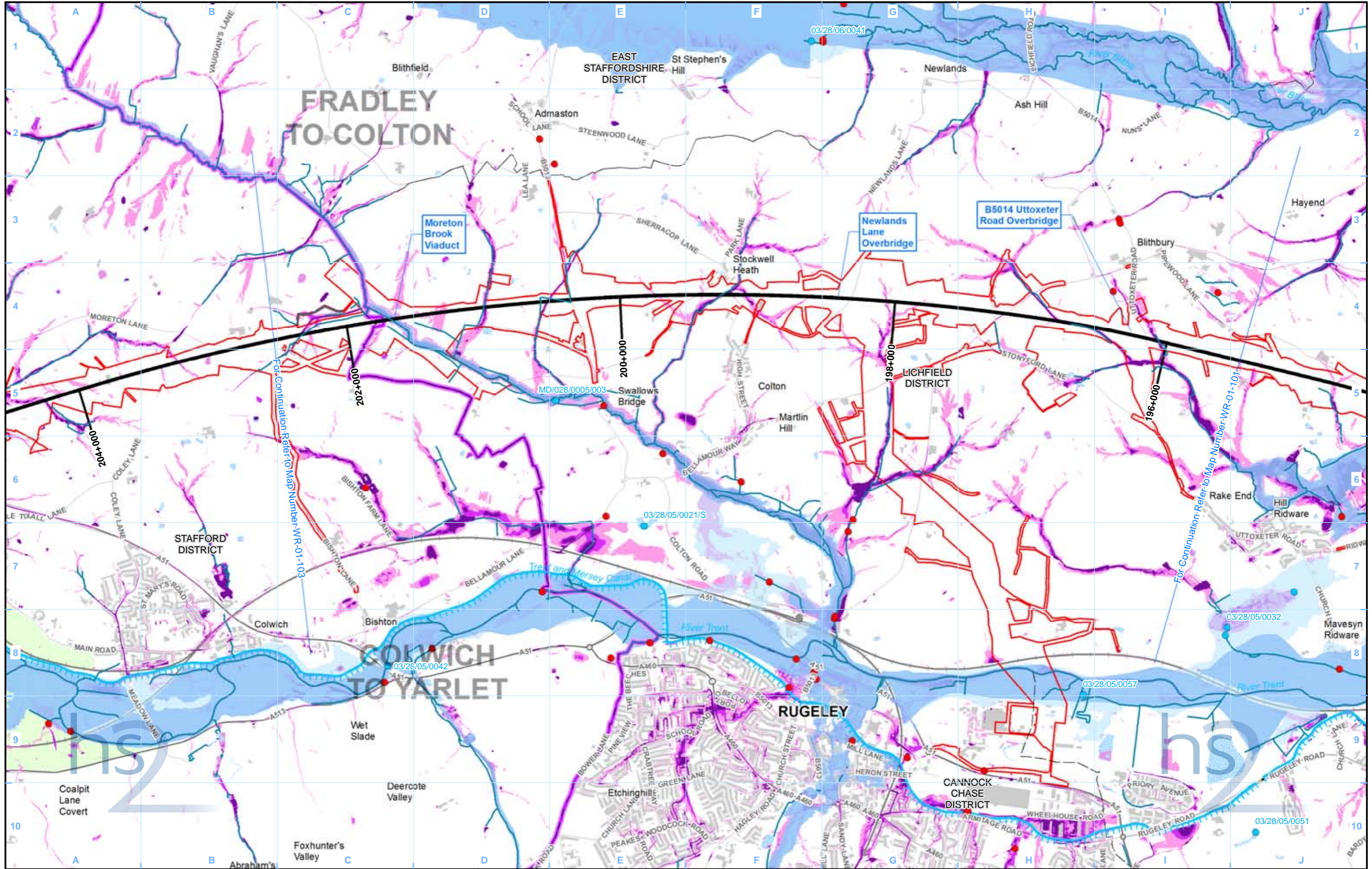
- Route in tunnel
- Route on surface
- Depot, station, headhouse or portal building
- Community area boundary
- Existing railway station
- County boundary
- District/Borough boundary
- Map sheets included in this community area
- Map sheets not included in this community area

Map Number	WR-01-INDEX-CA2
Map Name	Index Map of: Surface Water Baseline
Community Area 2: Colwich to Yarlet	

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Legend	
	Route in bored tunnel
	Route on surface
	Depot, station, headhouse or portal building
	Land potentially required during construction
	Community area boundary
	County boundary
	District/Borough boundary
	Licensed surface water abstraction (excluding public water supplies)
	Unlicensed private surface water abstractions
	Consented discharge to surface water
	Watercourse
	Culverted watercourse
	Canal
	Canal tunnel
	Lakes & Reservoirs
	Historic flooding area
	Flood Zone 2
	Flood Zone 3
	High - chance of flooding greater than 1 in 30 (3.33%)
	Medium - chance of flooding between 1 in 100 (1%) and 1 in 30 (3.33%)
	Low - chance of flooding between 1 in 1000 (0.1%) and 1 in 100 (1%)

Map Number	WR-01-102b
Map Name	Surface Water Baseline
Community Area 2: Colwich to Yarlet	

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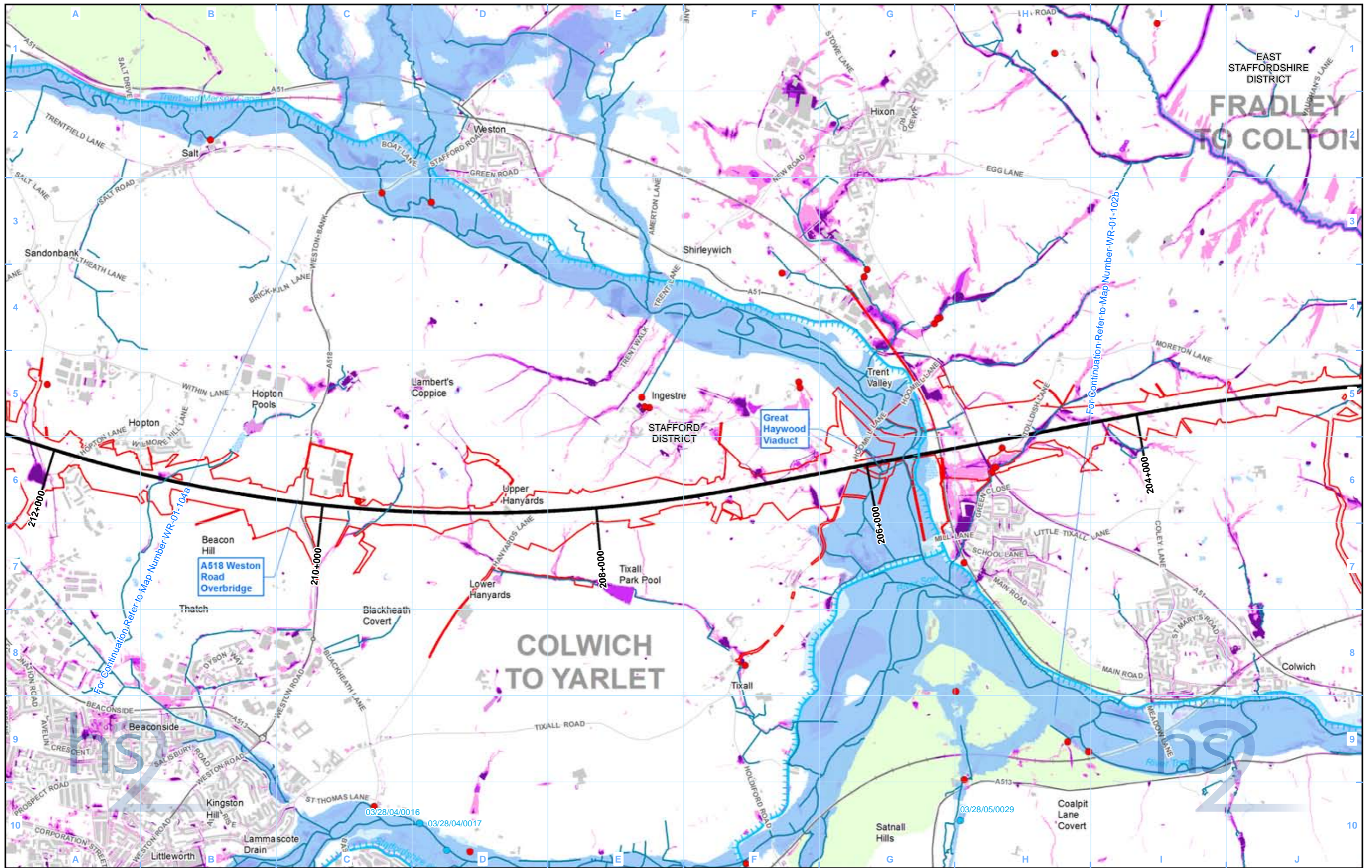
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Legend	
	Route in bored tunnel
	Route on surface
	Depot, station, headhouse or portal building
	Land potentially required during construction
	Community area boundary
	County boundary
	District/Borough boundary
	Licensed surface water abstraction (excluding public water supplies)
	Unlicensed private surface water abstractions
	Consented discharge to surface water
	Watercourse
	Culverted watercourse
	Canal
	Canal tunnel
	Lakes & Reservoirs
	Historic flooding area
	Flood Zone 2
	Flood Zone 3
	High - chance of flooding greater than 1 in 30 (3.33%)
	Medium - chance of flooding between 1 in 100 (1%) and 1 in 30 (3.33%)
	Low - chance of flooding between 1 in 1000 (0.1%) and 1 in 100 (1%)

Map Number	WR-01-103
Map Name	Surface Water Baseline
Community Area 2: Colwich to Yarlet	

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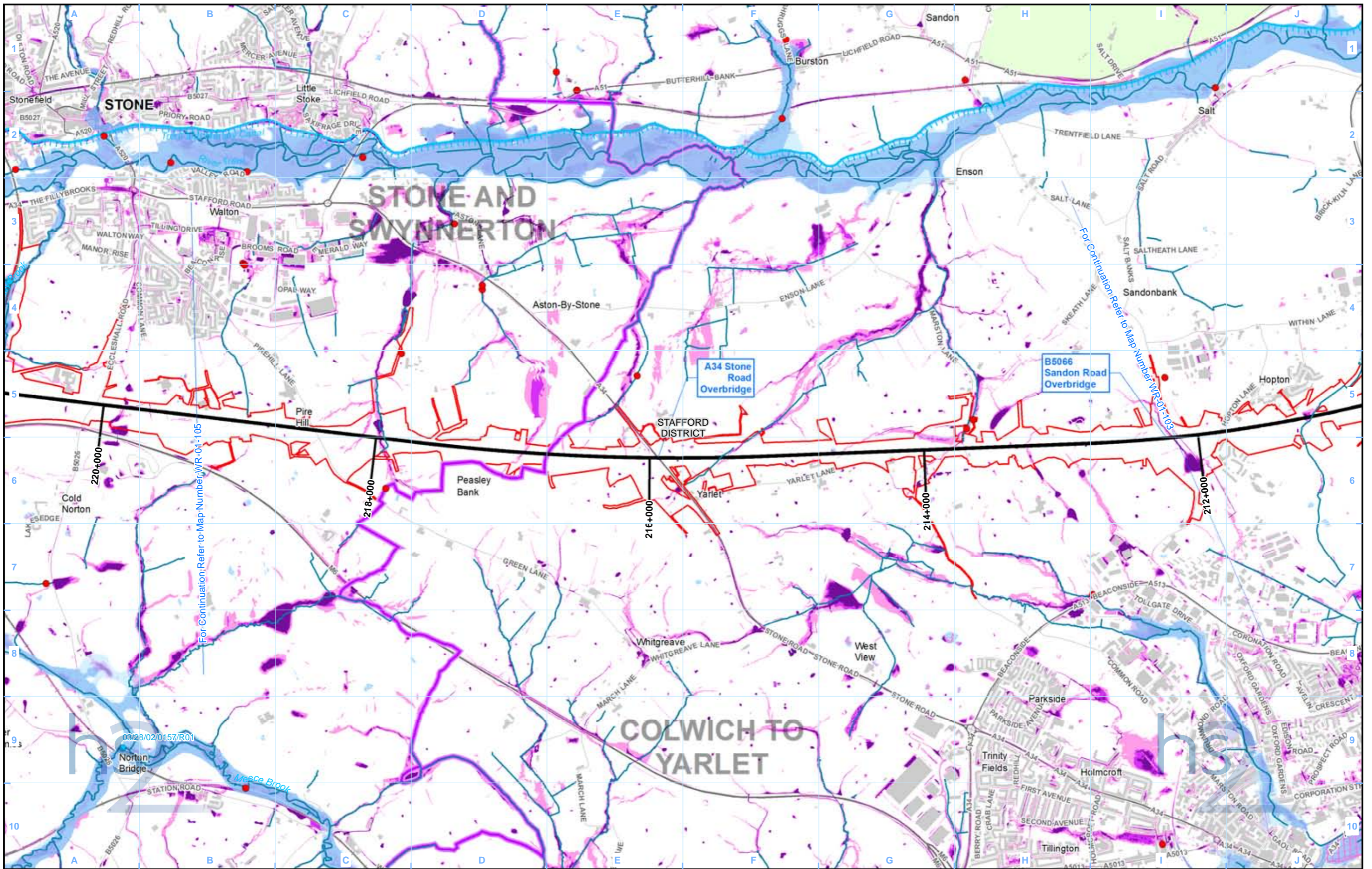
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Date: 14/06/17



Legend	
	Route in bored tunnel
	Route on surface
	Depot, station, headhouse or portal building
	Land potentially required during construction
	Community area boundary
	County boundary
	District/Borough boundary
	Licensed surface water abstraction (excluding public water supplies)
	Unlicensed private surface water abstractions
	Consented discharge to surface water
	Watercourse
	Culverted watercourse
	Canal
	Canal tunnel
	Lakes & Reservoirs
	Historic flooding area
	Flood Zone 2
	Flood Zone 3
	High - chance of flooding greater than 1 in 30 (3.33%)
	Medium - chance of flooding between 1 in 100 (1%) and 1 in 30 (3.33%)
	Low - chance of flooding between 1 in 1000 (0.1%) and 1 in 100 (1%)

Map Number	WR-01-104a
Map Name	Surface Water Baseline
Community Area 2:	Colwich to Yarlet

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 Date: 14/06/17

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Superficial Deposits

- Alluvium [ALV-CZPS] (Secondary A)
- Alluvium [ALV-XCZSV] (Secondary A)
- River terrace deposits, 1 to 2 [T1T2-XSV] (Secondary A)
- Enfield silt member [ESI-XCZ] (Non-Productive)
- Glaciofluvial deposits, devensian [GFDUD-XSV] (Secondary A)
- Glaciolacustrine deposits, devensian [GLLDD-XCZ] (Non-Productive)
- Kempton park gravel formation [KPGR-XSV] (Secondary A)
- Langley silt member [LASI-XCZ] (Non-Productive)
- Shepperton gravel member [SHGR-XSV] (Principal)
- Till, devensian [TILLD-DMTN] (Non-Productive)
- Till, devensian [TILLD-XDSV] (Non-Productive)
- Finsbury gravel member [FIGNR-XSV] (Secondary A)
- Hackney gravel member [HAGR-XSV] (Secondary A)
- Lynch hill gravel member [LHGR-XSV] (Secondary A)
- Taplow gravel formation [TPGR-XSV] (Principal/ Secondary A)
- Boyn hill gravel member [BHT-XSV] (Secondary A)
- Bosworth clay member [BOSW-XCZ] (Non-Productive)
- Black park gravel member [BPGR-XSV] (Secondary A)
- Dunsmore gravel [DMG-XSV] (Secondary A)
- Lowestoft formation [LOFT-DMTN] (Non-Productive)
- Oadby member [ODT-DMTN] (Non-Productive)
- Thrusington member [THT-DMTN] (Non-Productive)
- Winter hill gravel (lacustrine deposits) [WHGLD-XSV] (Secondary A)
- Winter hill gravel [WHG-XSV] (Secondary A)
- Westmill gravel member [WLGR-XSV] (Secondary A)
- Dollis hill gravel member [DHGR-XSV] (Secondary A)
- Gerrards cross gravel [GCGR-XSV] (Secondary A)
- Glaciofluvial deposits, mid pleistocene [GFDMP-XSV] (Secondary A)
- Glaciofluvial sheet deposits, mid pleistocene [GFSMP-XSV] (Secondary A)
- Glaciofluvial terrace deposits, mid pleistocene [GFTMP-XSV] (Secondary A)
- Glaciolacustrine deposits, mid pleistocene [GLLMP-XCZ] (Non-Productive)
- Till, mid pleistocene [TILMP-DMTN] (Non-Productive)
- Beaconsfield gravel [BDGR-XSV] (Secondary A)
- Baginton sand and gravel formation [BGSX-XSV] (Secondary A)
- Chorleywood gravel formation [CWGR-XSV] (Secondary A)
- Glacial deposits [GDU-XCZS] ()
- Glaciolacustrine deposits [GLLD-XCZ] (Non-Productive)
- Holme pierrepont sand and gravel member [HPSG-XSV] (Secondary A)
- Interglacial lacustrine deposits [IGLD-XCZ] (Non-Productive)
- Kesgrave catchment subgroup [KGCX-XSV] ()
- Princes risborough sand and gravel [PRSG-XSV] ()
- Stanmore gravel formation [STGR-XSV] (Secondary A)
- Wasperton sand and gravel member [WAT-XSV] (Secondary A)
- Westland green gravel [WGGR-XSV] (Secondary A)
- Alluvial fan deposits [ALF-V] (Secondary A)
- Glaciofluvial deposits [GFDU-XSV] (Secondary A)
- Head [HEAD-V] (Secondary (Undifferentiated))
- Head [HEAD-XCZ] (Secondary (Undifferentiated))
- Head [HEAD-XCZSV] (Secondary (Undifferentiated))
- Head, 1 [HEAD1-XCZSV] (Secondary (Undifferentiated))
- Lacustrine deposits [LDE-XCZS] (Non-Productive)
- Peat [PEAT-P] (N/A Aquifer)
- River terrace deposits, 1 [RTD1-XSV] (Secondary A)
- River terrace deposits, 2 [RTD2-XSV] (Secondary A)
- River terrace deposits, 3 [RTD3-XSV] (Secondary A)
- River terrace deposits, 4 [RTD4-XSV] (Secondary A)
- River terrace deposits (undifferentiated) [RTDU-XSV] (Secondary A)
- Sand and gravel of uncertain age and origin [SGAO-XSV] (Secondary A)
- Tufa [TUFA-CATUFA] (Aquifer)
- Wolston sand and gravel [WOSG-XSV] (Secondary A)
- Clay-with-flints formation [CWF-XCZSV] (Non-Productive)

Bedrock Geology

- Bagshot formation - sand [BGS-SANDU] (Secondary A)
- Claygate member - clay, silt and sand [CLGB-CLSISA] (Secondary A)
- Claygate member - sand, silt and clay [CLGB-SSCL] (Secondary A)
- London clay formation - clay and silt [LC-CLSI] (Non-Productive)
- London clay formation - clay, silt and sand [LC-CLSISA] (Non-Productive)
- Thanet formation - sand [TAB-SANDU] (Secondary A)
- Lambeth group - clay, silt and sand [LMBE-CLSISA] (Secondary A)
- Seaford chalk formation and newhaven chalk formation (undifferentiated) - chalk [SNCK-CHLK] (Principal)
- Chalk rock member - chalk [CKR-CHLK] (Principal)
- Lewes nodular chalk formation - chalk [LECH-CHLK] (Principal)
- Lewes nodular chalk formation and seaford chalk formation (undifferentiated) - chalk [LESE-CHLK] (Principal)
- Lewes nodular chalk formation and newhaven chalk formation (undifferentiated) - chalk [LSNCK-CHLK] (Principal)
- New pit chalk formation - chalk [NPCH-CHLK] (Principal)
- Glauconitic marl member - sandstone, glauconitic [GLML-GLSST] (Principal)
- Holywell nodular chalk formation - chalk [HCK-CHLK] (Principal)
- Holywell nodular chalk formation and new pit chalk formation (undifferentiated) - chalk [HNCK-CHLK] (Principal)
- Melbourn rock member - chalk [MR-CHLK] (Principal)
- Totterhoe stone member - chalk [TTST-CHLK] (Principal)
- West melbury marly chalk formation - chalk [WMCH-CHLK] (Principal)
- West melbury marly chalk formation and zig zag chalk formation (undifferentiated) - chalk [WZCK-CHLK] (Principal)
- Zig zag chalk formation - chalk [ZZCH-CHLK] (Principal)
- Gault formation - mudstone [GLT-MDST] (Non-Productive)
- Gault formation and upper greensand formation (undifferentiated) - mudstone, siltstone and sandstone [GUGS-MDSS] (Non-Productive)
- Upper greensand formation - siltstone and sandstone [UGS-SISD] (Non-Productive)
- Lower greensand group - sandstone [LGS-SDST] (Secondary A)
- Whitchurch sand formation - mudstone [WHS-MDST] (Secondary A)
- Whitchurch sand formation - sandstone [WHS-SDST] (Secondary A)
- Purbeck group - limestone and [subequal/subordinate] argillaceous rocks, interbedded [PB-LMAR] (Principal)
- Portland group - limestone and calcareous sandstone [PL-LMCS] (Principal)
- Portland sand formation - sandstone, calcareous [POSA-CALSST] (Secondary A)
- Portland sand formation - limestone and calcareous sandstone [POSA-LMCS] (Secondary A)
- Portland stone formation - limestone [POST-LMST] (Principal)
- Kimmeridge clay formation - mudstone [KC-MDST] (Non-Productive)
- Kimmeridge clay formation - siltstone and sandstone [KC-SISD] (Non-Productive)
- Amgrove spiculite member - sandstone [AGSP-SDST] (Secondary A)
- Amphill clay formation - mudstone [AMC-MDST] (Non-Productive)
- Oakley member - limestone and mudstone, interbedded [OKLY-LSMD] (Secondary A)
- Weymouth member - mudstone [WEY-MDST] (Non-Productive)
- West walton formation and amphill clay formation (undifferentiated) - mudstone [WWAC-MDST] (Non-Productive)
- West walton formation - limestone and [subequal/subordinate] argillaceous rocks, interbedded [WWB-LMAR] (Non-Productive)
- West walton formation - mudstone [WWB-MDST] (Non-Productive)
- Kellaways formation - sandstone, siltstone and mudstone [KLB-SDSM] (Secondary A)
- Kellaways clay member - mudstone [KLC-MDST] (Secondary A)
- Kellaways sand member - sandstone and siltstone, interbedded [KLS-SDSL] (Secondary A)
- Peterborough member - mudstone [PET-MDST] (Non-Productive)
- Stewartby member - mudstone [SBY-MDST] (Non-Productive)
- Bladon member - limestone [BLAD-LMST] (Principal)
- Bladon member - mudstone and limestone, interbedded [BLAD-MDLM] (Principal)
- Blisworth clay formation - mudstone [BWC-MDST] (Principal)
- Blisworth limestone formation - limestone [BWL-LMST] (Principal)
- Combrash formation - limestone [CB-LMST] (Secondary A)
- Forest marble formation - limestone [FMB-LMST] (Secondary A)
- Forest marble formation - limestone and mudstone, interbedded [FMB-LSMD] (Secondary A)
- Great oolite group - limestone and [subequal/subordinate] argillaceous rocks, interbedded [GOG-LMAR] (Principal To Secondary B)
- Sharp's hill formation - argillaceous rocks with subordinate sandstone and limestone [SHHB-ARSL] (Secondary A)
- Taynton limestone formation - limestone, ooidal [TY-LMOOL] (Principal)
- Wellingborough limestone member - limestone [WBRO-LMST] (Secondary A)
- White limestone formation - limestone [WHL-LMST] (Principal)
- Horsehay sand formation - sandstone [HYSA-SDST] (Secondary A)
- Rutland formation - mudstone [RLD-MDST] (Secondary B)
- Stamford member - sandstone and siltstone, interbedded [STAM-SDSL] (Secondary A)
- Northampton sand formation - sandstone, limestone and ironstone [NS-SDLI] (Secondary A)
- Whitby mudstone formation - mudstone [WHM-MDST] (Non-Productive)
- Dyrham formation - siltstone and mudstone, interbedded [DYS-SIMD] (Secondary (Undifferentiated))
- Marlstone rock formation - ferruginous limestone and ironstone [MRB-FLIR] (Secondary A)
- Marlstone rock formation - limestone, ferruginous [MRB-FLMST] (Secondary A)
- Charmouth mudstone formation - limestone [CHAM-LMST] (Secondary (Undifferentiated))
- Charmouth mudstone formation - mudstone [CHAM-MDST] (Non-Productive)
- Rugby limestone member - mudstone and limestone, interbedded [RLS-MDLM] (Secondary A)
- Langport member - limestone [LPMB-LMST] (Secondary (Undifferentiated))
- Penarth group - argillaceous rock and [subequal/subordinate] limestone, interbedded [PNG-AROCLS] (Secondary B)
- Penarth group - mudstone [PNG-MDST] (Secondary B)
- Salford shale member - limestone [SASH-LMST] (Secondary B)

- Salford shale member - mudstone [SASH-MDST] (Secondary B)
- Westbury formation - mudstone [WBY-MDST] (Secondary (Undifferentiated))
- Westbury formation - sandstone [WBY-SDST] (Secondary (Undifferentiated))
- Wilmcote limestone member - mudstone and limestone, interbedded [WCT-MDLM] (Secondary (Undifferentiated))
- Blue anchor formation - mudstone and siltstone [BAN-MDSI] (Secondary (Undifferentiated))
- Blue anchor formation - mudstone [BAN-MDST] (Secondary (Undifferentiated))
- Arden sandstone formation - mudstone [AS-MDST] (Secondary (Undifferentiated))
- Arden sandstone formation - sandstone, siltstone and mudstone [AS-SDSM] (Secondary A)
- Arden sandstone formation - siltstone and sandstone [AS-SISD] (Secondary A)
- Weatheroak sandstone member - sandstone [WKSX-SDST] ()
- Gunthorpe member - siltstone, dolomitic [GUN-DSLST] ()
- Gunthorpe member - mudstone [GUN-MDST] ()
- Tarporley siltstone formation - siltstone, mudstone and sandstone [TPSF-SIMS] (Secondary B)
- Bromsgrove sandstone formation - mudstone [BMS-MDST] (Principal)
- Bromsgrove sandstone formation - sandstone, pebbly (gravelly) [BMS-PESST] (Principal)
- Bromsgrove sandstone formation - sandstone [BMS-SDST] (Principal)
- Kidderminster formation - conglomerate [KDM-CONG] (Principal)
- Kidderminster formation - mudstone [KDM-MDST] (Principal)
- Kidderminster formation - sandstone and conglomerate, interbedded [KDM-SCON] (Principal)
- Mercia mudstone group - siltstone, dolomitic [MMG-DSLST] (Secondary (Undifferentiated))
- Mercia mudstone group - mudstone [MMG-MDST] (Secondary B)
- Wildmoor sandstone formation - sandstone [WRS-SDST] (Principal)
- Ashow formation - mudstone and sandstone [AW-MDSD] (Principal)
- Ashow formation - sandstone [AW-SDST] (Principal)
- Clent formation - argillaceous rocks and [subequal/subordinate] breccia, interbedded [CLT-ARBR] (Secondary A)
- Gibbet hill conglomerate bed - conglomerate [GHC-CONG] (Principal)
- Hopwas breccia formation - breccia [HPBR-BREC] (Principal)
- Hopwas breccia formation - breccia and sandstone, interbedded [HPBR-BRSS] (Principal)
- Kenilworth sandstone formation - breccia [KHS-BREC] (Principal)
- Kenilworth sandstone formation - mudstone [KHS-MDST] (Principal)
- Kenilworth sandstone formation - sandstone [KHS-SDST] (Principal)
- Alveley member - limestone [ALY-LMST] (Secondary A)
- Alveley member - mudstone and sandstone [ALY-MDSD] (Secondary A)
- Alveley member - mudstone [ALY-MDST] (Secondary A)
- Alveley member - sandstone [ALY-SDST] (Secondary A)
- Alveley member - sandstone and mudstone [ALY-STMD] (Secondary A)
- Allesley member - argillaceous rocks and [subordinate/subequal] sandstone and conglomerate, interbedded [ASY-ARSC] (Principal)
- Allesley member - conglomerate [ASY-CONG] (Principal)
- Allesley member - sandstone [ASY-SDST] (Principal)
- Enville member - conglomerate [EN-CONG] (Secondary A)
- Enville member - sandstone, conglomerate and [subordinate] argillaceous rocks [EN-SCAR] (Secondary A)
- Enville member - sandstone with subordinate conglomerate, siltstone and mudstone [EN-SCSM] (Secondary A)
- Enville member - sandstone [EN-SDST] (Secondary A)
- Halesowen formation - limestone [HA-LMST] (Secondary A)
- Halesowen formation - mudstone, siltstone and sandstone [HA-MDSS] (Secondary A)
- Halesowen formation - sandstone [HA-SDST] (Secondary A)
- Keresley member - argillaceous rocks and [subordinate/subequal] sandstone and conglomerate, interbedded [KRS-ARSC] (Principal)
- Keresley member - conglomerate [KRS-CONG] (Principal)
- Keresley member - limestone [KRS-LMST] (Principal)
- Keresley member - sandstone [KRS-SDST] (Principal)
- Tile hill mudstone formation - argillaceous rocks and [subequal/subordinate] sandstone, interbedded [TLM-ARSD] (Principal)
- Tile hill mudstone formation - sandstone [TLM-SDST] (Principal)
- Whitacre member - conglomerate [WIT-CONG] (Principal)
- Whitacre member - limestone [WIT-LMST] (Principal)
- Whitacre member - mudstone and sandstone [WIT-MDSD] (Principal)
- Whitacre member - sandstone [WIT-SDST] (Principal)
- Pennine middle coal measures formation - mudstone, siltstone and sandstone [PMCM-MDSS] (Secondary A)
- Pennine middle coal measures formation - sandstone [PMCM-SDST] (Secondary A)
- Thick coal (south staffordshire) - coal [THIC-COAL] (Secondary A)
- Pennine lower coal measures formation - mudstone, siltstone and sandstone [PLCM-MDSS] (Secondary A)
- Pennine lower coal measures formation - sandstone [PLCM-SDST] (Secondary A)
- Pennine lower coal measures formation and pennine middle coal measures formation (undifferentiated) - mudstone, siltstone and sandstone [PLMC-MDSS] (Secondary A Aquifer)
- Etruria formation - conglomerate [ETM-CONG] (Secondary A)
- Etruria formation - mudstone, sandstone and conglomerate [ETM-MDSC] (Secondary A)
- Etruria formation - sandstone [ETM-SDST] (Secondary A)
- Unnamed igneous intrusion, westphalian - microgabro [UICW-MCGB] ()
- Rough rock - sandstone [RR-SDST] ()
- Millstone grit group [see also migr] - mudstone, siltstone and sandstone [MG-MDSS] ()
- Millstone grit group [see also migr] - sandstone [MG-SDST] ()
- Coalbrookdale formation - mudstone [CBRD-MDST] (Secondary B)
- Rubery sandstone member - sandstone [RBS-SDST] (Secondary B)
- Midlands minor intrusive suite - lamprophyres [MMI-LMPY] ()
- Monks park shale formation - mudstone [MPSH-MDST] (Secondary B)
- Merevale shale formation - mudstone [MVSH-MDST] (Secondary B)

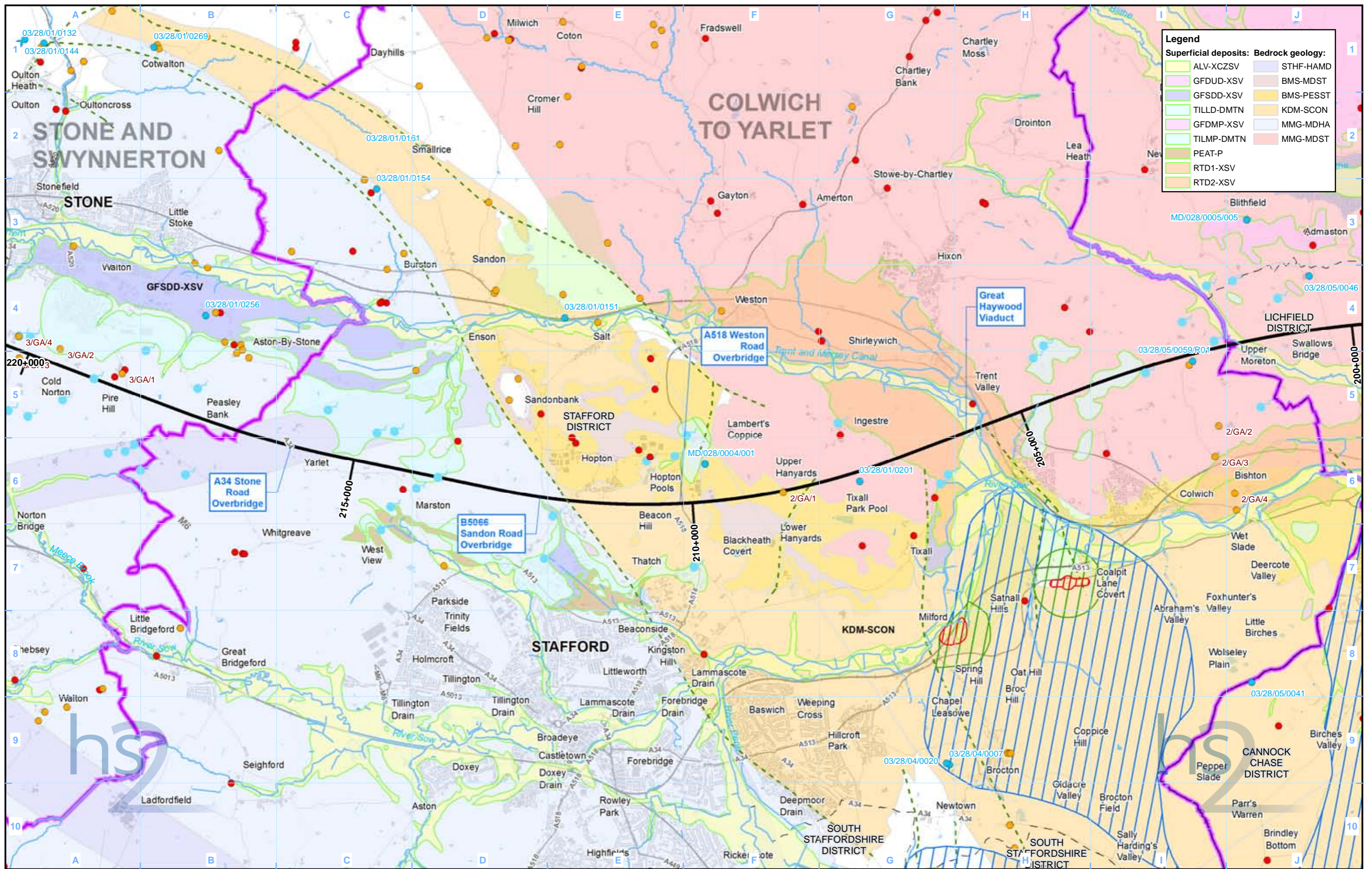
Map Number	WR-02 - Legend
Map Name	WR-02 - Full Geological Legend with Rock Unit Names and Aquifer Status

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Doc Number: C861-ARP-EV-MAP-000-162206-P03 **Date:** 06/06/17




Legend	
Superficial deposits:	Bedrock geology:
ALV-XCZSV	STHF-HAMD
GFDUD-XSV	BMS-MDST
GFSDD-XSV	BMS-PESST
TILLD-DMTN	KDM-SCON
GFDMP-XSV	MMG-MDHA
TILMP-DMTN	MMG-MDST
PEAT-P	
RTD1-XSV	
RTD2-XSV	

Legend	
Route in tunnel	Lakes & Reservoirs
Route on surface	Geological fault line
Depot, station, headhouse or portal building	Licensed groundwater abstraction (excluding public water supplies)
Community area boundary	Unlicensed private groundwater abstraction
County boundary	Consented discharge to groundwater
District/Borough boundary	Spring

Groundwater source protection zone:	
Zone 1	Zone 2
Zone 3	

For full geological legend including strata names and aquifer status please refer to WR-02 - Legend

Map Number	WR-02-202
Map Name	Groundwater Baseline
Community Area 2:	Colwich to Yarlet


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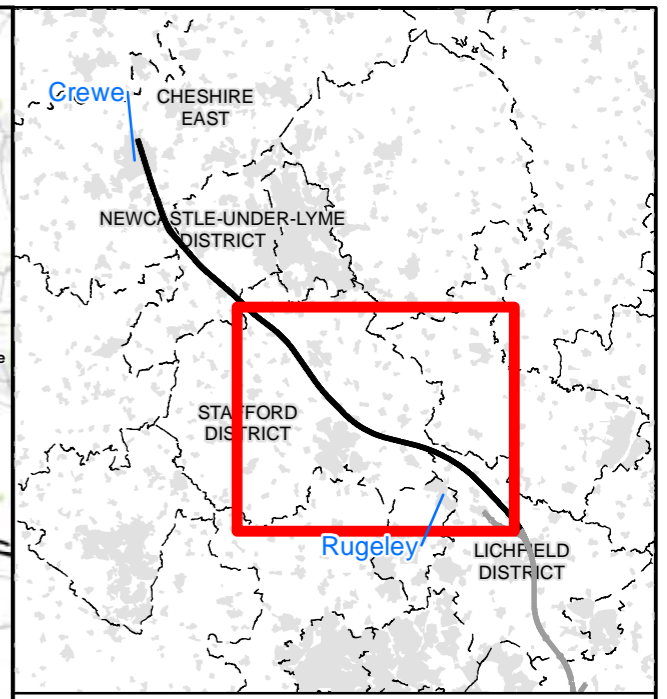
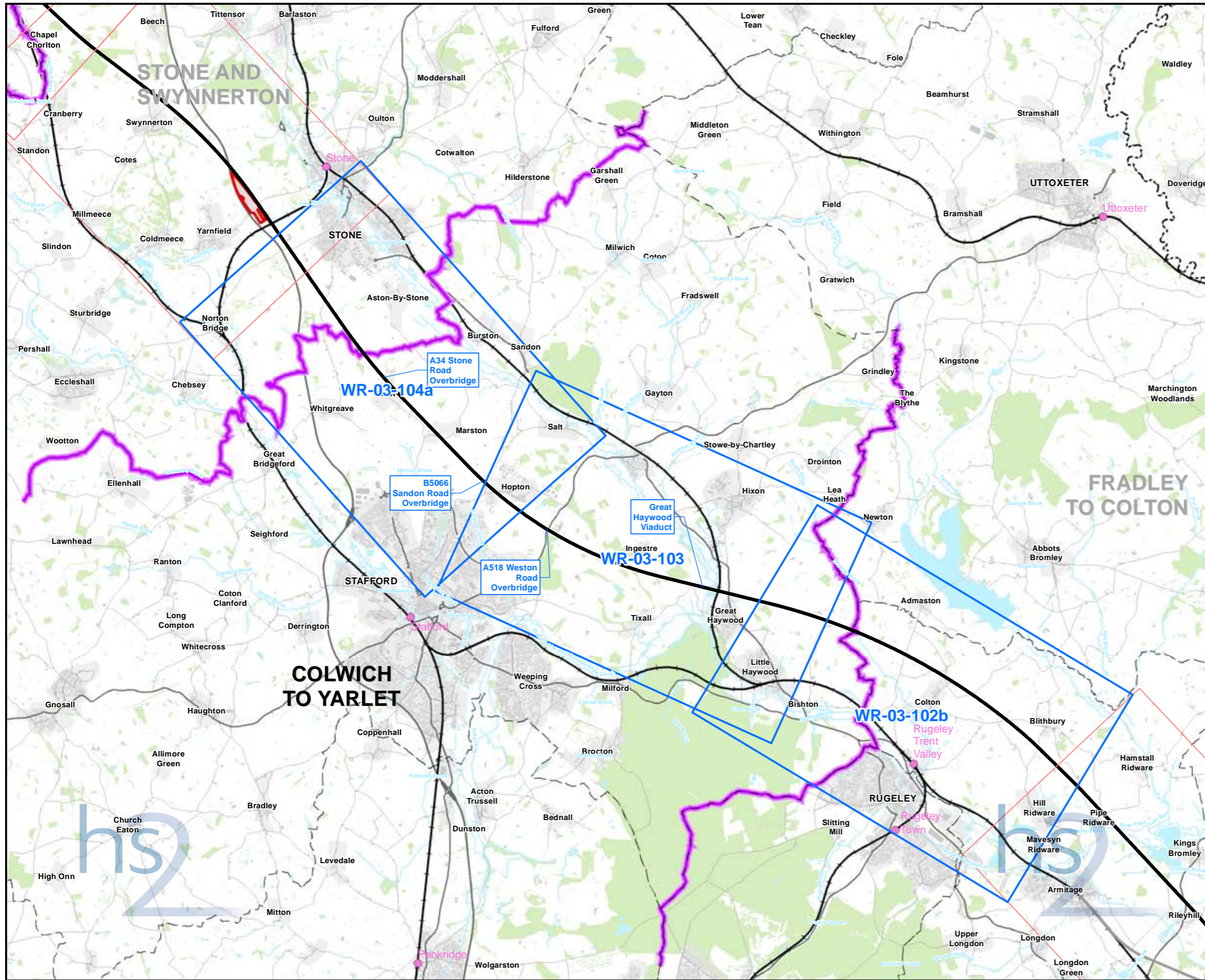
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Doc Number: C861-ARP-EV-MAP-000-152202-P04

Date: 14/06/17



Map Series Information:

This map series shows water bodies, their Water Framework Directive current status and associated ecological features.

Main Map Legend

- Route in tunnel
- Route on surface
- Depot, station, headhouse or portal building
- Community area boundary
- Existing railway station
- County boundary
- District/Borough boundary
- Map sheets included in this community area
- Map sheets not included in this community area

Map Number **WR-03-INDEX-CA2**

Map Name **Index Map of:
Water Framework Directive**

Community Area 2:
Colwich to Yarlet

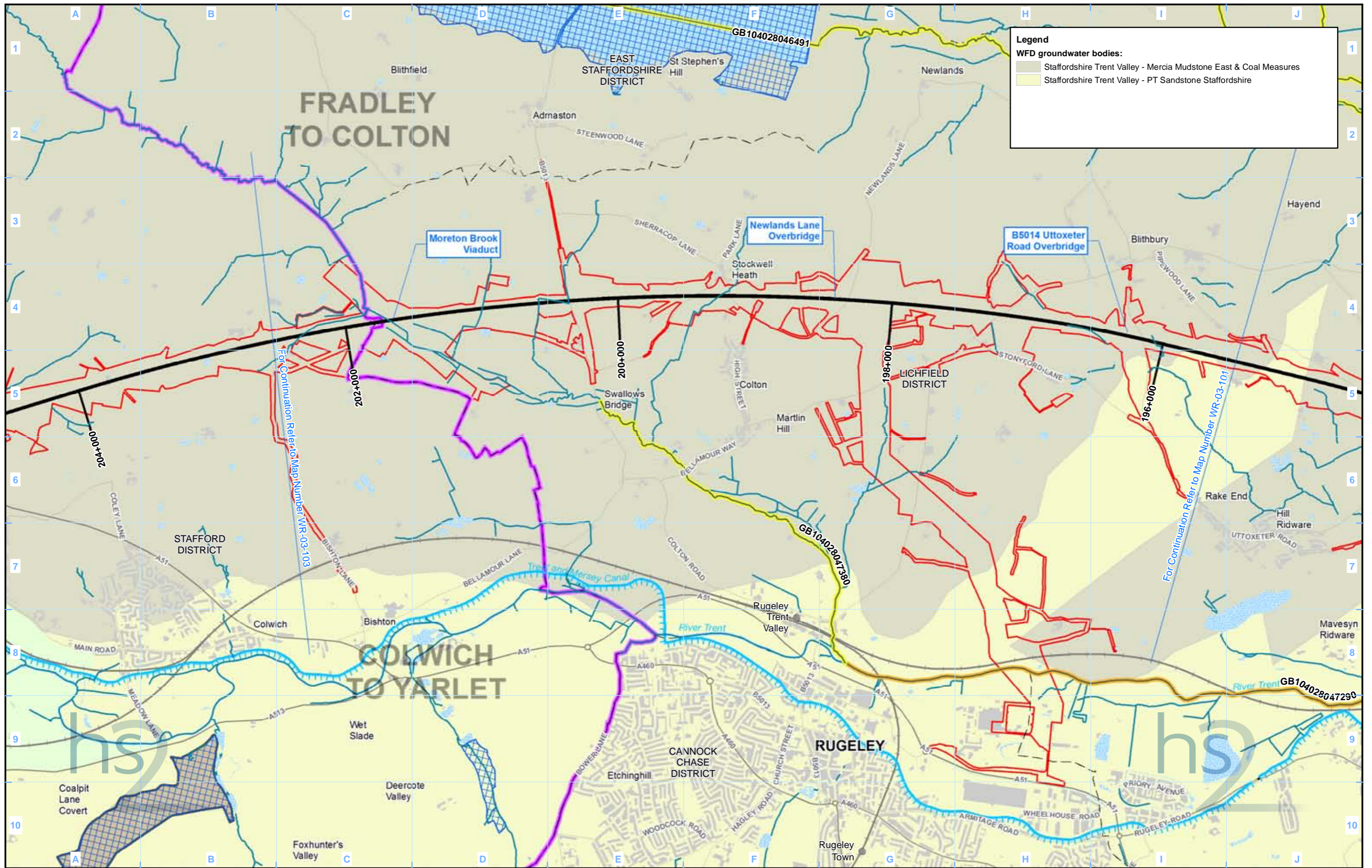
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Doc Number: C861-ARP-EV-MAP-000-151002-P04 **Date: 14/06/17**



Legend

WFD groundwater bodies:

- Staffordshire Trent Valley - Mercia Mudstone East & Coal Measures
- Staffordshire Trent Valley - PT Sandstone Staffordshire

Legend

- Route in tunnel
- Route on surface
- Depot, station, headhouse or portal building
- Land potentially required during construction
- Community area boundary
- County boundary
- District/Borough boundary

Canal

- Canal
- Canal tunnel
- Watercourse
- Culverted watercourse
- Open water

WFD Surface Water Bodies Overall Status Classification (2015 RBMP Cycle 2)

- Good
- Moderate
- Poor
- Bad

WFD Lakes Overall Status

- Good
- Moderate
- Poor
- Bad

Special Area of Conservation (SAC)

- Sites of Special Scientific Interest (SSSI)

Map Number: WR-03-102b

Map Name: Water Framework Directive

Community Area 2: Colwich to Yarlet

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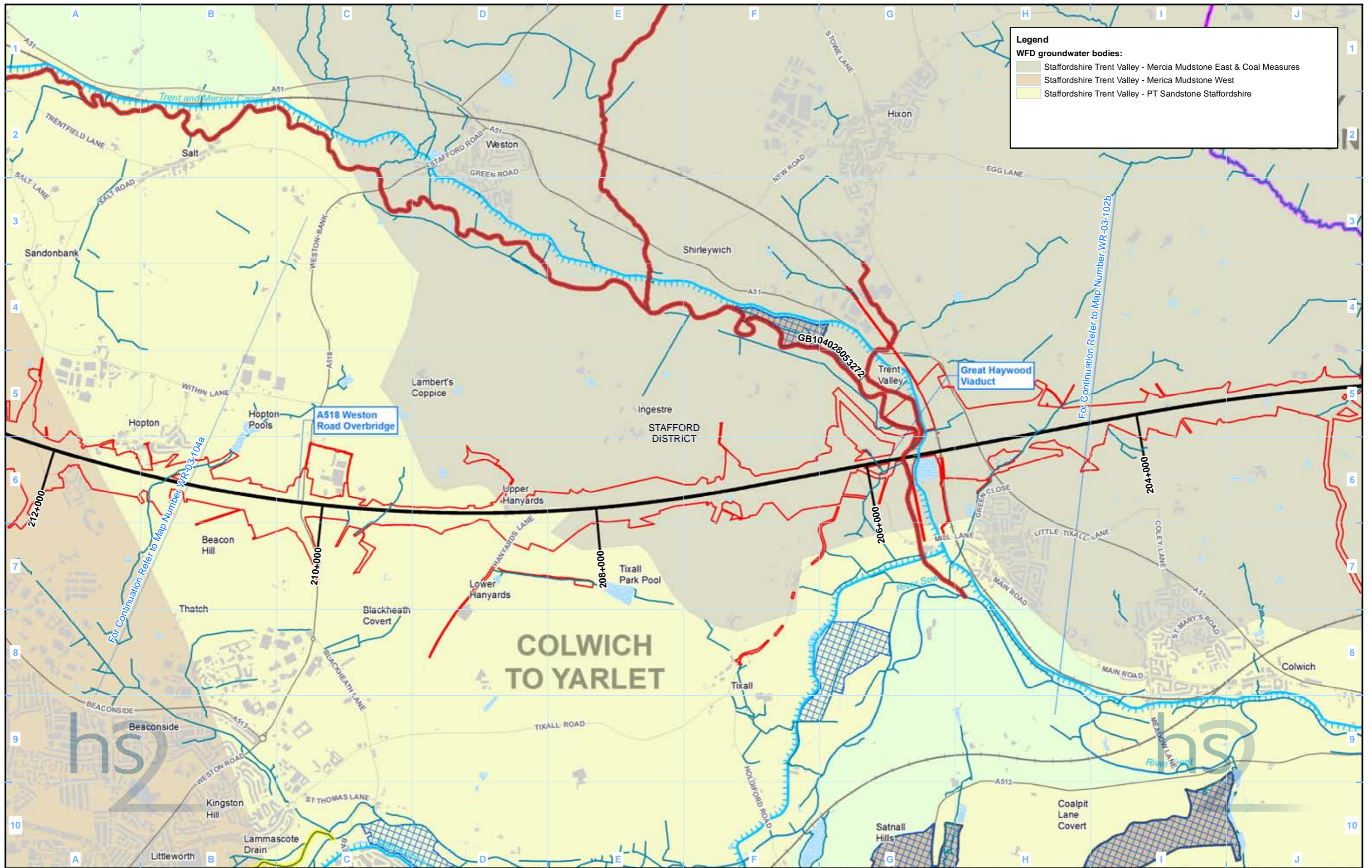
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Doc Number: C861-ARP-EV-MAP-000-153302-P04

Date: 14/06/17

Scale at A3: 1:25,000

0 250 500 750 1,000 Metres



Legend

WFD groundwater bodies:

- Staffordshire Trent Valley - Mercia Mudstone East & Coal Measures
- Staffordshire Trent Valley - Mercia Mudstone West
- Staffordshire Trent Valley - PT Sandstone Staffordshire

Legend

- Route in tunnel
- Route on surface
- Depot, station, headhouse or portal building
- Land potentially required during construction
- Community area boundary
- County boundary
- District/Borough boundary
- Canal
- Canal tunnel
- Watercourse
- Culverted watercourse
- Open water
- WFD Surface Water Bodies Overall Status Classification (2015 RBMP Cycle 2)**
- Good
- Moderate
- Poor
- Bad
- WFD Lakes Overall Status**
- Good
- Moderate
- Poor
- Bad
- Special Area of Conservation (SAC)
- Sites of Special Scientific Interest (SSSI)

Map Number: WR-03-103

Map Name: Water Framework Directive

Community Area 2: Colwich to Yarlet

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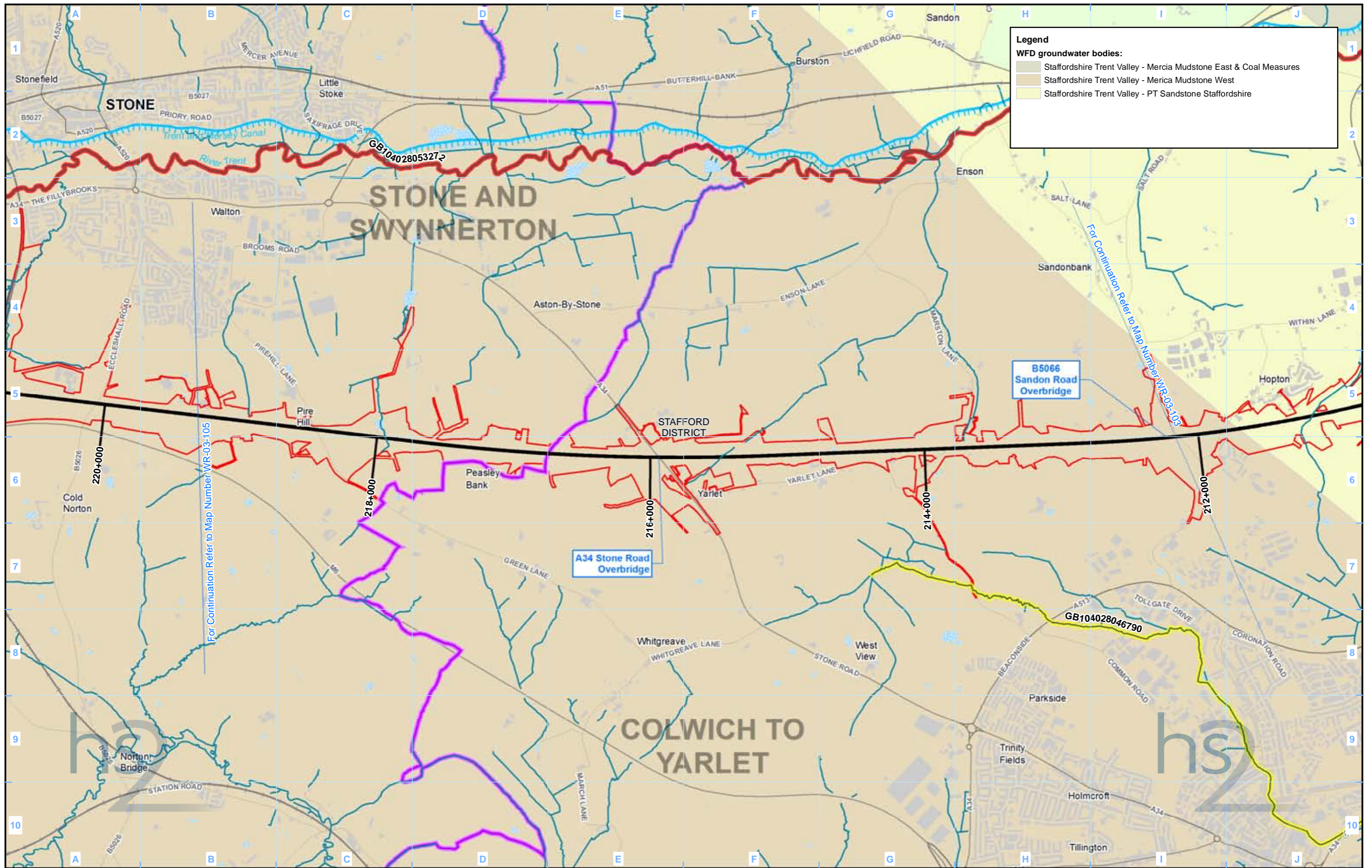
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Date: 14/06/17

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Legend

WFD groundwater bodies:

- Staffordshire Trent Valley - Mercia Mudstone East & Coal Measures
- Staffordshire Trent Valley - Mercia Mudstone West
- Staffordshire Trent Valley - PT Sandstone Staffordshire

Legend

- Route in tunnel
- Route on surface
- Depot, station, headhouse or portal building
- Land potentially required during construction
- Community area boundary
- County boundary
- District/Borough boundary
- Canal
- Canal tunnel
- Watercourse
- Culverted watercourse
- Open water
- WFD Surface Water Bodies Overall Status Classification (2015 RBMP Cycle 2)**
- Good
- Moderate
- Poor
- Bad
- WFD Lakes Overall Status**
- Good
- Moderate
- Poor
- Bad
- Special Area of Conservation (SAC)
- Sites of Special Scientific Interest (SSSI)

Map Number: WR-03-104a

Map Name: Water Framework Directive

Community Area 2: Colwich to Yarlet

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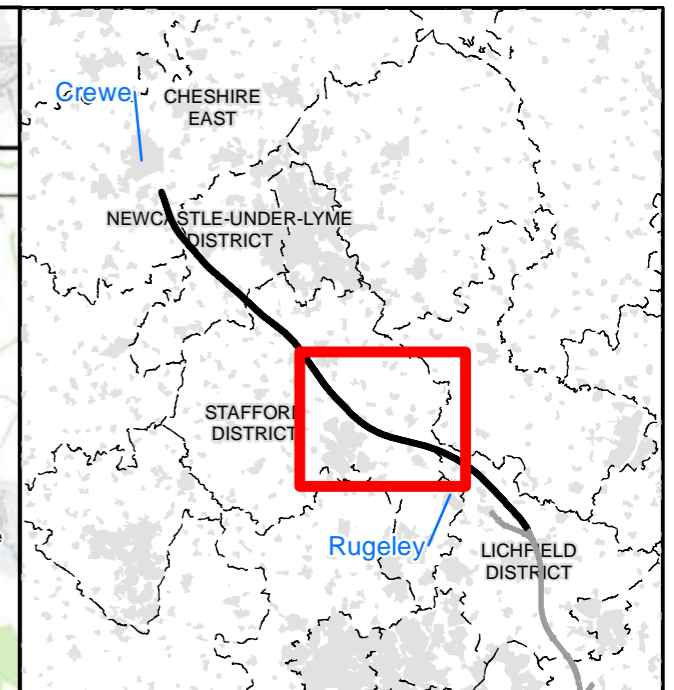
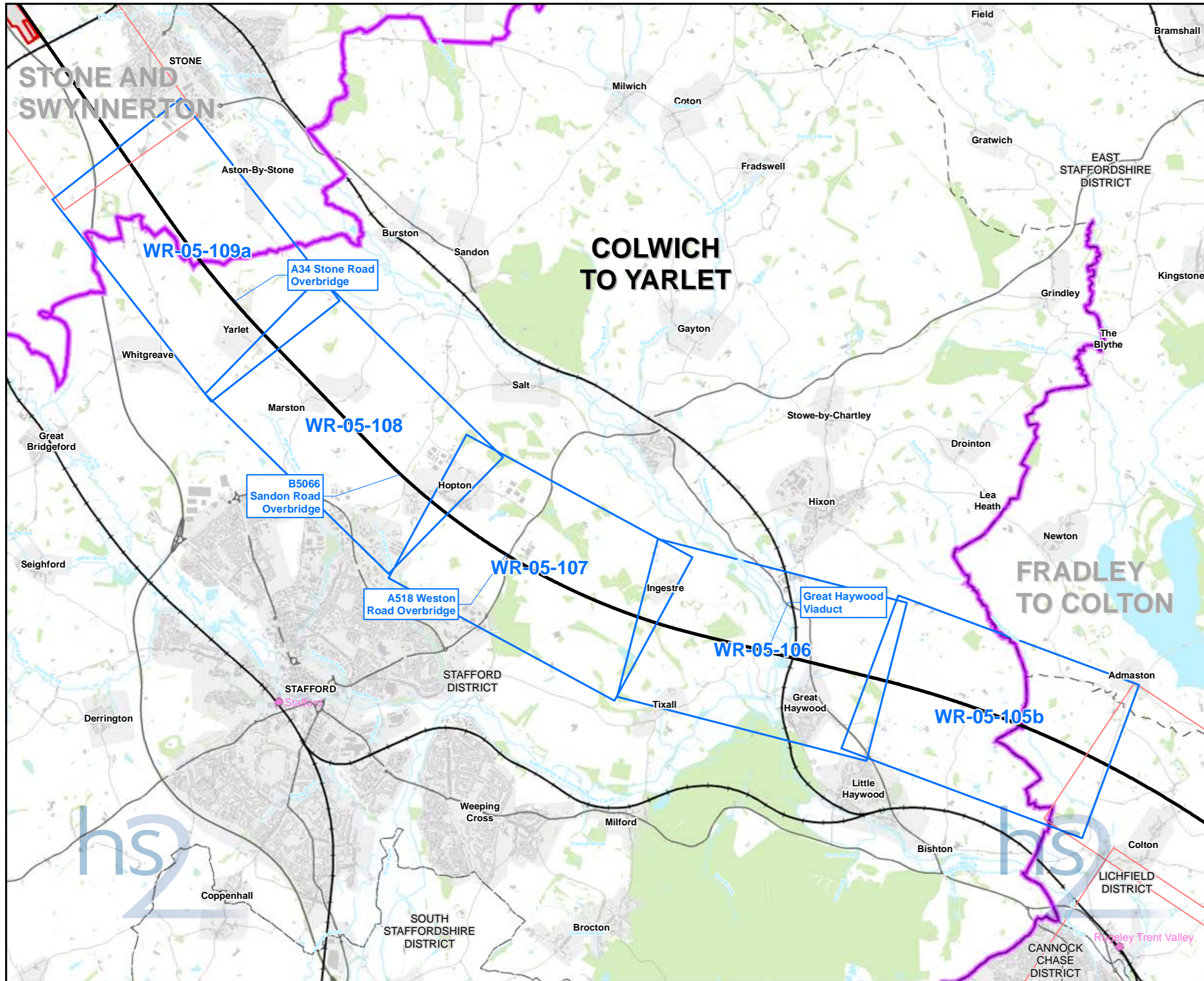
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Map Series Information:

The map shows the output from hydraulic modelling of specific crossing locations and the effect the scheme has on flood extent at 1 in 100 years inclusive of climate change (20%) return period.

- Main Map Legend**
- Route in tunnel
 - Route on surface
 - Depot, station, headhouse or portal building
 - Community area boundary
 - Existing railway station
 - County boundary
 - District/Borough boundary
 - Map sheets included in this community area
 - Map sheets not included in this community area

Map Number	WR-05-INDEX-CA2
Map Name	Index Map of: Modelled Baseline and Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding
Community Area 2: Colwich to Yarlet	

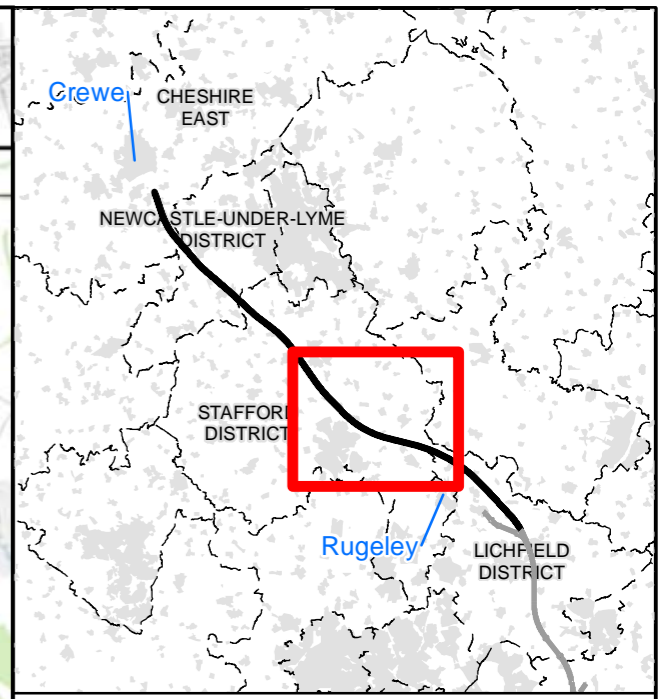
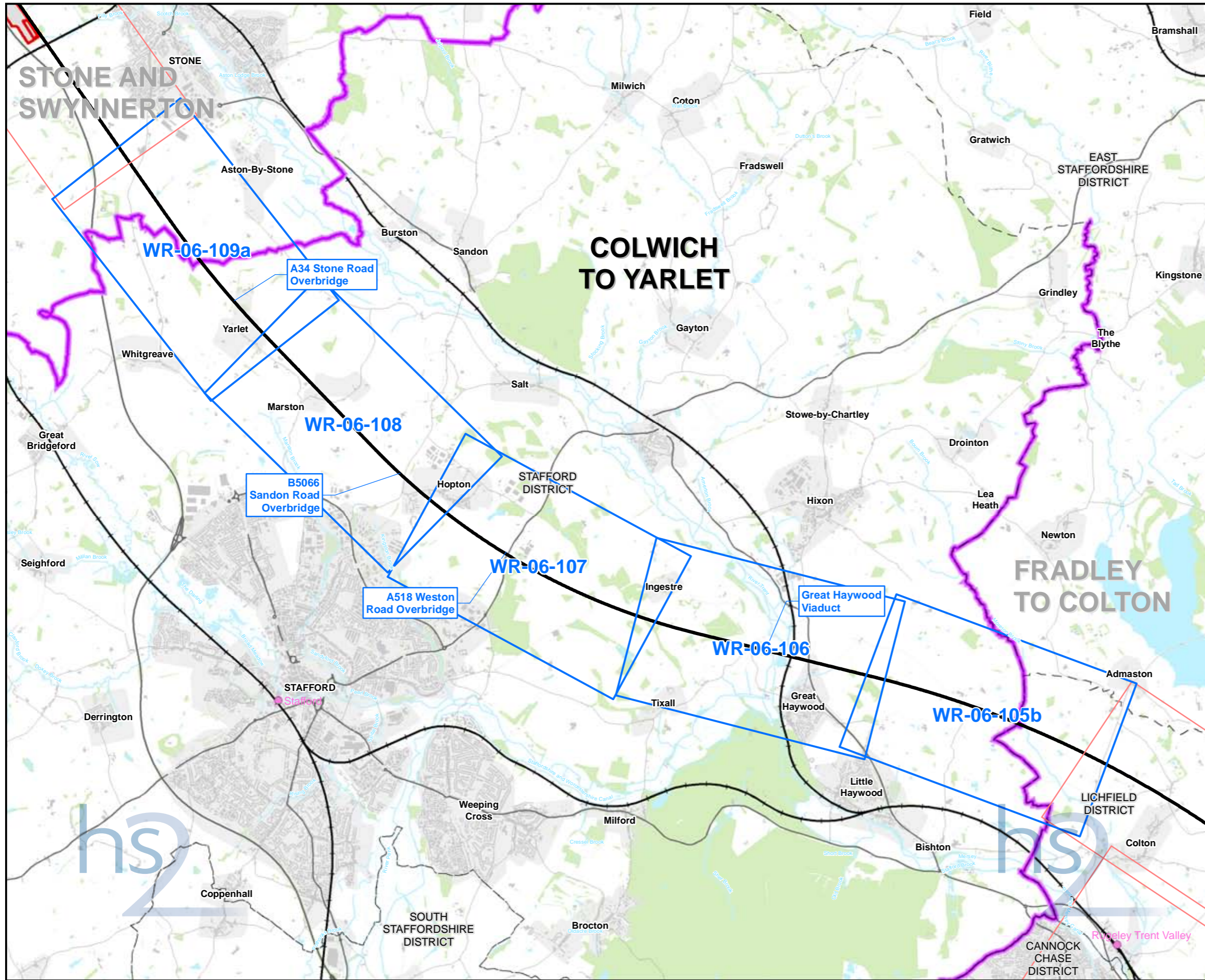
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Doc Number: C861-ARP-EV-MAP-000-155002-P04 **Date: 14/06/17**



Map Series Information:

The map shows the output from hydraulic modelling of specific crossing locations and the effect the scheme has on flood extent at 1 in 20 year return period.

Main Map Legend

- Route in tunnel
- Route on surface
- Depot, station, headhouse or portal building
- Community area boundary
- Existing railway station
- County boundary
- District/Borough boundary
- Map sheets included in this community area
- Map sheets not included in this community area

Map Number **WR-06-INDEX-CA2**

Map Name
Index Map of:
Modelled Baseline and Post Development Flood
Extent 1 in 20 (5%) Annual Probability of River
Flooding

Community Area 2:
Colwich to Yarlet

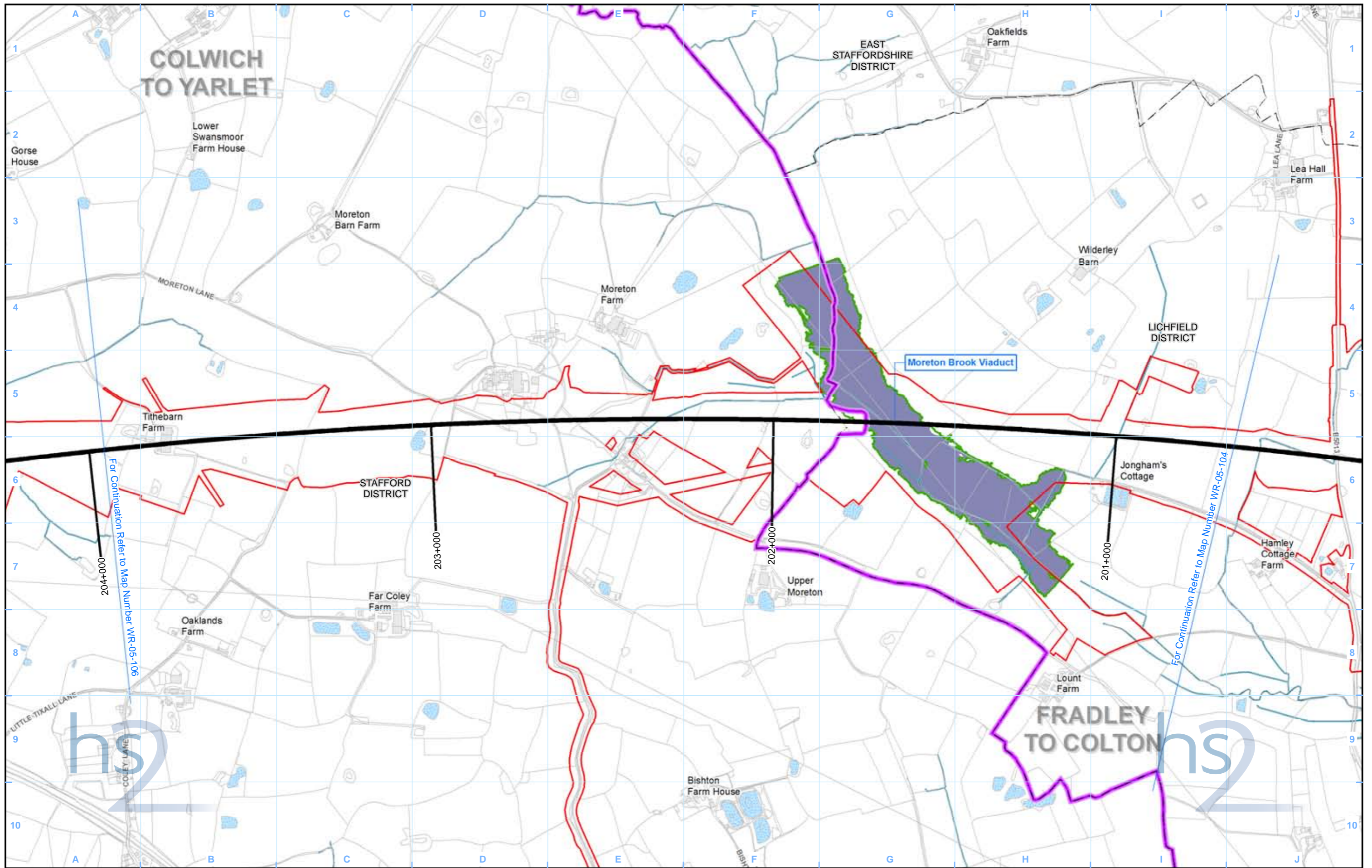
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- Legend**
- Route in tunnel
 - Route on surface
 - Depot, station, headhouse or portal building
 - Land potentially required during construction
 - Community area boundary
 - County boundary
 - District/Borough boundary
 - Watercourse
 - Culverted watercourse
 - Canal
 - Canal tunnel
 - Open water
 - Registered Park and Garden
 - Modelled Baseline Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding
 - Modelled Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding

Map Number: WR-05-105b

Map Name: Modelled Baseline and Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding

Community Area 2: Colwich to Yarlet

Map Number: WR-05-105b

Map Name: Modelled Baseline and Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding

Community Area 2: Colwich to Yarlet

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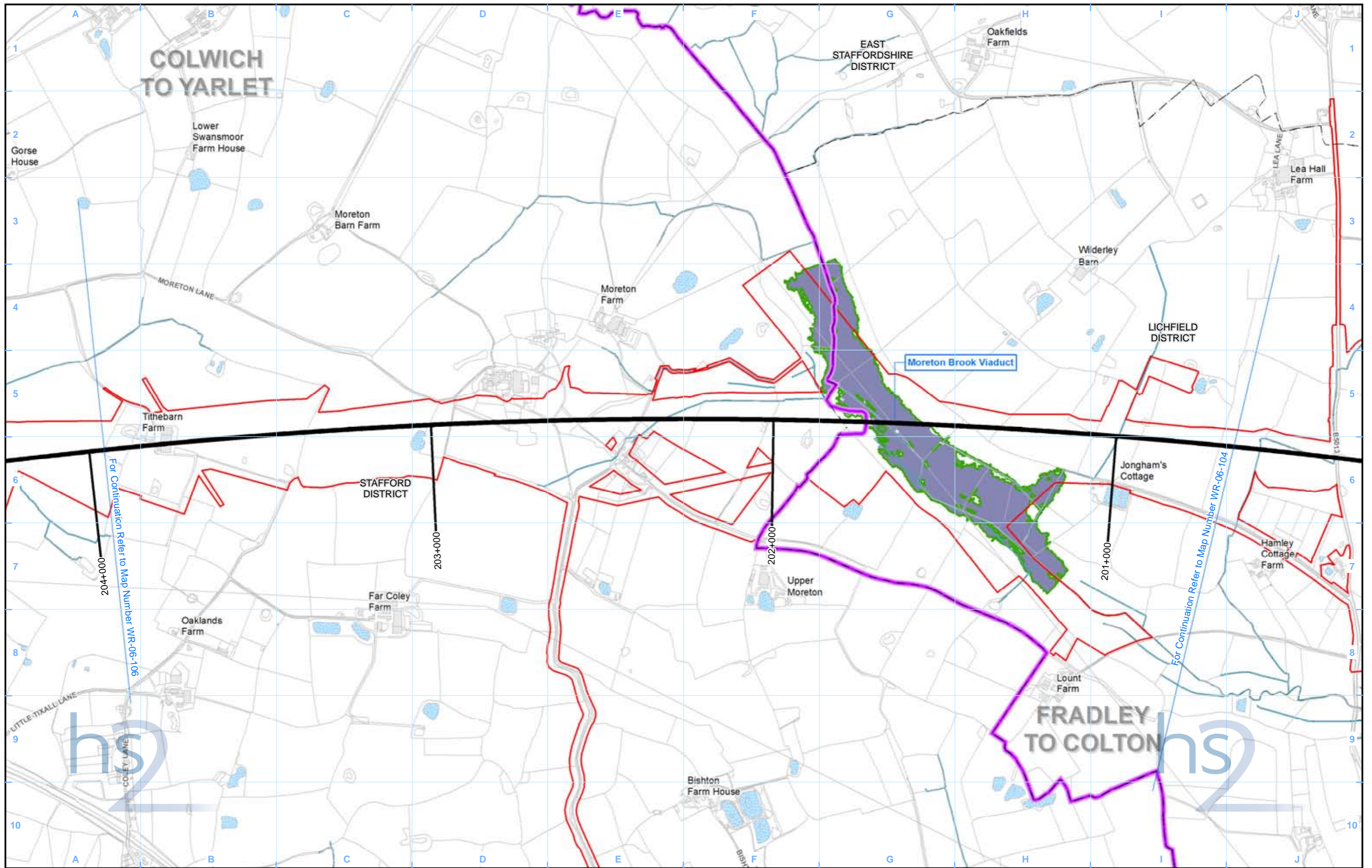
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Date: 14/06/17



- Legend**
- Route in tunnel
 - Route on surface
 - Depot, station, headhouse or portal building
 - Land potentially required during construction
 - Community area boundary
 - County boundary
 - District/Borough boundary
 - Watercourse
 - Culverted watercourse
 - Canal
 - Canal tunnel
 - Open water
 - Registered Park and Garden
 - Modelled Baseline Flood Extent 1 in 20 (5%) Annual Probability of River Flooding
 - Modelled Post Development Flood Extent 1 in 20 (5%) Annual Probability of River Flooding

Map Number
WR-06-105b

Map Name
Modelled Baseline and Post Development Flood Extent 1 in 20 (5%) Annual Probability of River Flooding

Community Area 2:
Colwich to Yarlet

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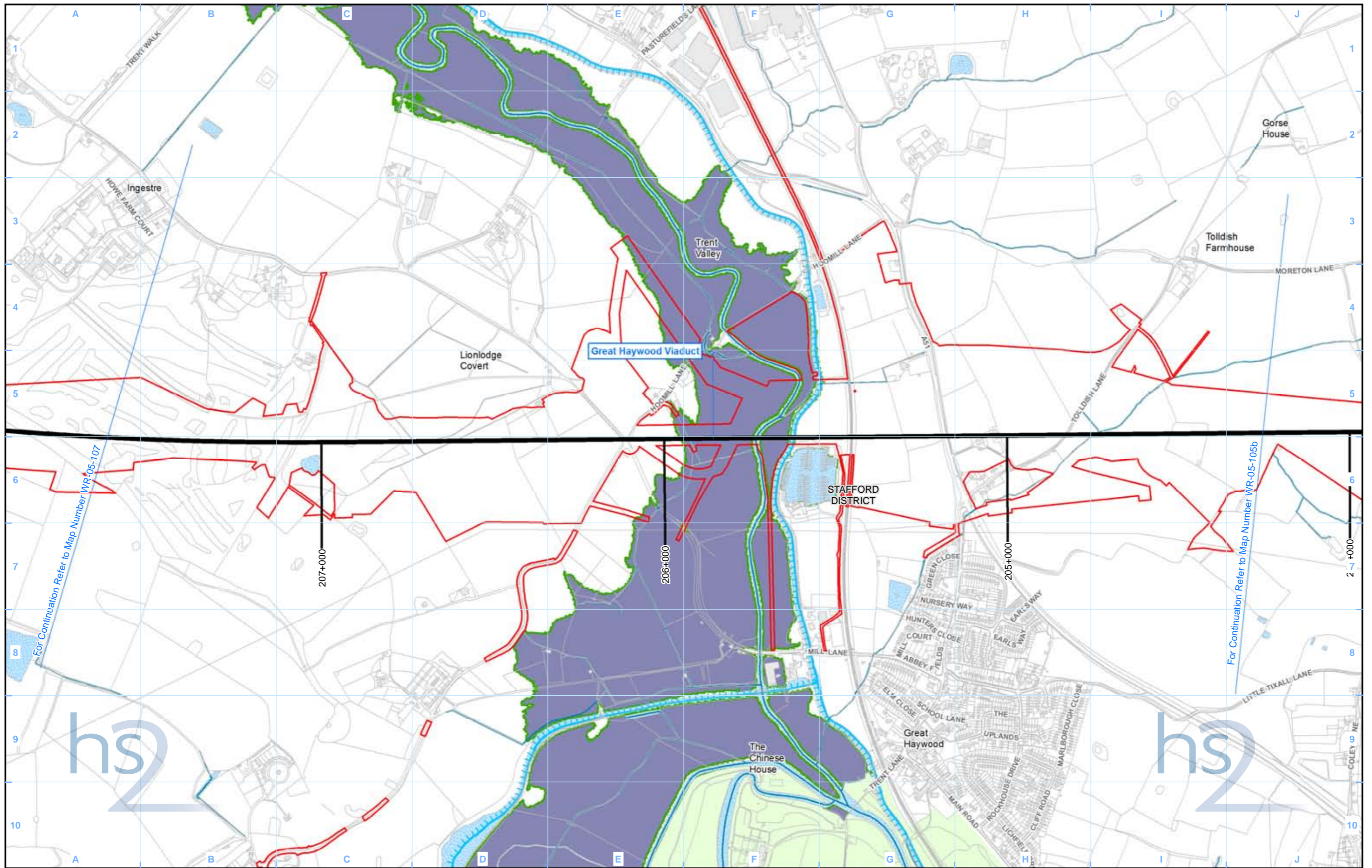
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- Legend**
- Route in tunnel
 - Route on surface
 - Depot, station, headhouse or portal building
 - Land potentially required during construction
 - Community area boundary
 - County boundary
 - District/Borough boundary
 - Watercourse
 - Culverted watercourse
 - Canal
 - Canal tunnel
 - Open water
 - Registered Park and Garden
 - Modelled Baseline Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding
 - Modelled Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding

Map Number: WR-05-106

Map Name: Modelled Baseline and Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding

Community Area 2: Colwich to Yarlet

Map Number: WR-05-106

Map Name: Modelled Baseline and Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding

Community Area 2: Colwich to Yarlet

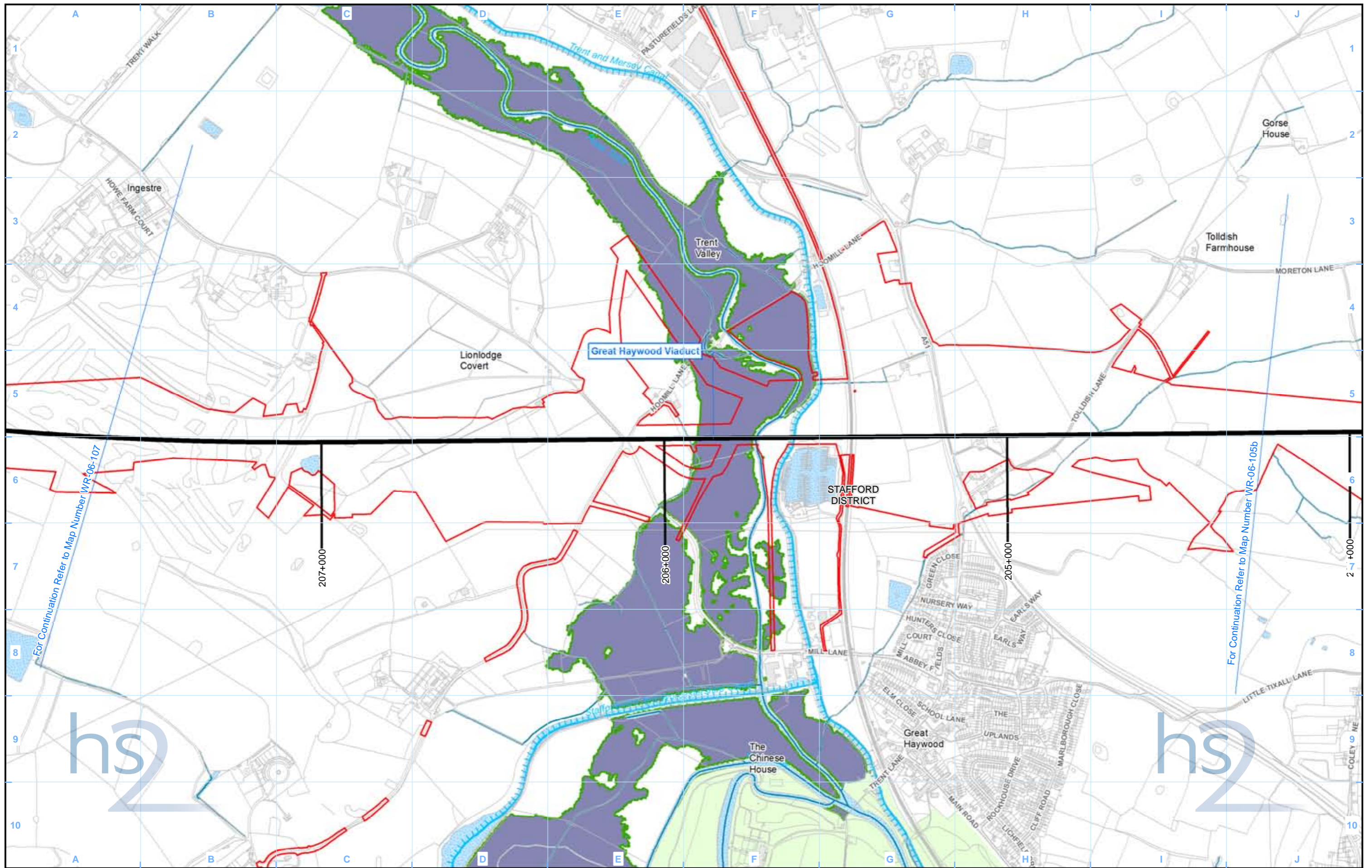
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Legend			
	Route in tunnel		District/Borough boundary
	Route on surface		Watercourse
	Depot, station, headhouse or portal building		Culverted watercourse
	Land potentially required during construction		Canal
	Community area boundary		Canal tunnel
	County boundary		Open water
			Registered Park and Garden
			Modelled Baseline Flood Extent 1 in 20 (5%) Annual Probability of River Flooding
			Modelled Post Development Flood Extent 1 in 20 (5%) Annual Probability of River Flooding

Map Number	WR-06-106
Map Name	Modelled Baseline and Post Development Flood Extent 1 in 20 (5%) Annual Probability of River Flooding
Community Area 2:	Colwich to Yarlet

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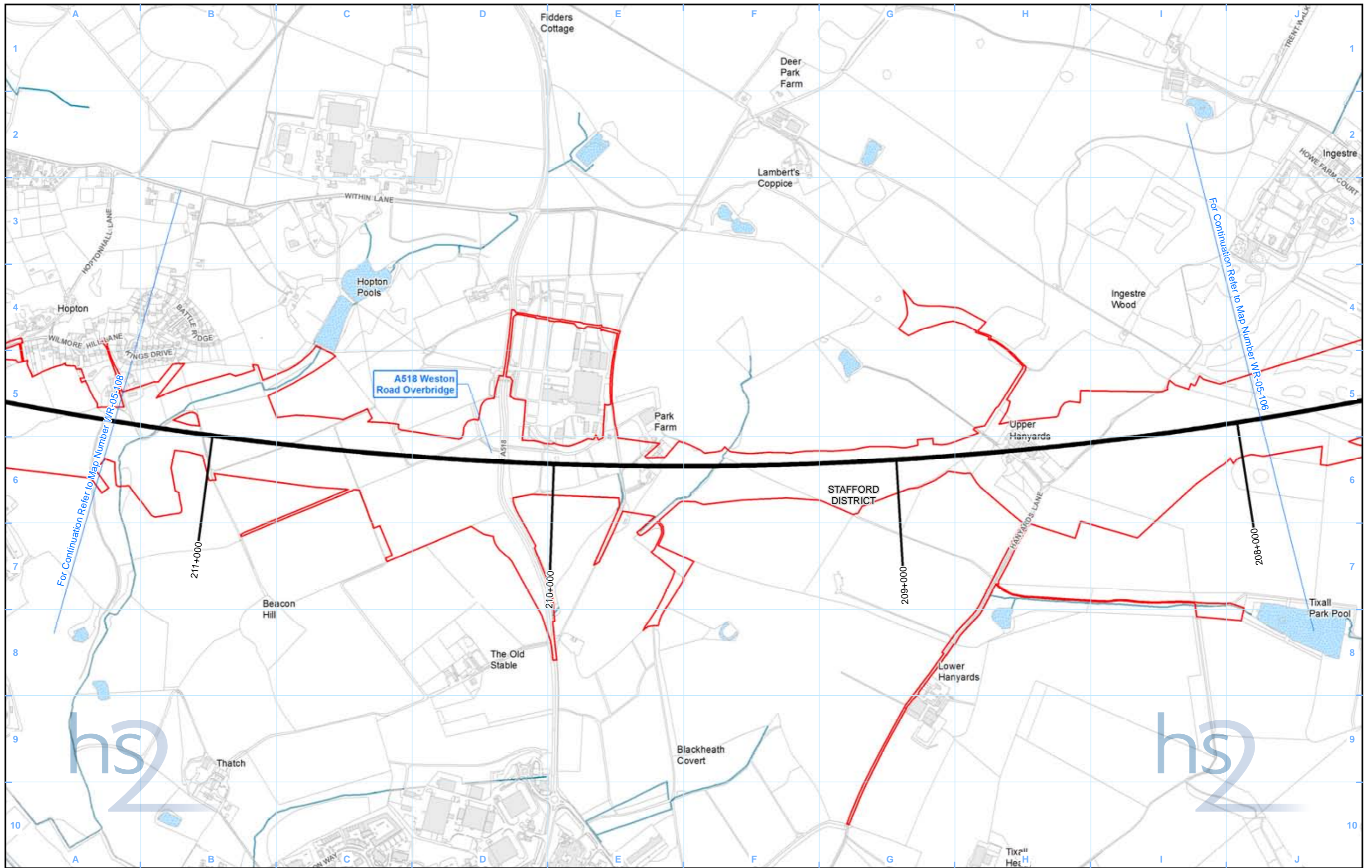
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Scale at A3: 1:10,000

Metres

Date: 14/06/17



Legend	
	Route in tunnel
	Route on surface
	Depot, station, headhouse or portal building
	Land potentially required during construction
	Community area boundary
	County boundary
	District/Borough boundary
	Watercourse
	Culverted watercourse
	Canal
	Canal tunnel
	Open water
	Registered Park and Garden
	Modelled Baseline Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding
	Modelled Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding

Map Number	WR-05-107
Map Name	Modelled Baseline and Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding
Community Area 2:	Colwich to Yarlet

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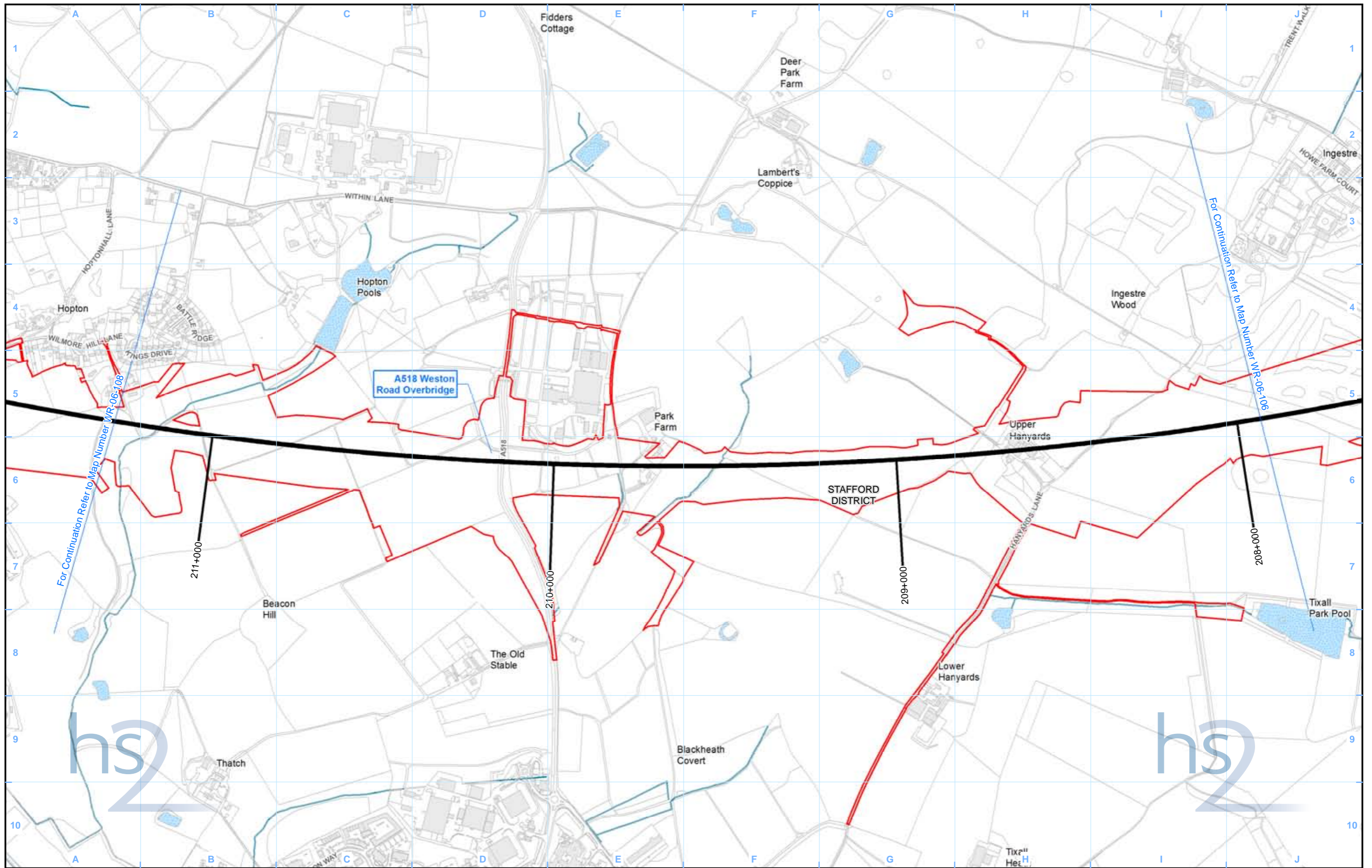
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Doc Number: C861-ARP-EV-MAP-000-155207-P04

Date: 14/06/17

Scale at A3: 1:10,000

Metres



Legend

Route in tunnel	District/Borough boundary	Modelled Baseline Flood Extent 1 in 20 (5% Annual Probability of River Flooding)
Route on surface	Watercourse	Modelled Post Development Flood Extent 1 in 20 (5% Annual Probability of River Flooding)
Depot, station, headhouse or portal building	Culverted watercourse	Canal
Land potentially required during construction	Canal tunnel	Open water
Community area boundary	Registered Park and Garden	
County boundary		

Map Number	WR-06-107
Map Name	Modelled Baseline and Post Development Flood Extent 1 in 20 (5% Annual Probability of River Flooding)
Community Area 2:	Colwich to Yarlet

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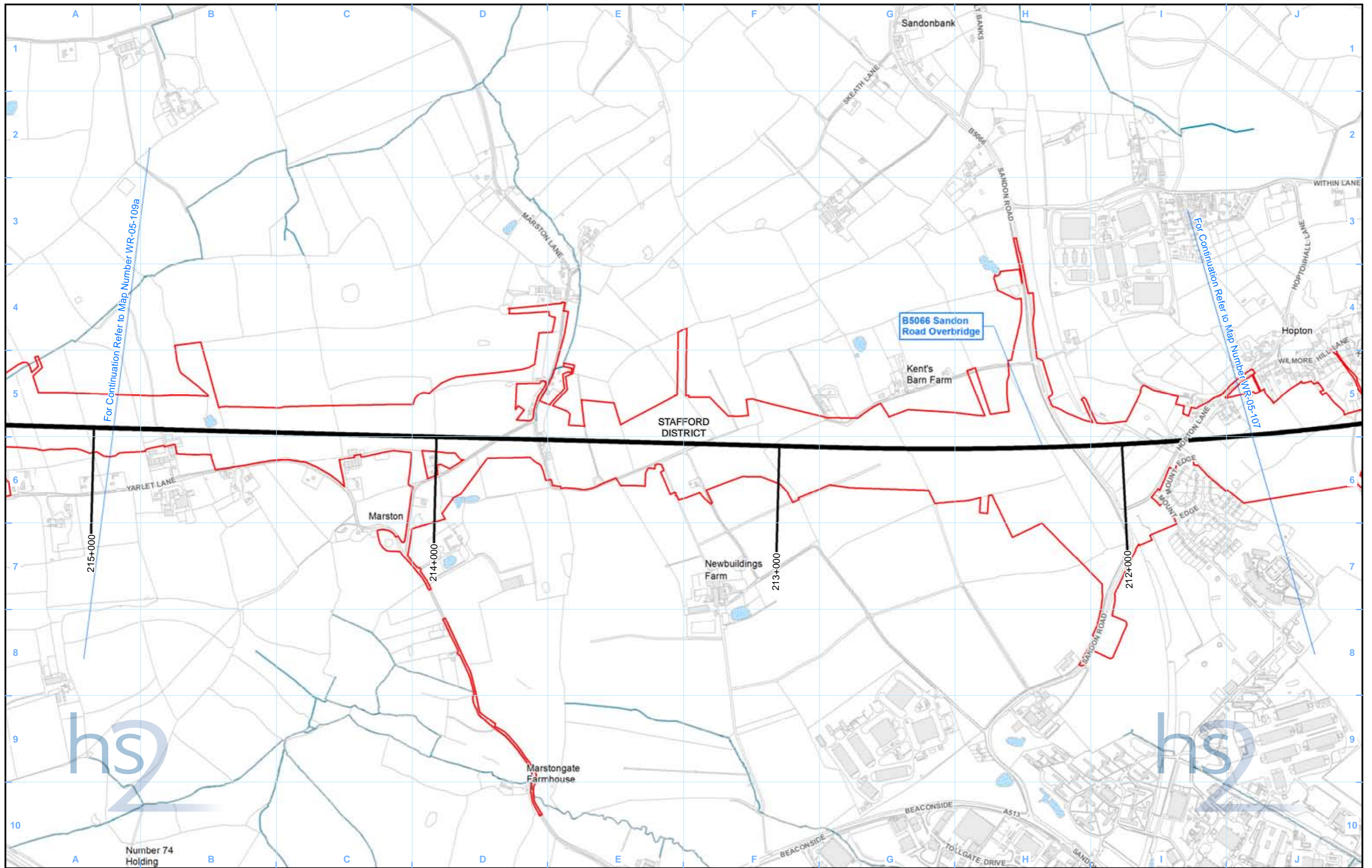
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0 100 200 300 400 Metres

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- Legend**
- Route in tunnel
 - Route on surface
 - Depot, station, headhouse or portal building
 - Land potentially required during construction
 - Community area boundary
 - County boundary
 - District/Borough boundary
 - Watercourse
 - Culverted watercourse
 - Canal
 - Canal tunnel
 - Open water
 - Registered Park and Garden
 - Modelled Baseline Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding
 - Modelled Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding

Map Number	WR-05-108
Map Name	Modelled Baseline and Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding
Community Area 2: Colwich to Yarlet	

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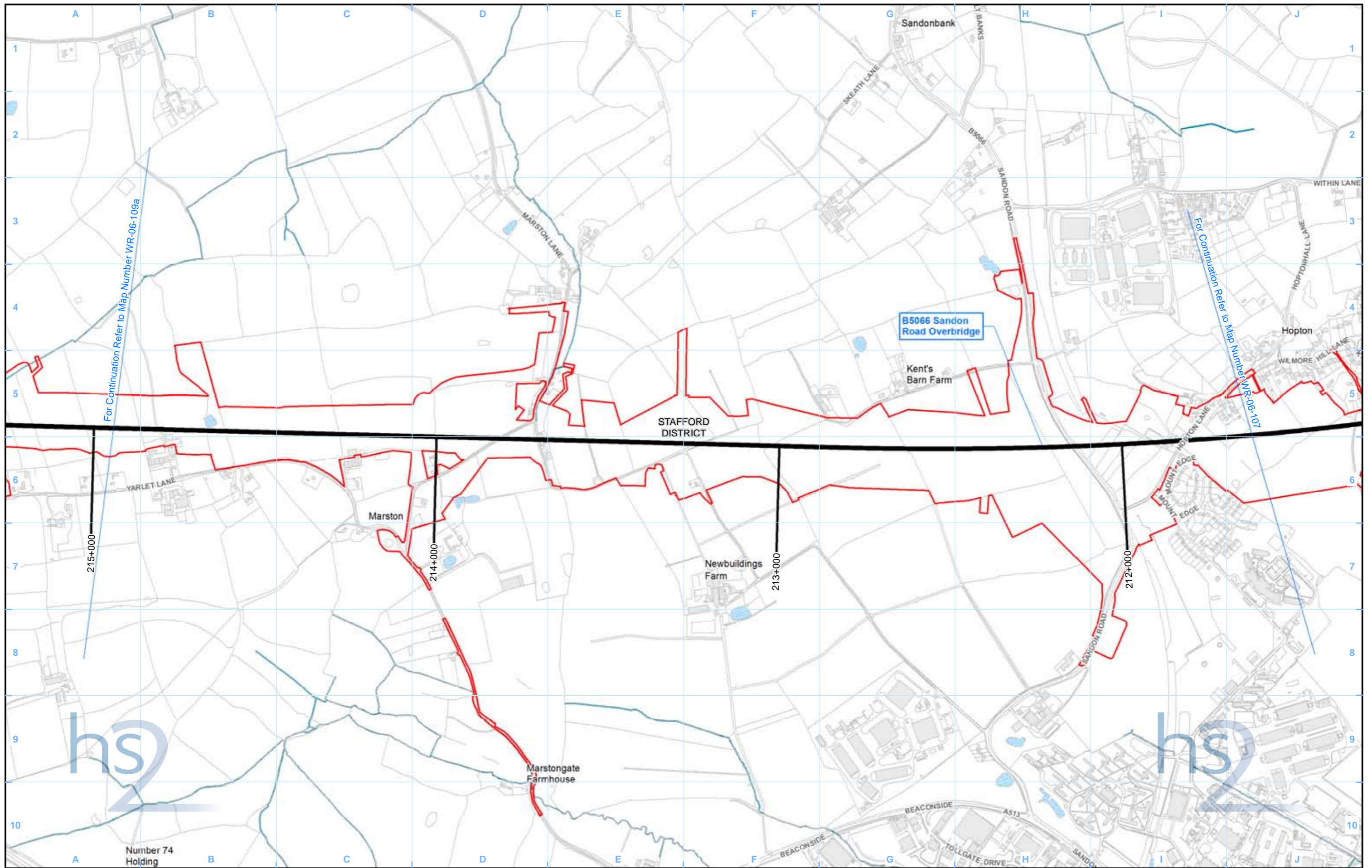
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Legend			
	Route in tunnel		District/Borough boundary
	Route on surface		Modelled Baseline Flood Extent 1 in 20 (5%) Annual Probability of River Flooding
	Depot, station, headhouse or portal building		Modelled Post Development Flood Extent 1 in 20 (5%) Annual Probability of River Flooding
	Land potentially required during construction		Canal
	Community area boundary		Canal tunnel
	County boundary		Open water
			Registered Park and Garden

Map Number	WR-06-108
Map Name	Modelled Baseline and Post Development Flood Extent 1 in 20 (5%) Annual Probability of River Flooding
Community Area 2: Colwich to Yarlet	

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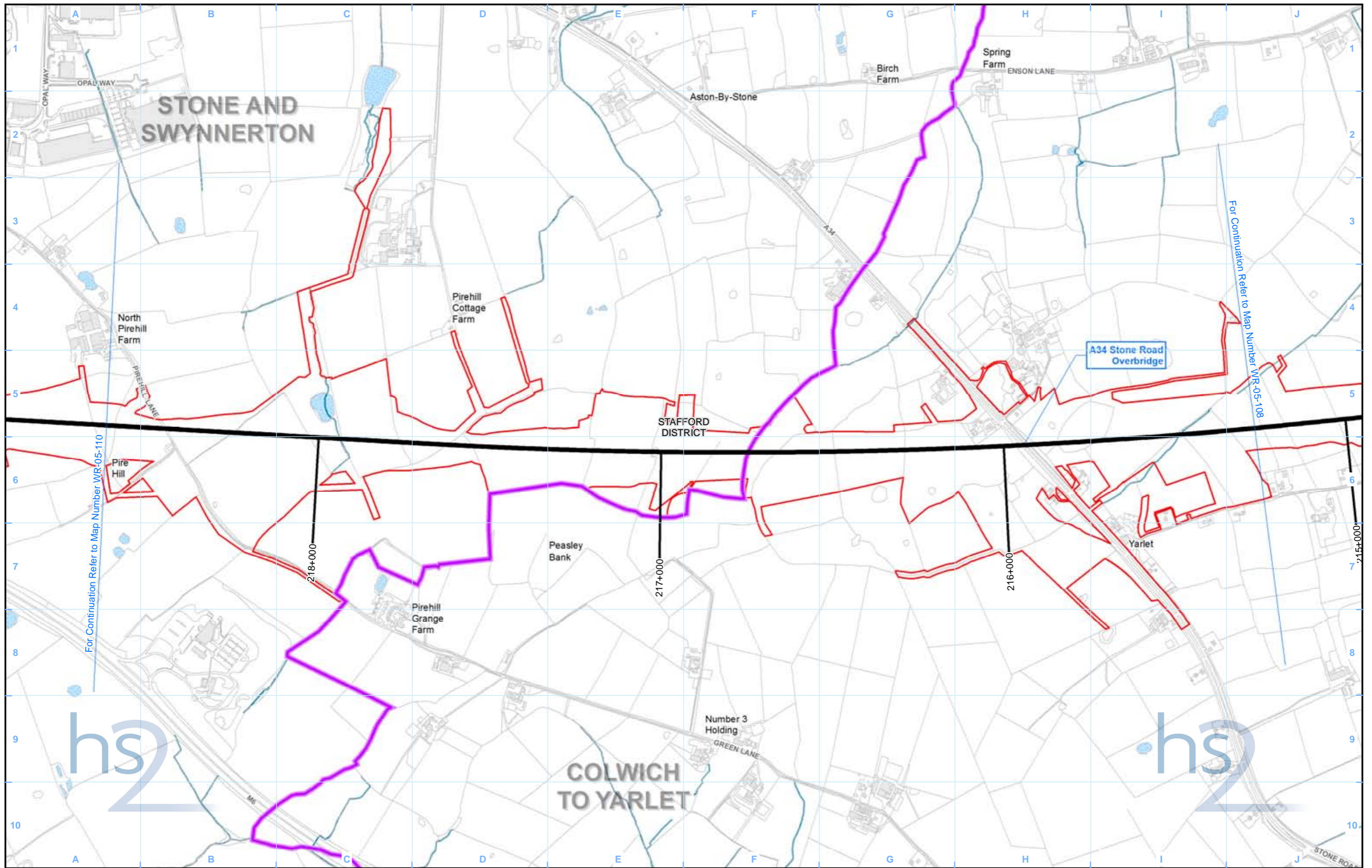
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Doc Number: C861-ARP-EV-MAP-000-156208-P04

Date: 14/06/17



- Legend**
- Route in tunnel
 - Route on surface
 - Depot, station, headhouse or portal building
 - Land potentially required during construction
 - Community area boundary
 - County boundary
 - District/Borough boundary
 - Watercourse
 - Culverted watercourse
 - Canal
 - Canal tunnel
 - Open water
 - Registered Park and Garden
 - Modelled Baseline Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding
 - Modelled Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding

Map Number	WR-05-109a
Map Name	Modelled Baseline and Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding
Community Area 2:	Colwich to Yarlet

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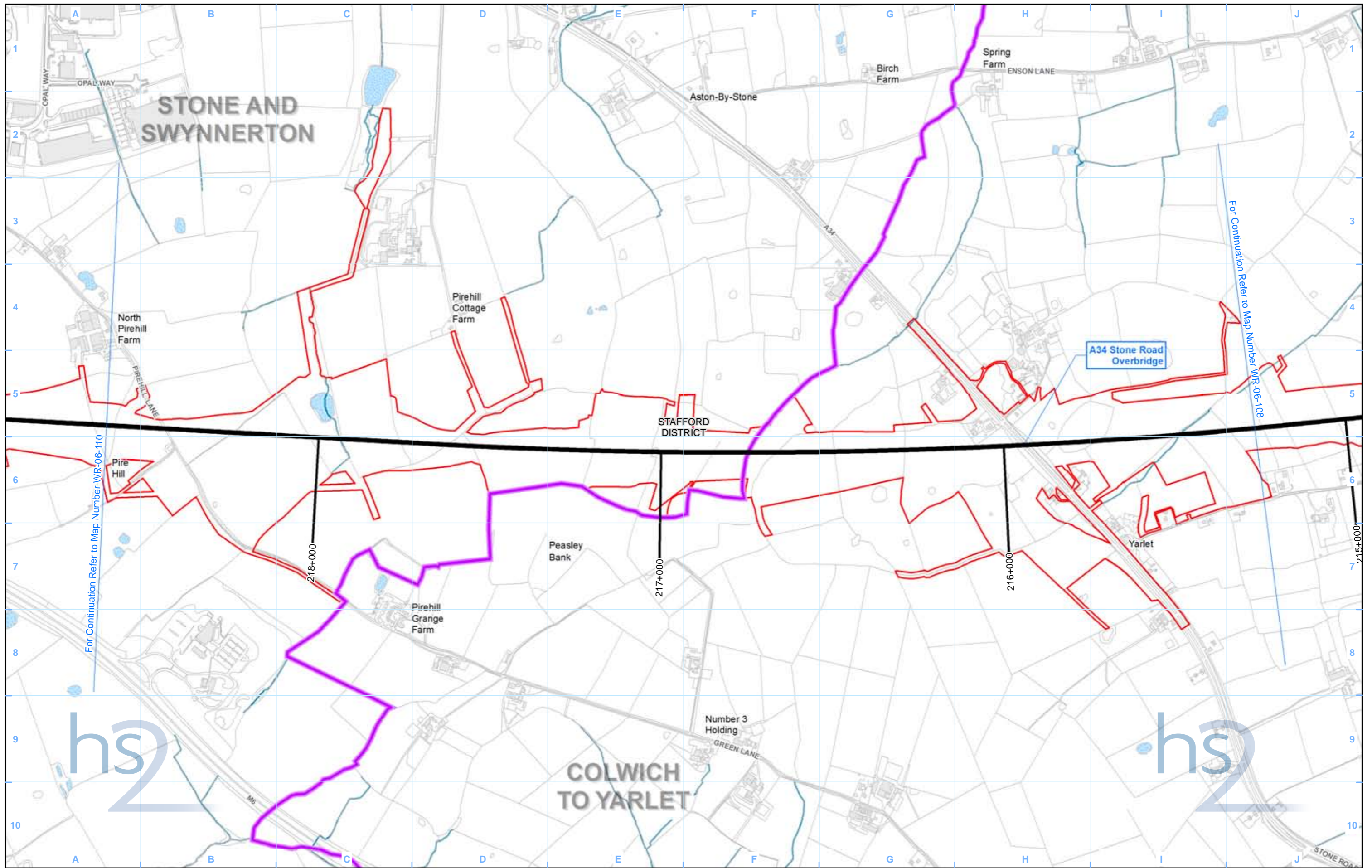
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Doc Number: C861-ARP-EV-MAP-000-155209-P04

Scale at A3: 1:10,000

Metres

Date: 14/06/17



- Legend**
- Route in tunnel
 - Route on surface
 - Depot, station, headhouse or portal building
 - Land potentially required during construction
 - Community area boundary
 - County boundary
 - District/Borough boundary
 - Watercourse
 - Culverted watercourse
 - Canal
 - Canal tunnel
 - Open water
 - Registered Park and Garden
 - Modelled Baseline Flood Extent 1 in 20 (5%) Annual Probability of River Flooding
 - Modelled Post Development Flood Extent 1 in 20 (5%) Annual Probability of River Flooding

Map Number
WR-06-109a

Map Name
Modelled Baseline and Post Development Flood Extent 1 in 20 (5%) Annual Probability of River Flooding

Community Area 2:
Colwich to Yarlet

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High Speed Rail (West Midlands-Crewe)

Environmental Statement

CA3 Stone and Swynnerton

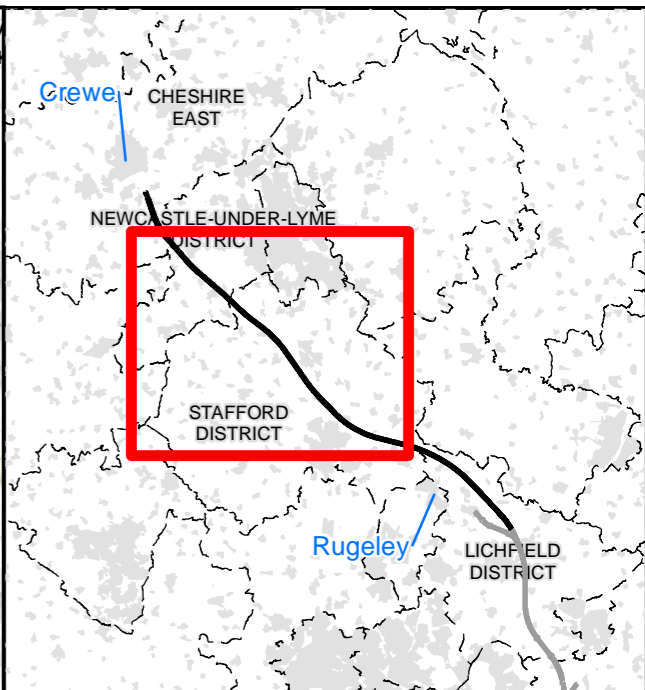
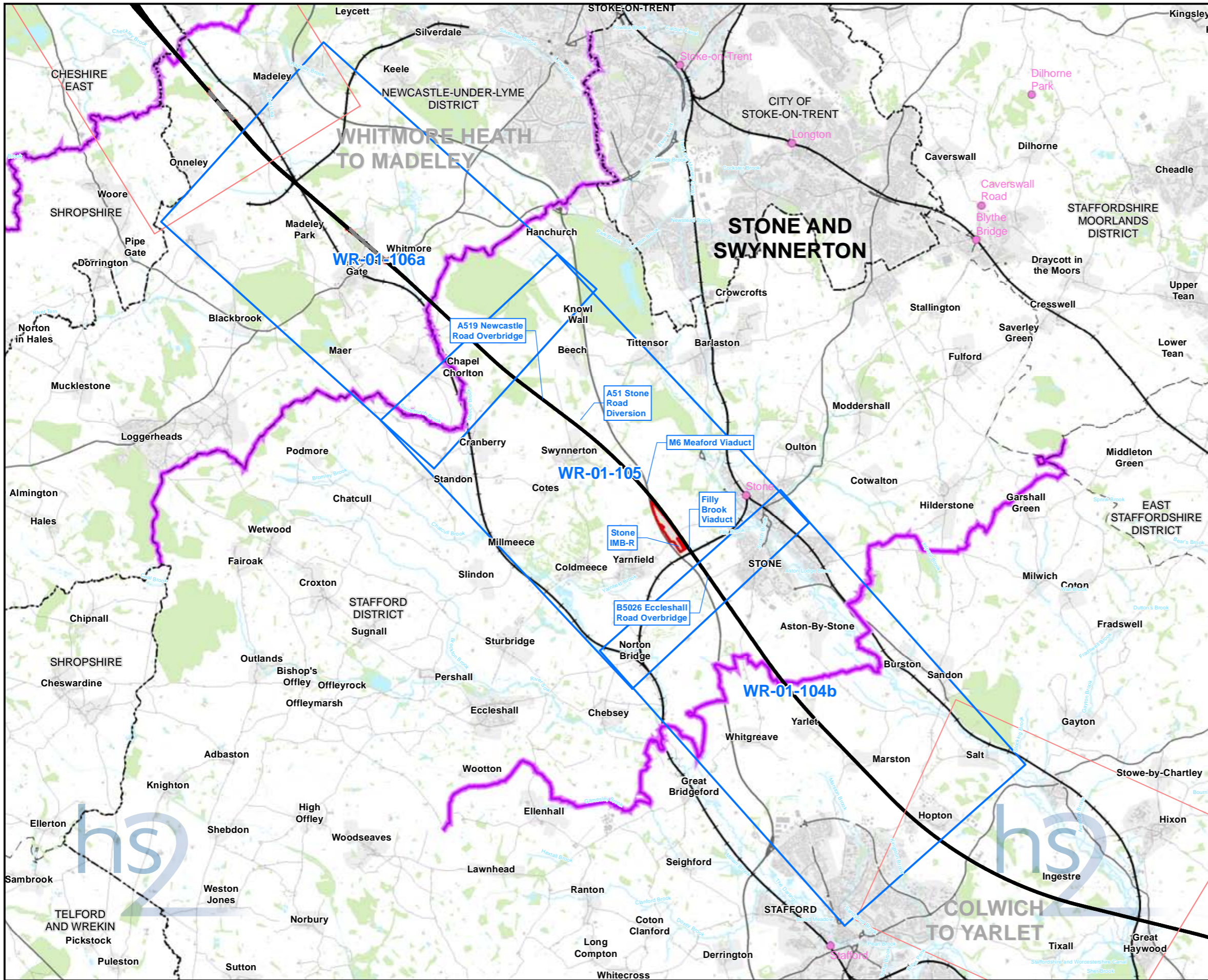
WR-01 - Surface Water Baseline

WR-02 - Groundwater Baseline

WR-03 - Water Framework Directive

**WR-05 - Modelled Baseline and Post Development Flood
Extent 1 in 100 (1%+CC) including Climate Change
Annual Probability of River Flooding**

**WR-06 - Modelled Baseline and Post Development Flood
Extent 1 in 20 (5%) Annual Probability of River Flooding**



Map Series Information:

This map series shows surface water features such as rivers, streams, ponds, canals and reservoirs, flood zones, and surface water abstractions as referred to in the ES.

All points where the alignment crosses a watercourse are also shown and labelled with their reference in the text. These are shown as "Surface Water Crossings (SWC)".

The design of the Proposed Scheme will be informed through stakeholder engagement and further engineering and environmental studies

Main Map Legend	
	Route in tunnel
	Route on surface
	Depot, station, headhouse or portal building
	Community area boundary
	Existing railway station
	County boundary
	District/Borough boundary
	Map sheets included in this community area
	Map sheets not included in this community area

Map Number	WR-01-INDEX-CA3
Map Name	Index Map of: Surface Water Baseline
	Community Area 3: Stone and Swynnerton

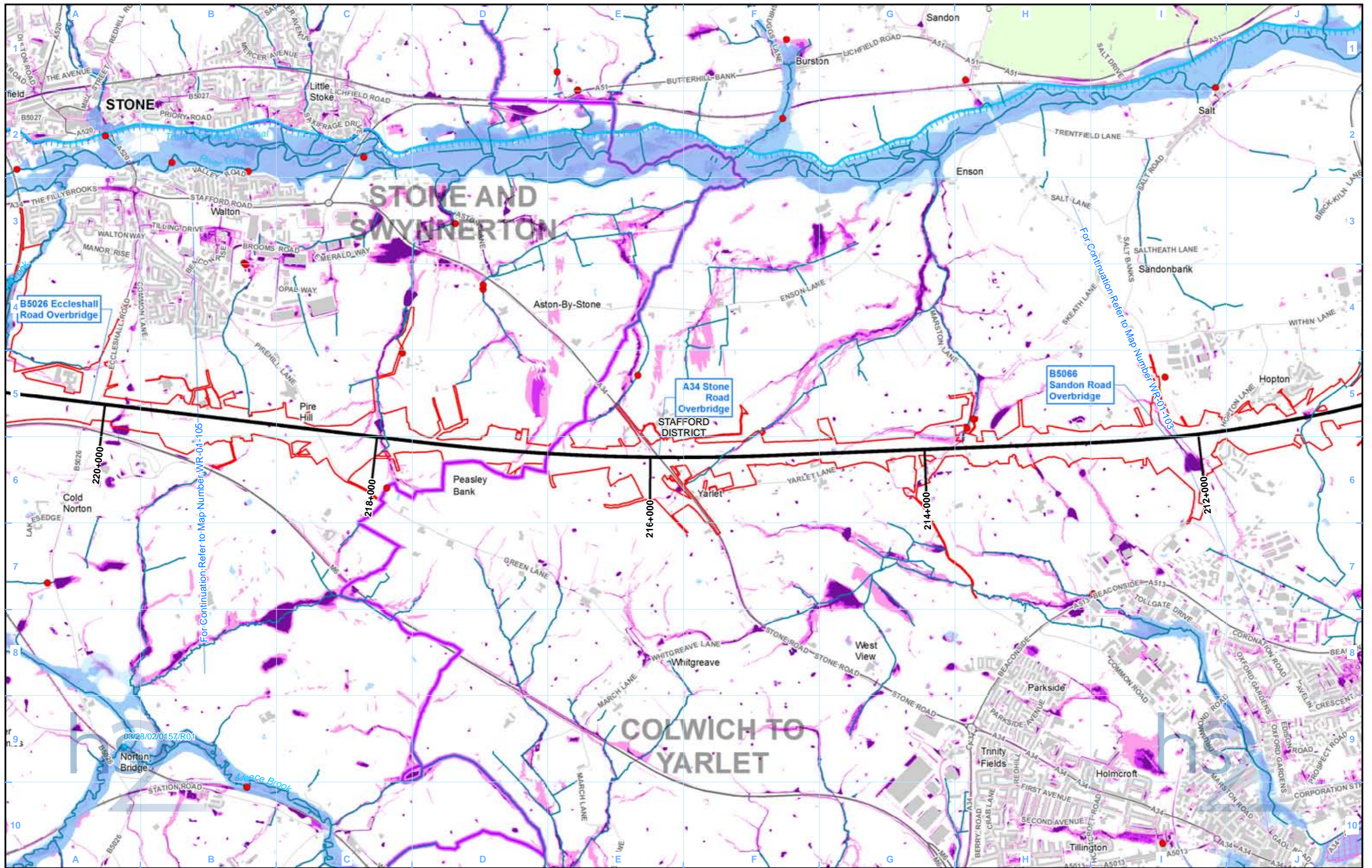
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03/23/02/0157/R01

- Legend**
- Route in bored tunnel
 - Route on surface
 - Depot, station, headhouse or portal building
 - Land potentially required during construction
 - Community area boundary
 - County boundary
 - District/Borough boundary
 - Licensed surface water abstraction (excluding public water supplies)
 - Unlicensed private surface water abstractions
 - Consented discharge to surface water
 - Watercourse
 - Culverted watercourse
 - Canal
 - Canal tunnel
 - Lakes & Reservoirs
 - Historic flooding area
 - Flood Zone 2
 - Flood Zone 3
 - High - chance of flooding greater than 1 in 30 (3.33%)
 - Medium - chance of flooding between 1 in 100 (1%) and 1 in 30 (3.33%)
 - Low - chance of flooding between 1 in 1000 (0.1%) and 1 in 100 (1%)

Map Number: WR-01-104b

Map Name: Surface Water Baseline

Community Area 3: Stone and Swynnerton

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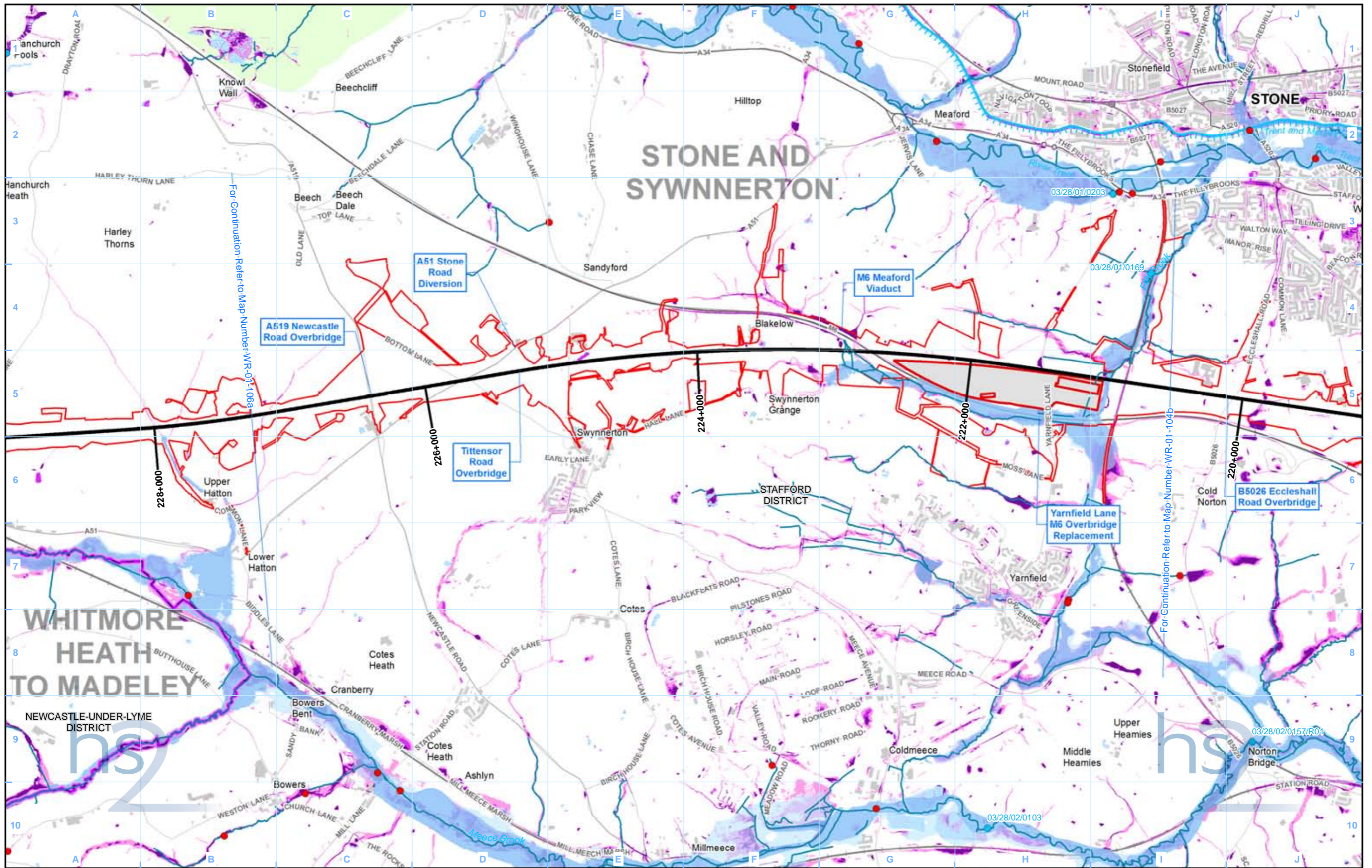
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Date: 14/06/17



Legend	
	Route in bored tunnel
	Route on surface
	Depot, station, headhouse or portal building
	Land potentially required during construction
	Community area boundary
	County boundary
	District/Borough boundary
	Licensed surface water abstraction (excluding public water supplies)
	Unlicensed private surface water abstractions
	Consented discharge to surface water
	Watercourse
	Culverted watercourse
	Canal
	Canal tunnel
	Lakes & Reservoirs
	Historic flooding area
	Flood Zone 2
	Flood Zone 3
	High - chance of flooding greater than 1 in 30 (3.33%)
	Medium - chance of flooding between 1 in 100 (1%) and 1 in 30 (3.33%)
	Low - chance of flooding between 1 in 1000 (0.1%) and 1 in 100 (1%)

Map Number	WR-01-105
Map Name	Surface Water Baseline
Community Area 3: Stone and Swynnerton	

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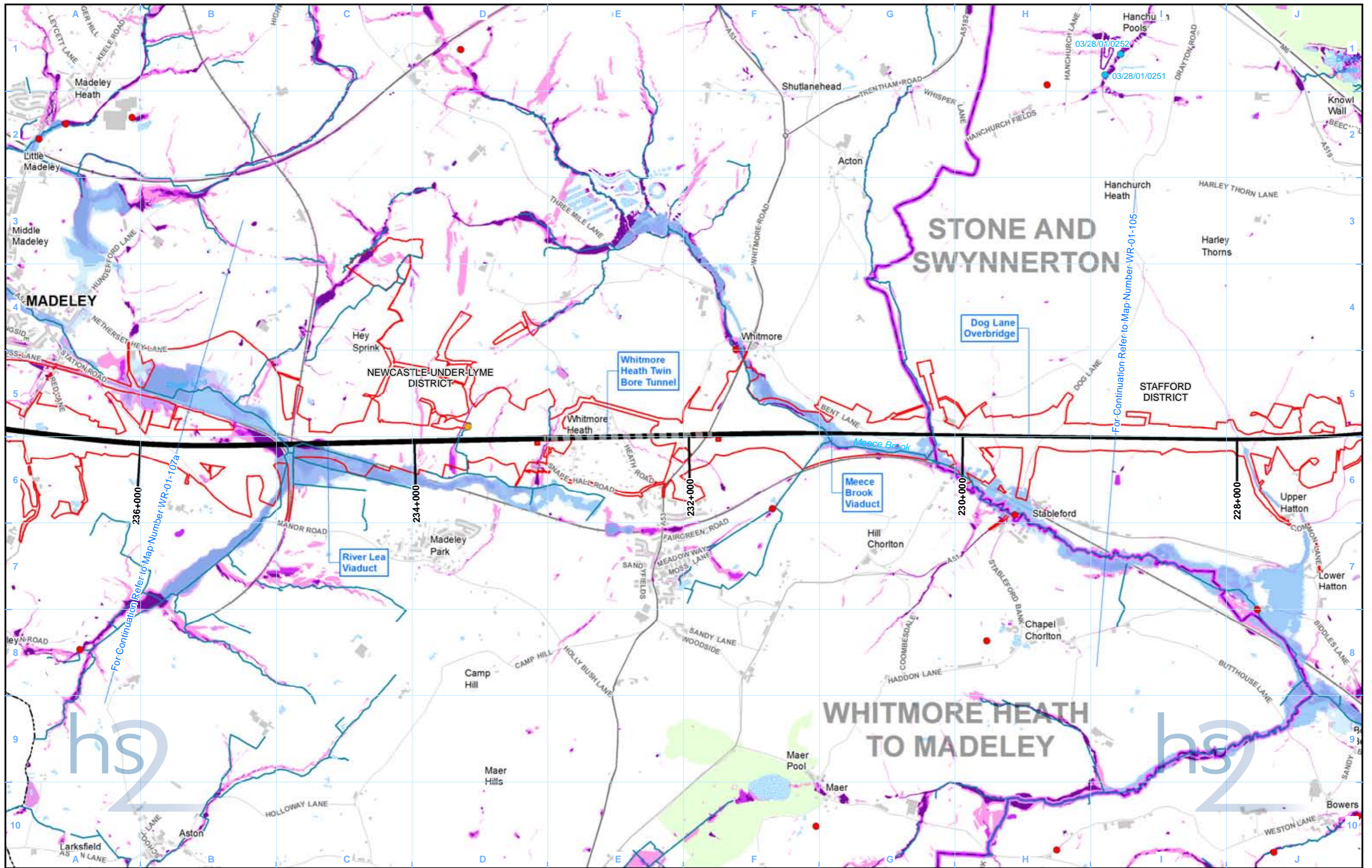
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Date: 14/06/17



Legend

- Route in bored tunnel
- Route on surface
- Depot, station, headhouse or portal building
- Land potentially required during construction
- Community area boundary
- County boundary

- District/Borough boundary
- Licensed surface water abstraction (excluding public water supplies)
- Unlicensed private surface water abstractions
- Consented discharge to surface water
- Watercourse
- Culverted watercourse

- Canal
- Canal tunnel
- Lakes & Reservoirs
- Historic flooding area
- Flood Zone 2
- Flood Zone 3

- High - chance of flooding greater than 1 in 30 (3.33%)
- Medium - chance of flooding between 1 in 100 (1%) and 1 in 30 (3.33%)
- Low - chance of flooding between 1 in 1000 (0.1%) and 1 in 100 (1%)

Map Number: WR-01-106a

Map Name: Surface Water Baseline

Community Area 3: Stone and Swynnerton

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Date: 14/06/17

Superficial Deposits

- Alluvium [ALV-CZPS] (Secondary A)
Alluvium [ALV-XCZSV] (Secondary A)
River terrace deposits, 1 to 2 [T1T2-XSV] (Secondary A)
Enfield silt member [ESI-XCZ] (Non-Productive)
Glaciofluvial deposits, devensian [GFDUD-XSV] (Secondary A)
Glaciolacustrine deposits, devensian [GLLDD-XCZ] (Non-Productive)
Kempston park gravel formation [KPGR-XSV] (Secondary A)
Langley silt member [LASI-XCZ] (Non-Productive)
Shepperton gravel member [SHGR-XSV] (Principal)
Till, devensian [TILLD-DMTN] (Non-Productive)
Till, devensian [TILLD-XDSV] (Non-Productive)
Finsbury gravel member [FIGR-XSV] (Secondary A)
Hackney gravel member [HAGR-XSV] (Secondary A)
Lynch hill gravel member [LHGR-XSV] (Secondary A)
Taplow gravel formation [TPGR-XSV] (Principal/ Secondary A)
Boyn hill gravel member [BHT-XSV] (Secondary A)
Bosworth clay member [BOSW-XCZ] (Non-Productive)
Black park gravel member [BPGR-XSV] (Secondary A)
Dunsmore gravel [DMG-XSV] (Secondary A)
Lowestoft formation [LOFT-DMTN] (Non-Productive)
Oadby member [ODT-DMTN] (Non-Productive)
Thrusington member [THT-DMTN] (Non-Productive)
Winter hill gravel (lacustrine deposits) [WHGLD-XSV] (Secondary A)
Winter hill gravel [WHG-XSV] (Secondary A)
Westmill gravel member [WLGR-XSV] (Secondary A)
Dollis hill gravel member [DHGR-XSV] (Secondary A)
Gerrards cross gravel [GCGR-XSV] (Secondary A)
Glaciofluvial deposits, mid pleistocene [GFDMP-XSV] (Secondary A)
Glaciofluvial sheet deposits, mid pleistocene [GFSMP-XSV] (Secondary A)
Glaciofluvial terrace deposits, mid pleistocene [GFTMP-XSV] (Secondary A)
Glaciolacustrine deposits, mid pleistocene [GLLMP-XCZ] (Non-Productive)
Till, mid pleistocene [TILMP-DMTN] (Non-Productive)
Beaconsfield gravel [BDGR-XSV] (Secondary A)
Baginton sand and gravel formation [BGSX-XSV] (Secondary A)
Chorleywood gravel formation [CWGR-XSV] (Secondary A)
Glacial deposits [GDU-XCZS] ()
Glaciolacustrine deposits [GLLD-XCZ] (Non-Productive)
Holme pierrepoint sand and gravel member [HPSG-XSV] (Secondary A)
Interglacial lacustrine deposits [IGLD-XCZ] (Non-Productive)
Kesgrave catchment subgroup [KGCA-XSV] ()
Princes risborough sand and gravel [PRSG-XSV] ()
Stanmore gravel formation [STGR-XSV] (Secondary A)
Wasperton sand and gravel member [WAT-XSV] (Secondary A)
Westland green gravel [WGGR-XSV] (Secondary A)
Alluvial fan deposits [ALF-V] (Secondary A)
Glaciofluvial deposits [GFDU-XSV] (Secondary A)
Head [HEAD-V] (Secondary (Undifferentiated))
Head [HEAD-XCZ] (Secondary (Undifferentiated))
Head [HEAD-XCZSV] (Secondary (Undifferentiated))
Head, 1 [HEAD1-XCZSV] (Secondary (Undifferentiated))
Lacustrine deposits [LDE-XCZS] (Non-Productive)
Peat [PEAT-P] (N/A Aquifer)
River terrace deposits, 1 [RTD1-XSV] (Secondary A)
River terrace deposits, 2 [RTD2-XSV] (Secondary A)
River terrace deposits, 3 [RTD3-XSV] (Secondary A)
River terrace deposits, 4 [RTD4-XSV] (Secondary A)
River terrace deposits (undifferentiated) [RTDU-XSV] (Secondary A)
Sand and gravel of uncertain age and origin [SGAO-XSV] (Secondary A)
Tufa [TUFA-CATUFA] (Aquifer)
Wolston sand and gravel [WOSG-XSV] (Secondary A)
Clay-with-flints formation [CWF-XCZSV] (Non-Productive)

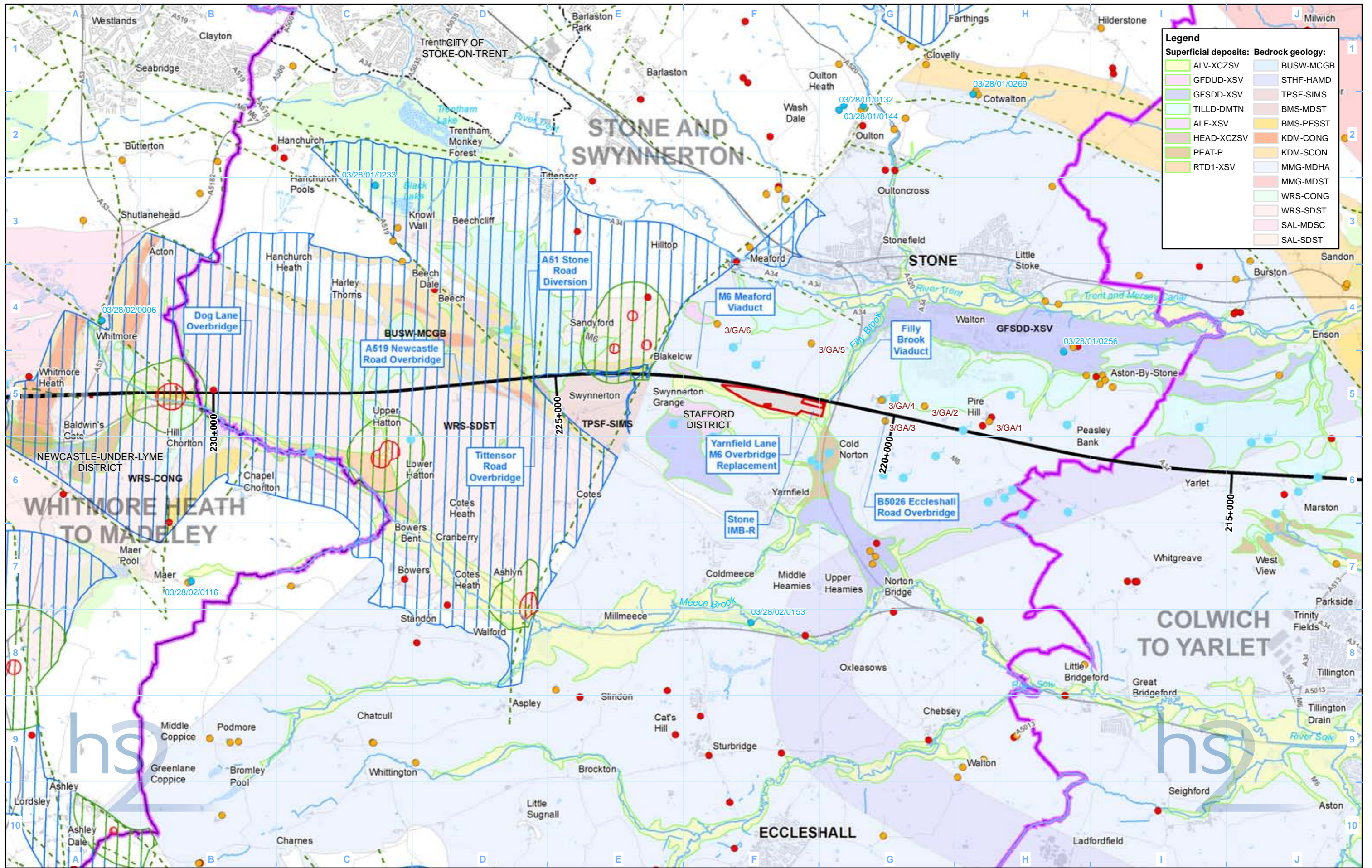
Bedrock Geology

- Bagshot formation - sand [BGS-SANDU] (Secondary A)
Claygate member - clay, silt and sand [CLGB-CLSISA] (Secondary A)
Claygate member - sand, silt and clay [CLGB-SSCL] (Secondary A)
London clay formation - clay and silt [LC-CLSI] (Non-Productive)
London clay formation - clay, silt and sand [LC-CLSISA] (Non-Productive)
Thanet formation - sand [TAB-SANDU] (Secondary A)
Lambeth group - clay, silt and sand [LMBE-CLSISA] (Secondary A)
Seaford chalk formation and newhaven chalk formation (undifferentiated) - chalk [SNCK-CHLK] (Principal)
Chalk rock member - chalk [CKR-CHLK] (Principal)
Lewes nodular chalk formation - chalk [LECH-CHLK] (Principal)
Lewes nodular chalk formation and seaford chalk formation (undifferentiated) - chalk [LESE-CHLK] (Principal)
Lewes nodular chalk formation and newhaven chalk formation (undifferentiated) - chalk [LSNCK-CHLK] (Principal)
New pit chalk formation - chalk [NPCH-CHLK] (Principal)
Glauconitic marl member - sandstone, glauconitic [GLML-GLSST] (Principal)
Holywell nodular chalk formation - chalk [HCK-CHLK] (Principal)
Holywell nodular chalk formation and new pit chalk formation (undifferentiated) - chalk [HNCK-CHLK] (Principal)
Melbourn rock member - chalk [MR-CHLK] (Principal)
Totterhoe stone member - chalk [TTST-CHLK] (Principal)
West melbury marly chalk formation - chalk [WMCH-CHLK] (Principal)
West melbury marly chalk formation and zig zag chalk formation (undifferentiated) - chalk [WZCK-CHLK] (Principal)
Zig zag chalk formation - chalk [ZZCH-CHLK] (Principal)
Gault formation - mudstone [GLT-MDST] (Non-Productive)
Gault formation and upper greensand formation (undifferentiated) - mudstone, siltstone and sandstone [GUGS-MDSS] (Non-Productive)
Upper greensand formation - siltstone and sandstone [UGS-SISD] (Non-Productive)
Lower greensand group - sandstone [LGS-SDST] (Secondary A)
Whitchurch sand formation - mudstone [WHS-MDST] (Secondary A)
Whitchurch sand formation - sandstone [WHS-SDST] (Secondary A)
Purbeck group - limestone and [subequal/subordinate] argillaceous rocks, interbedded [PB-LMAR] (Principal)
Portland group - limestone and calcareous sandstone [PL-LMCS] (Principal)
Portland sand formation - sandstone, calcareous [POSA-CALSST] (Secondary A)
Portland sand formation - limestone and calcareous sandstone [POSA-LMCS] (Secondary A)
Portland stone formation - limestone [POST-LMST] (Principal)
Kimmeridge clay formation - mudstone [KC-MDST] (Non-Productive)
Kimmeridge clay formation - siltstone and sandstone [KC-SISD] (Non-Productive)
Amrgrove spiculite member - sandstone [AGSP-SDST] (Secondary A)
Amphill clay formation - mudstone [AMC-MDST] (Non-Productive)
Oakley member - limestone and mudstone, interbedded [OKLY-LMMD] (Secondary A)
Weymouth member - mudstone [WEY-MDST] (Non-Productive)
West walton formation and amphill clay formation (undifferentiated) - mudstone [WWAC-MDST] (Non-Productive)
West walton formation - limestone and [subequal/subordinate] argillaceous rocks, interbedded [WWWB-LMAR] (Non-Productive)
West walton formation - mudstone [WWWB-MDST] (Non-Productive)
Kellaways formation - sandstone, siltstone and mudstone [KLB-SDSM] (Secondary A)
Kellaways clay member - mudstone [KLC-MDST] (Secondary A)
Kellaways sand member - sandstone and siltstone, interbedded [KLS-SDSL] (Secondary A)
Peterborough member - mudstone [PET-MDST] (Non-Productive)
Stewartby member - mudstone [SBY-MDST] (Non-Productive)
Bladon member - limestone [BLAD-LMST] (Principal)
Bladon member - mudstone and limestone, interbedded [BLAD-MDLM] (Principal)
Blisworth clay formation - mudstone [BWC-MDST] (Principal)
Blisworth limestone formation - limestone [BWL-LMST] (Principal)
Combrash formation - limestone [CB-LMST] (Secondary A)
Forest marble formation - limestone [FMB-LMST] (Secondary A)
Forest marble formation - limestone and mudstone, interbedded [FMB-LMMD] (Secondary A)
Great oolite group - limestone and [subequal/subordinate] argillaceous rocks, interbedded [GOG-LMAR] (Principal To Secondary B)
Sharp's hill formation - argillaceous rocks with subordinate sandstone and limestone [SHHB-ARSL] (Secondary A)
Taynton limestone formation - limestone, ooidal [TY-LMOOL] (Principal)
Wellingborough limestone member - limestone [WBRO-LMST] (Secondary A)
White limestone formation - limestone [WHL-LMST] (Principal)
Horsehay sand formation - sandstone [HYSA-SDST] (Secondary A)
Rutland formation - mudstone [RLD-MDST] (Secondary B)
Stamford member - sandstone and siltstone, interbedded [STAM-SDSL] (Secondary A)
Northampton sand formation - sandstone, limestone and ironstone [NS-SDLI] (Secondary A)
Whitby mudstone formation - mudstone [WHM-MDST] (Non-Productive)
Dyrham formation - siltstone and mudstone, interbedded [DYS-SIMD] (Secondary (Undifferentiated))
Marlstone rock formation - ferruginous limestone and ironstone [MRB-FLIR] (Secondary A)
Marlstone rock formation - limestone, ferruginous [MRB-FLMST] (Secondary A)
Charmouth mudstone formation - limestone [CHAM-LMST] (Secondary (Undifferentiated))
Charmouth mudstone formation - mudstone [CHAM-MDST] (Non-Productive)
Rugby limestone member - mudstone and limestone, interbedded [RLS-MDLM] (Secondary A)
Langport member - limestone [LPMB-LMST] (Secondary (Undifferentiated))
Penarth group - argillaceous rock and [subequal/subordinate] limestone, interbedded [PNG-AROCLS] (Secondary B)
Penarth group - mudstone [PNG-MDST] (Secondary B)
Saltford shale member - limestone [SASH-LMST] (Secondary B)

- Saltford shale member - mudstone [SASH-MDST] (Secondary B)
Westbury formation - mudstone [WBY-MDST] (Secondary (Undifferentiated))
Westbury formation - sandstone [WBY-SDST] (Secondary (Undifferentiated))
Wilmcote limestone member - mudstone and limestone, interbedded [WCT-MDLM] (Secondary (Undifferentiated))
Blue anchor formation - mudstone and siltstone [BAN-MDSI] (Secondary (Undifferentiated))
Blue anchor formation - mudstone [BAN-MDST] (Secondary (Undifferentiated))
Arden sandstone formation - mudstone [AS-MDST] (Secondary (Undifferentiated))
Arden sandstone formation - sandstone, siltstone and mudstone [AS-SDSM] (Secondary A)
Arden sandstone formation - siltstone and sandstone [AS-SISD] (Secondary A)
Weatheroak sandstone member - sandstone [WKSA-SDST] ()
Gunthorpe member - siltstone, dolomitic [GUN-DSLST] ()
Gunthorpe member - mudstone [GUN-MDST] ()
Tarporley siltstone formation - siltstone, mudstone and sandstone [TPSF-SIMS] (Secondary B)
Bromsgrove sandstone formation - mudstone [BMS-MDST] (Principal)
Bromsgrove sandstone formation - sandstone, pebbly (gravelly) [BMS-PESST] (Principal)
Bromsgrove sandstone formation - sandstone [BMS-SDST] (Principal)
Kidderminster formation - conglomerate [KDM-CONG] (Principal)
Kidderminster formation - mudstone [KDM-MDST] (Principal)
Kidderminster formation - sandstone and conglomerate, interbedded [KDM-SCON] (Principal)
Mercia mudstone group - siltstone, dolomitic [MMG-DSLST] (Secondary (Undifferentiated))
Mercia mudstone group - mudstone [MMG-MDST] (Secondary B)
Wildmoor sandstone formation - sandstone [WRS-SDST] (Principal)
Ashow formation - mudstone and sandstone [AW-MDSD] (Principal)
Ashow formation - sandstone [AW-SDST] (Principal)
Clent formation - argillaceous rocks and [subequal/subordinate] breccia, interbedded [CLT-ARBR] (Secondary A)
Gibbet hill conglomerate bed - conglomerate [GHC-CONG] (Principal)
Hopwas breccia formation - breccia [HPBR-BREC] (Principal)
Hopwas breccia formation - breccia and sandstone, interbedded [HPBR-BRSS] (Principal)
Kenilworth sandstone formation - breccia [KHS-BREC] (Principal)
Kenilworth sandstone formation - mudstone [KHS-MDST] (Principal)
Kenilworth sandstone formation - sandstone [KHS-SDST] (Principal)
Alveley member - limestone [ALY-LMST] (Secondary A)
Alveley member - mudstone and sandstone [ALY-MDSD] (Secondary A)
Alveley member - mudstone [ALY-MDST] (Secondary A)
Alveley member - sandstone [ALY-SDST] (Secondary A)
Alveley member - sandstone and mudstone [ALY-STMD] (Secondary A)
Allesley member - argillaceous rocks and [subordinate/subequal] sandstone and conglomerate, interbedded [ASY-ARSC] (Principal)
Allesley member - conglomerate [ASY-CONG] (Principal)
Allesley member - sandstone [ASY-SDST] (Principal)
Enville member - conglomerate [EN-CONG] (Secondary A)
Enville member - sandstone, conglomerate and [subordinate] argillaceous rocks [EN-SCAR] (Secondary A)
Enville member - sandstone with subordinate conglomerate, siltstone and mudstone [EN-SCSM] (Secondary A)
Enville member - sandstone [EN-SDST] (Secondary A)
Halesowen formation - limestone [HA-LMST] (Secondary A)
Halesowen formation - mudstone, siltstone and sandstone [HA-MDSS] (Secondary A)
Halesowen formation - sandstone [HA-SDST] (Secondary A)
Keresley member - argillaceous rocks and [subordinate/subequal] sandstone and conglomerate, interbedded [KRS-ARSC] (Principal)
Keresley member - conglomerate [KRS-CONG] (Principal)
Keresley member - limestone [KRS-LMST] (Principal)
Keresley member - sandstone [KRS-SDST] (Principal)
Tile hill mudstone formation - argillaceous rocks and [subequal/subordinate] sandstone, interbedded [TLM-ARSD] (Principal)
Tile hill mudstone formation - sandstone [TLM-SDST] (Principal)
Whitacre member - conglomerate [WIT-CONG] (Principal)
Whitacre member - limestone [WIT-LMST] (Principal)
Whitacre member - mudstone and sandstone [WIT-MDSD] (Principal)
Whitacre member - sandstone [WIT-SDST] (Principal)
Pennine middle coal measures formation - mudstone, siltstone and sandstone [PMCM-MDSS] (Secondary A)
Pennine middle coal measures formation - sandstone [PMCM-SDST] (Secondary A)
Thick coal (south staffordshire) - coal [THIC-COAL] (Secondary A)
Pennine lower coal measures formation - mudstone, siltstone and sandstone [PLCM-MDSS] (Secondary A)
Pennine lower coal measures formation - sandstone [PLCM-SDST] (Secondary A)
Pennine lower coal measures formation and pennine middle coal measures formation (undifferentiated) - mudstone, siltstone and sandstone [PLMC-MDSS] (Secondary A Aquifer)
Etruria formation - conglomerate [ETM-CONG] (Secondary A)
Etruria formation - mudstone, sandstone and conglomerate [ETM-MDSC] (Secondary A)
Etruria formation - sandstone [ETM-SDST] (Secondary A)
Unnamed igneous intrusion, westphalian - microgabro [UICW-MCGB] ()
Rough rock - sandstone [RR-SDST] ()
Millstone grit group [see also migr] - mudstone, siltstone and sandstone [MG-MDSS] ()
Millstone grit group [see also migr] - sandstone [MG-SDST] ()
Coalbrookdale formation - mudstone [CBRD-MDST] (Secondary B)
Rubery sandstone member - sandstone [RBS-SDST] (Secondary B)
Midlands minor intrusive suite - lamprophyres [MMI-LMPY] ()
Monks park shale formation - mudstone [MPSH-MDST] (Secondary B)
Merevale shale formation - mudstone [MVSH-MDST] (Secondary B)

Map Number: WR-02 - Legend
Map Name: WR-02 - Full Geological Legend with Rock Unit Names and Aquifer Status

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Legend

Superficial deposits:	Bedrock geology:
ALV-XCZSV	BUSW-MCGB
GFDUD-XSV	STHF-HAMD
GFSDD-XSV	TPSF-SIMS
TILLD-DMTN	BMS-MDST
ALF-XSV	BMS-PESST
HEAD-XCZSV	KDM-CONG
PEAT-P	KDM-SCON
RTD1-XSV	MMG-MDHA
	MMG-MDST
	WRS-CONG
	WRS-SDST
	SAL-MDSC
	SAL-SDST

Legend

Route in tunnel	Lakes & Reservoirs	Groundwater source protection zone:
Route on surface	Geological fault line	Zone 1
Depot, station, headhouse or portal building	Licensed groundwater abstraction (excluding public water supplies)	Zone 2
Community area boundary	Unlicensed private groundwater abstraction	Zone 3
County boundary	Consented discharge to groundwater	
District/Borough boundary	Spring	

For full geological legend including strata names and aquifer status please refer to WR-02 - Legend

Map Number: WR-02-203

Map Name: Groundwater Baseline

Community Area 3: Stone and Swynnerton

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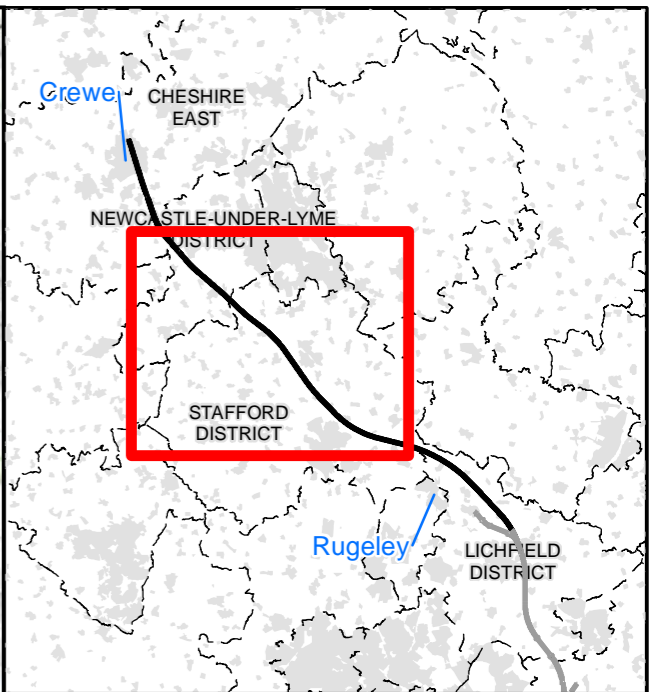
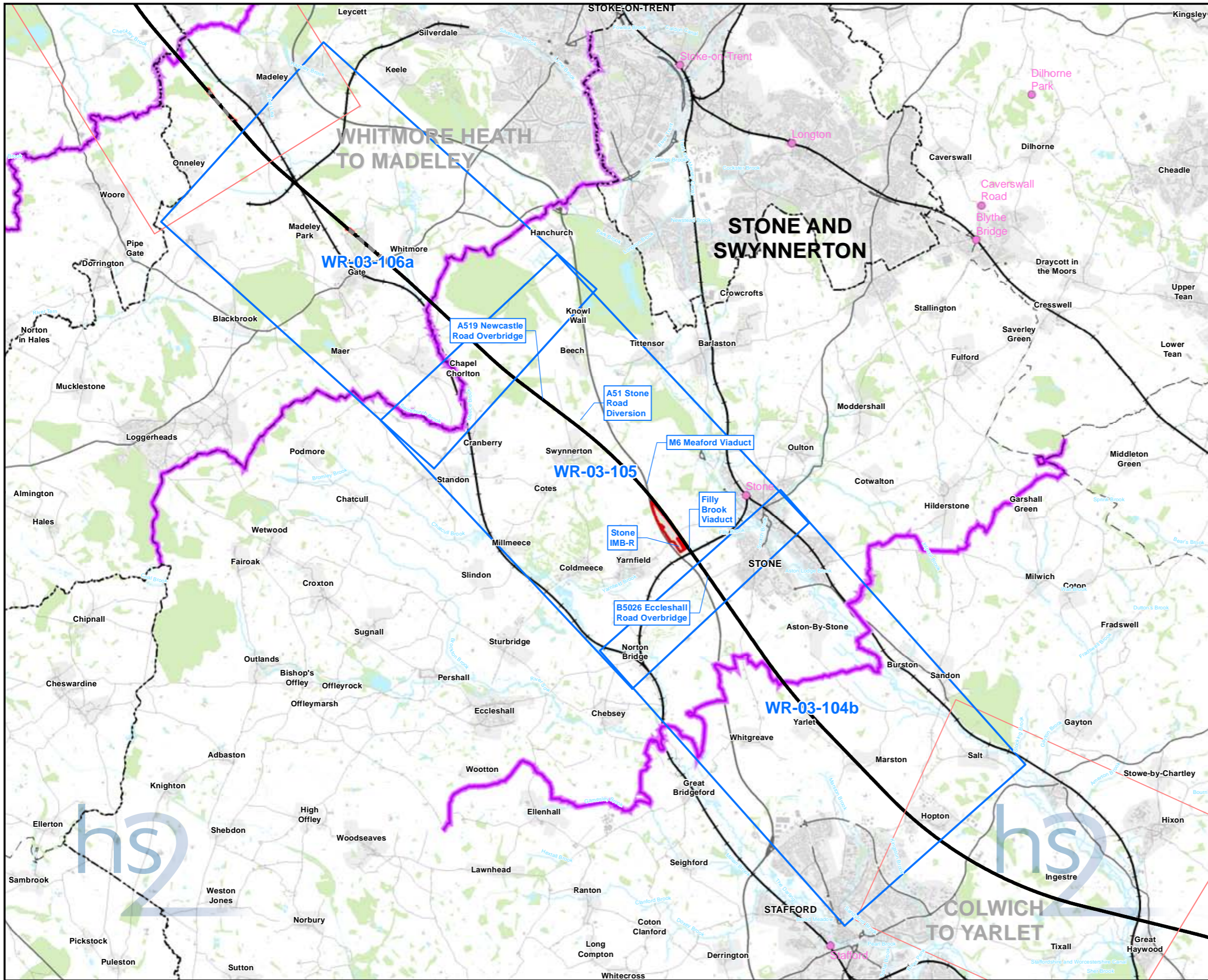
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Doc Number: C861-ARP-EV-MAP-000-152203-P04

Date: 14/06/17



Map Series Information:
 This map series shows water bodies, their Water Framework Directive current status and associated ecological features.

- Main Map Legend**
- Route in tunnel
 - Route on surface
 - Depot, station, headhouse or portal building
 - Community area boundary
 - Existing railway station
 - County boundary
 - District/Borough boundary
 - Map sheets included in this community area
 - Map sheets not included in this community area

Map Number **WR-03-INDEX-CA3**
 Map Name **Index Map of:
 Water Framework Directive**
 Community Area 3:
 Stone and Swynnerton

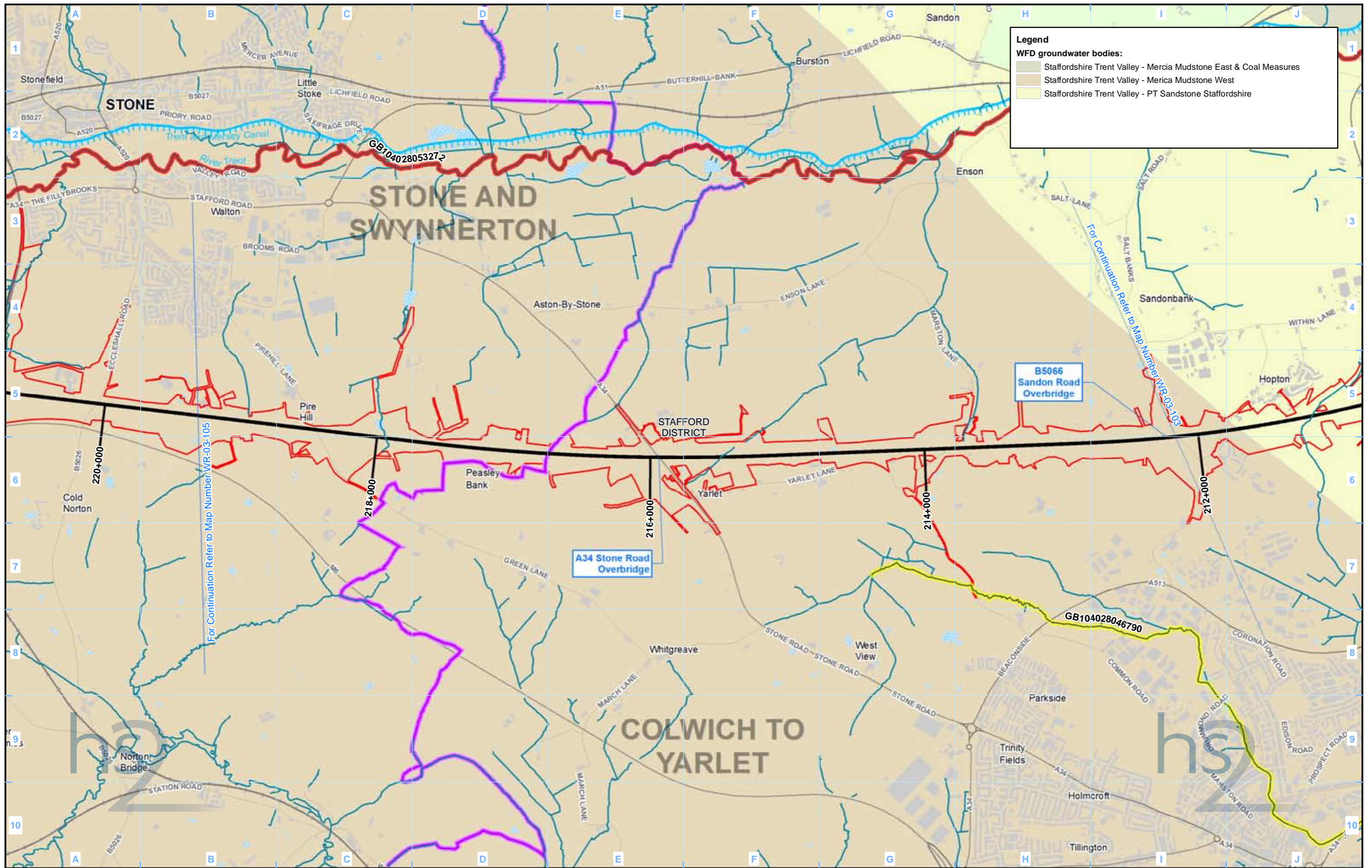
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Legend

WFD groundwater bodies:

- Staffordshire Trent Valley - Mercia Mudstone East & Coal Measures
- Staffordshire Trent Valley - Mercia Mudstone West
- Staffordshire Trent Valley - PT Sandstone Staffordshire

Legend

- Route in tunnel
- Route on surface
- Depot, station, headhouse or portal building
- Land potentially required during construction
- Community area boundary
- County boundary
- District/Borough boundary

WFD Surface Water Bodies

- Canal
- Canal tunnel
- Watercourse
- Culverted watercourse
- Open water

WFD Surface Water Bodies Overall Status Classification (2015 RBMP Cycle 2)

- Good
- Moderate
- Poor
- Bad

WFD Lakes

- Overall Status
- Good
- Moderate
- Poor
- Bad

Special Area of Conservation (SAC)

- Sites of Special Scientific Interest (SSSI)

Map Number: WR-03-104b

Map Name: Water Framework Directive

Community Area 3: Stone and Swynnerton

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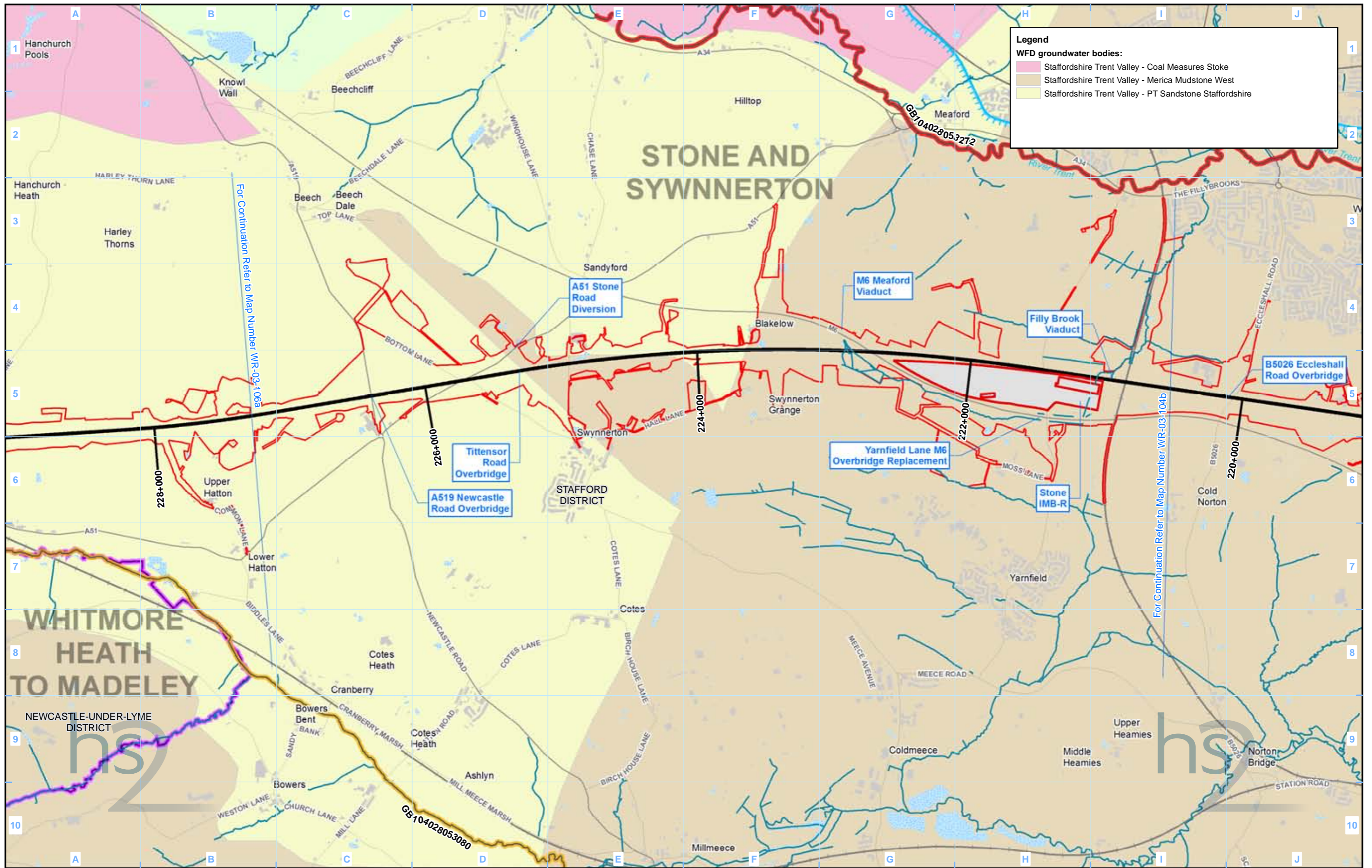
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Doc Number: C861-ARP-EV-MAP-000-153304-P04

Date: 14/06/17

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0 250 500 750 1,000 Metres



Legend

- Route in tunnel
- Route on surface
- Depot, station, headhouse or portal building
- Land potentially required during construction
- Community area boundary
- County boundary
- District/Borough boundary

WFD Surface Water Bodies

Overall Status Classification (2015 RBMP Cycle 2)

- Good
- Moderate
- Poor
- Bad

WFD Lakes

Overall Status

- Good
- Moderate
- Poor
- Bad

Special Area of Conservation (SAC)

Sites of Special Scientific Interest (SSSI)

Map Number WR-03-105

Map Name Water Framework Directive

Community Area 3: Stone and Swynnerton

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Doc Number: C861-ARP-EV-MAP-000-153205-P04

Date: 14/06/17

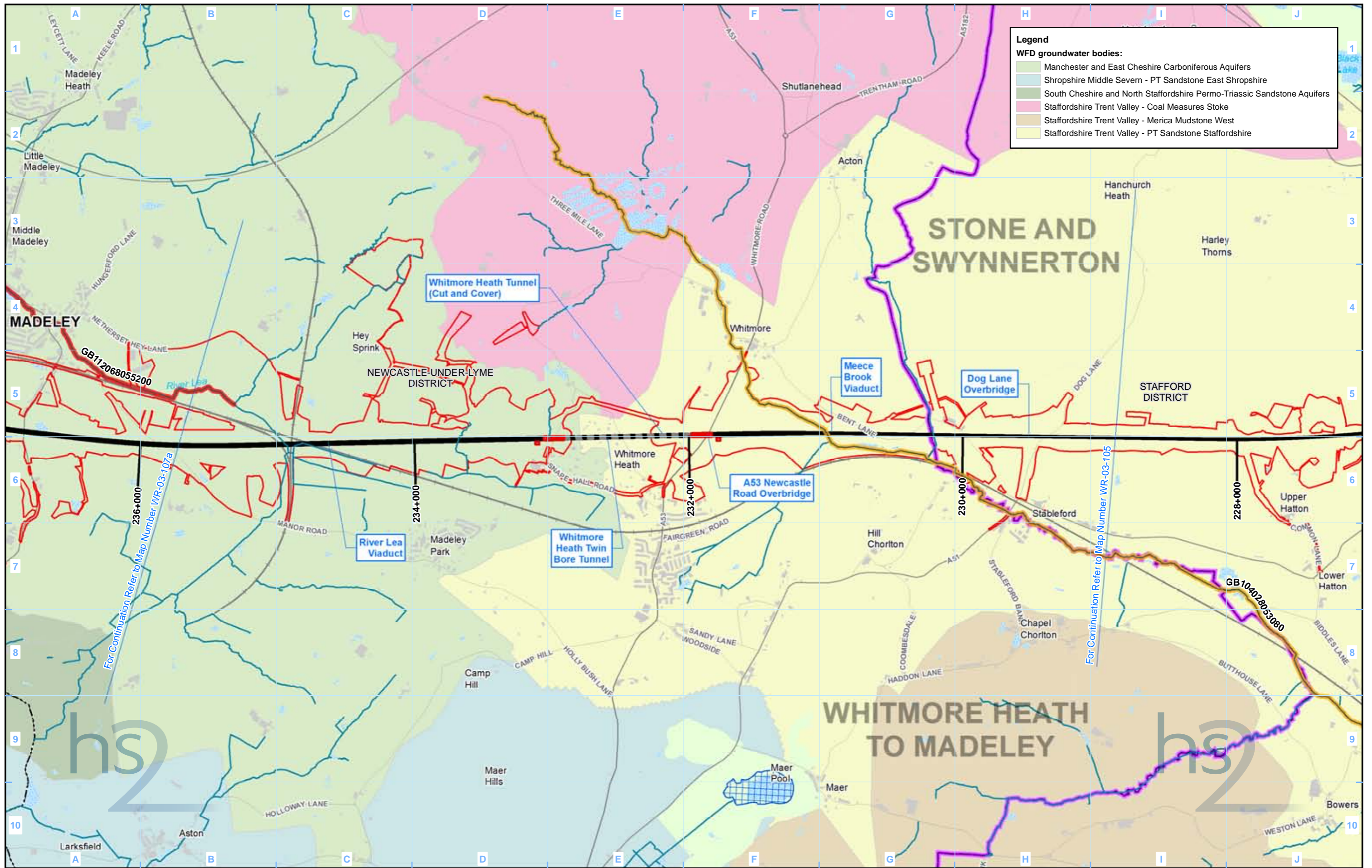
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Scale at A3: 1:25,000

Metres

250 500 750 1,000



Legend

WFD groundwater bodies:

- Manchester and East Cheshire Carboniferous Aquifers
- Shropshire Middle Severn - PT Sandstone East Shropshire
- South Cheshire and North Staffordshire Permo-Triassic Sandstone Aquifers
- Staffordshire Trent Valley - Coal Measures Stoke
- Staffordshire Trent Valley - Merica Mudstone West
- Staffordshire Trent Valley - PT Sandstone Staffordshire

Legend

- Route in tunnel
- Route on surface
- Depot, station, headhouse or portal building
- Land potentially required during construction
- Community area boundary
- County boundary
- District/Borough boundary
- Canal
- Canal tunnel
- Watercourse
- Culverted watercourse
- Open water
- WFD Surface Water Bodies Overall Status Classification (2015 RBMP Cycle 2)**
- Good
- Moderate
- Poor
- Bad
- WFD Lakes Overall Status**
- Good
- Moderate
- Poor
- Bad
- Special Area of Conservation (SAC)
- Sites of Special Scientific Interest (SSSI)

Map Number: WR-03-106a

Map Name: Water Framework Directive

Community Area 3: Stone and Swynnerton

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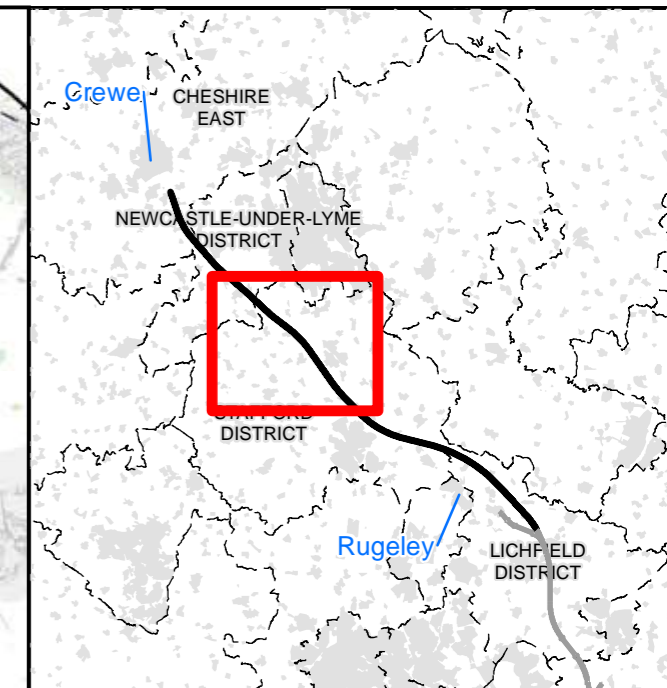
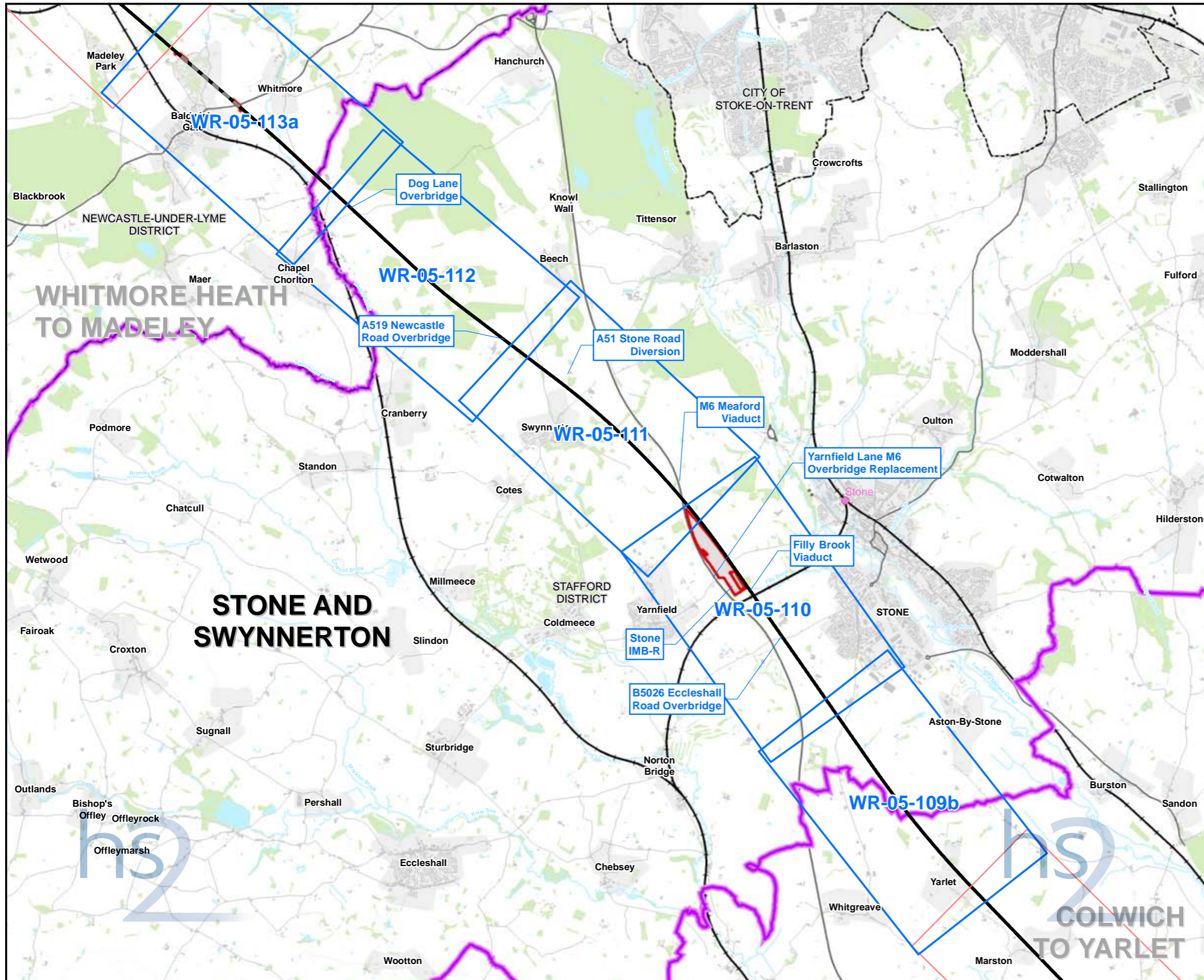
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Date: 14/06/17

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0 250 500 750 1,000 Metres



Map Series Information:

The map shows the output from hydraulic modelling of specific crossing locations and the effect the scheme has on flood extent at 1 in 100 years inclusive of climate change (20%) return period.

Main Map Legend	
	Route in tunnel
	Route on surface
	Depot, station, headhouse or portal building
	Community area boundary
	Existing railway station
	County boundary
	District/Borough boundary
	Map sheets included in this community area
	Map sheets not included in this community area

Map Number	WR-05-INDEX-CA3
Map Name	Index Map of: Modelled Baseline and Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding
	Community Area 3: Stone and Swynnerton

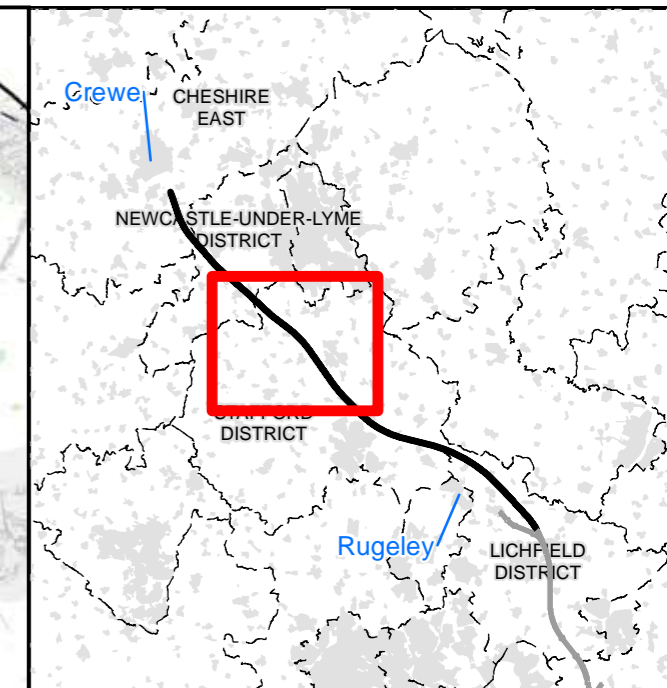
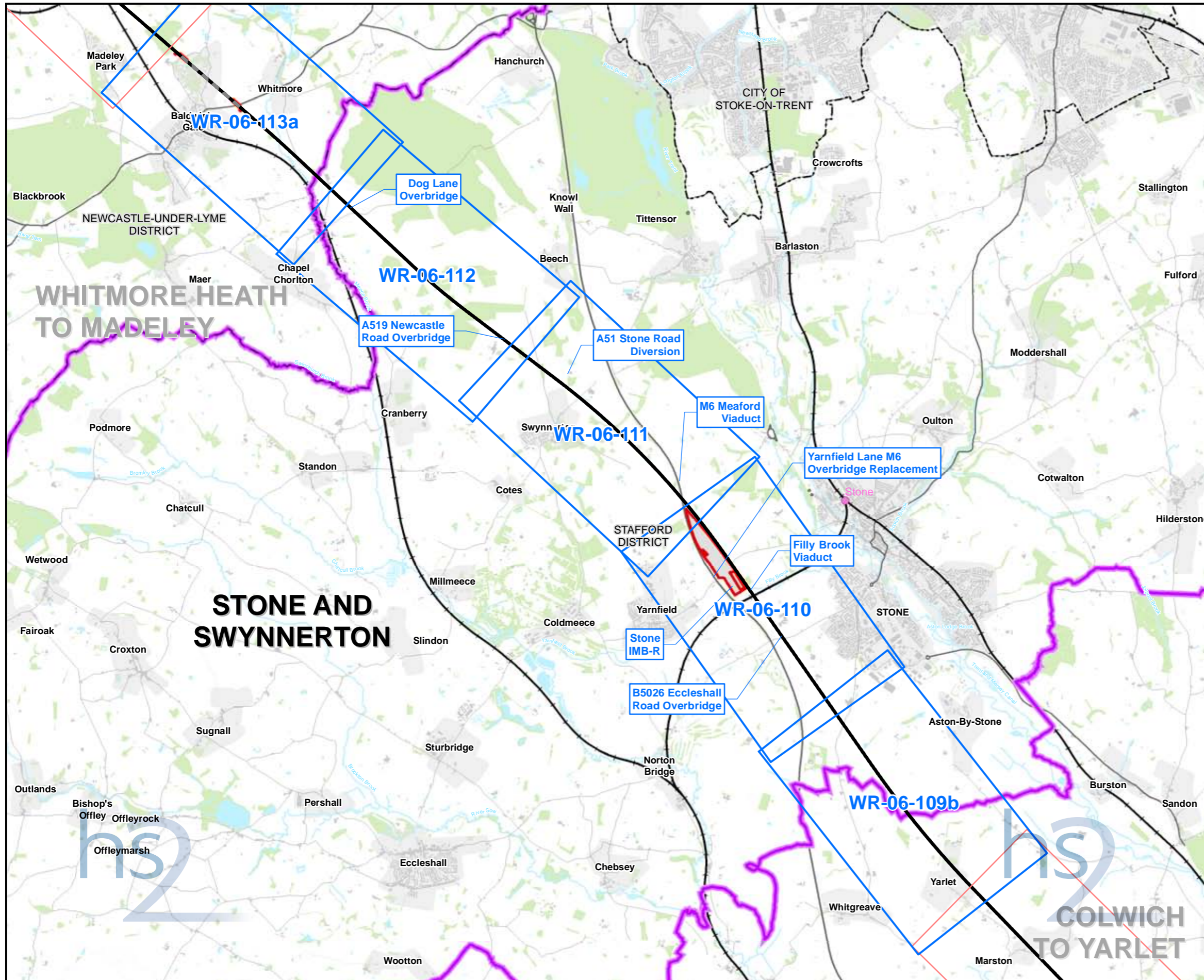
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Map Series Information:

The map shows the output from hydraulic modelling of specific crossing locations and the effect the scheme has on flood extent at 1 in 20 year return period.

Main Map Legend

Route in tunnel	Map sheets included in this community area
Route on surface	Map sheets not included in this community area
Depot, station, headhouse or portal building	Community area boundary
Existing railway station	County boundary
District/Borough boundary	

Map Number	WR-06-INDEX-CA3
Map Name	Index Map of: Modelled Baseline and Post Development Flood Extent 1 in 20 (5%) Annual Probability of River Flooding
	Community Area 3: Stone and Swynnerton

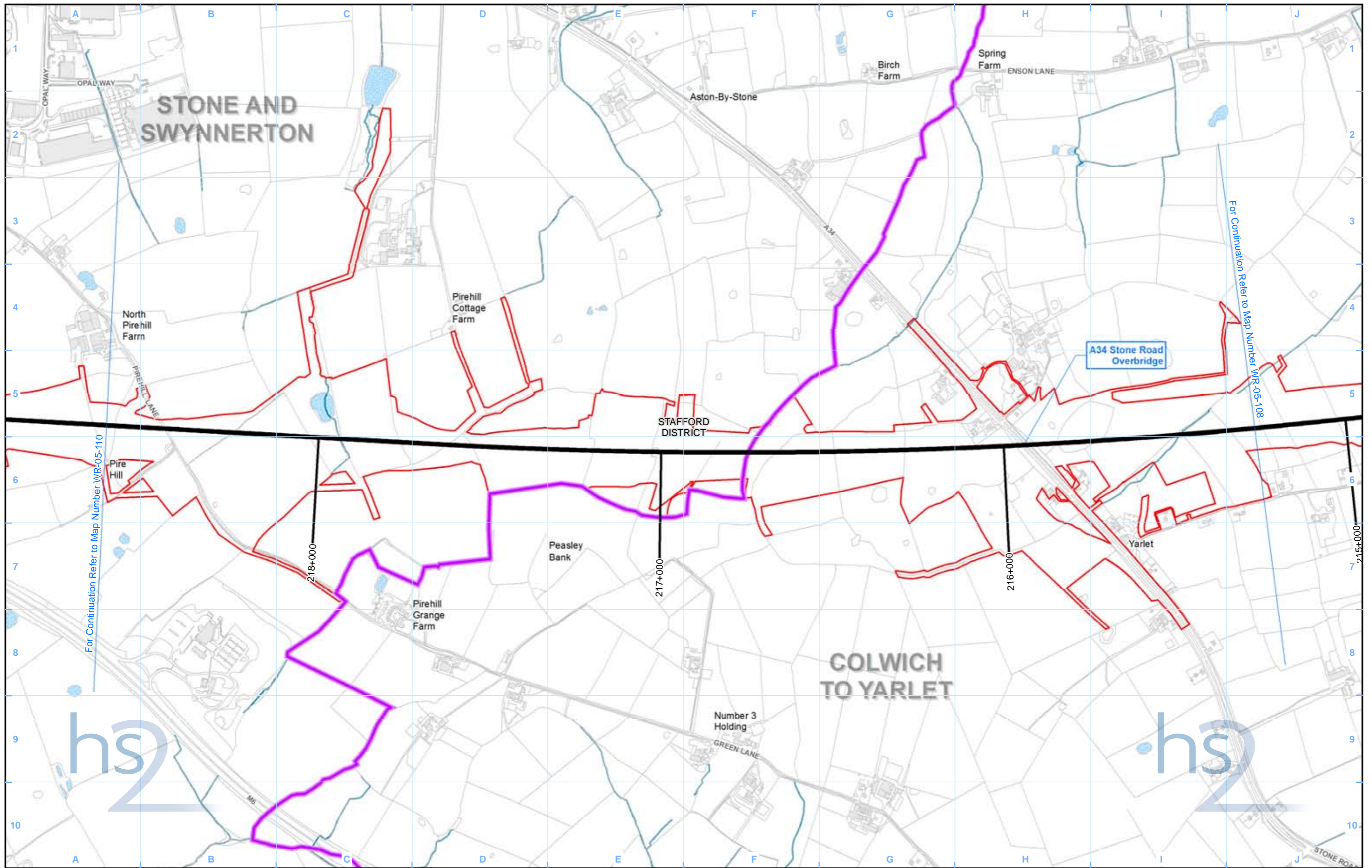
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- Legend**
- Route in tunnel
 - Route on surface
 - Depot, station, headhouse or portal building
 - Land potentially required during construction
 - Community area boundary
 - County boundary
 - District/Borough boundary
 - Watercourse
 - Culverted watercourse
 - Canal
 - Canal tunnel
 - Open water
 - Registered Park and Garden

- Modelled Baseline Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding
- Modelled Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding

Map Number	WR-05-109b
Map Name	Modelled Baseline and Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding
Community Area 3: Stone and Swynnerton	

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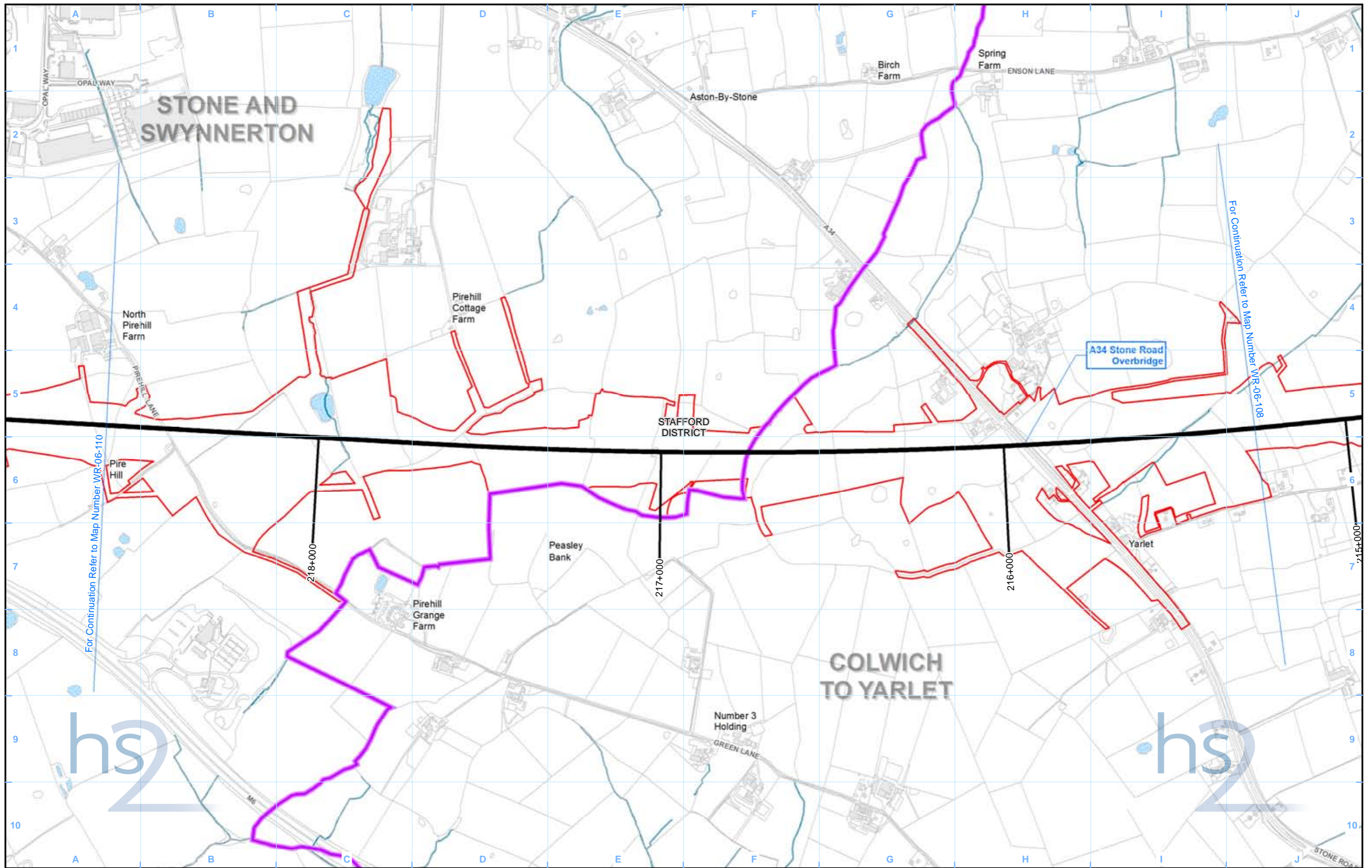
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Doc Number: C861-ARP-EV-MAP-000-155309-P04

Scale at A3: 1:10,000

Metres

Date: 14/06/17



- Legend**
- Route in tunnel
 - Route on surface
 - Depot, station, headhouse or portal building
 - Land potentially required during construction
 - Community area boundary
 - County boundary
 - District/Borough boundary
 - Watercourse
 - Culverted watercourse
 - Canal
 - Canal tunnel
 - Open water
 - Registered Park and Garden
 - Modelled Baseline Flood Extent 1 in 20 (5%) Annual Probability of River Flooding
 - Modelled Post Development Flood Extent 1 in 20 (5%) Annual Probability of River Flooding

Map Number	WR-06-109b
Map Name	Modelled Baseline and Post Development Flood Extent 1 in 20 (5%) Annual Probability of River Flooding
Community Area 3: Stone and Swynnerton	

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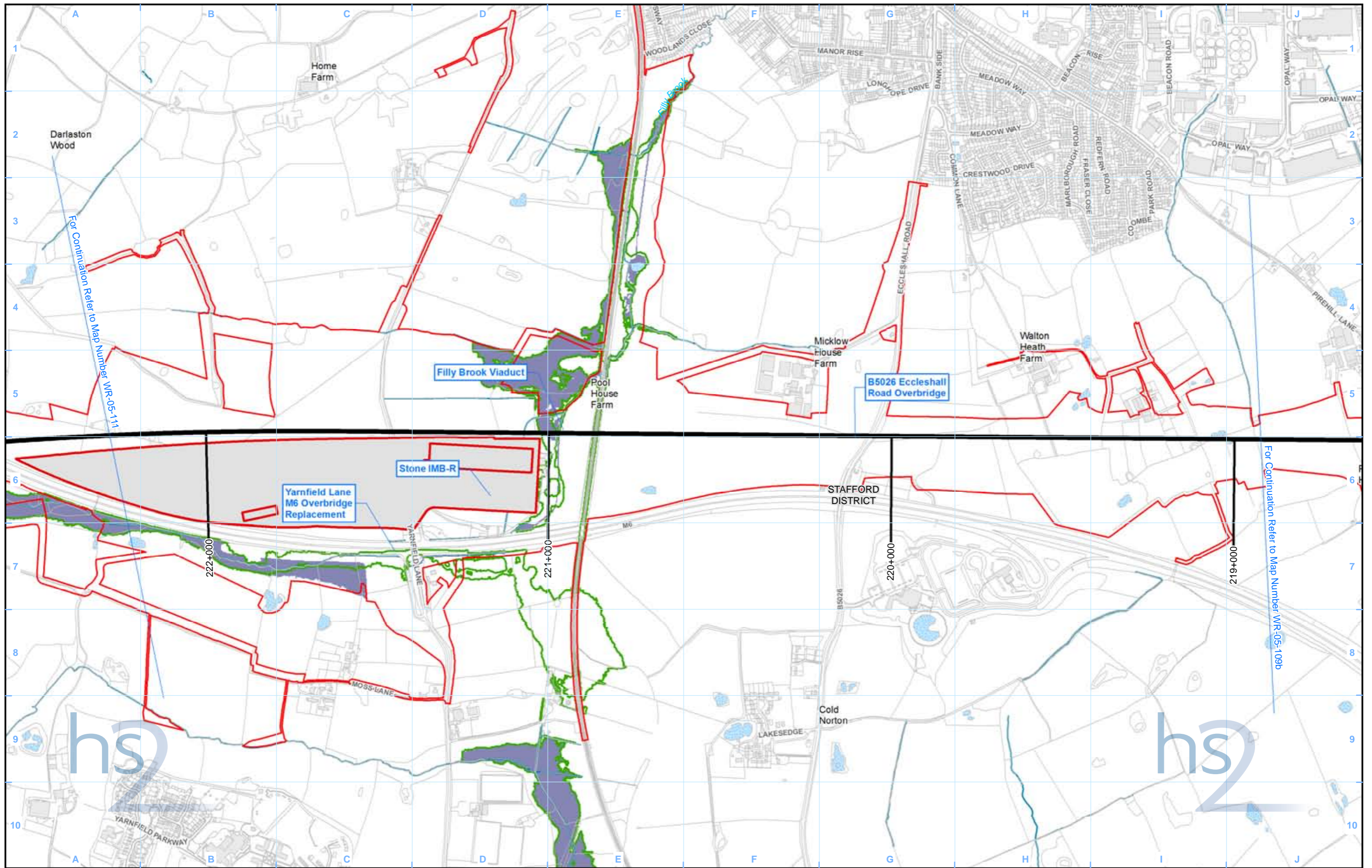
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Doc Number: C861-ARP-EV-MAP-000-156309-P04

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Metres

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- Legend**
- Route in tunnel
 - Route on surface
 - Depot, station, headhouse or portal building
 - Land potentially required during construction
 - Community area boundary
 - County boundary
 - District/Borough boundary
 - Watercourse
 - Culverted watercourse
 - Canal
 - Canal tunnel
 - Open water
 - Registered Park and Garden
 - Modelled Baseline Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding
 - Modelled Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding

Map Number
WR-05-110

Map Name
Modelled Baseline and Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding

Community Area 3:
Stone and Swynnerton

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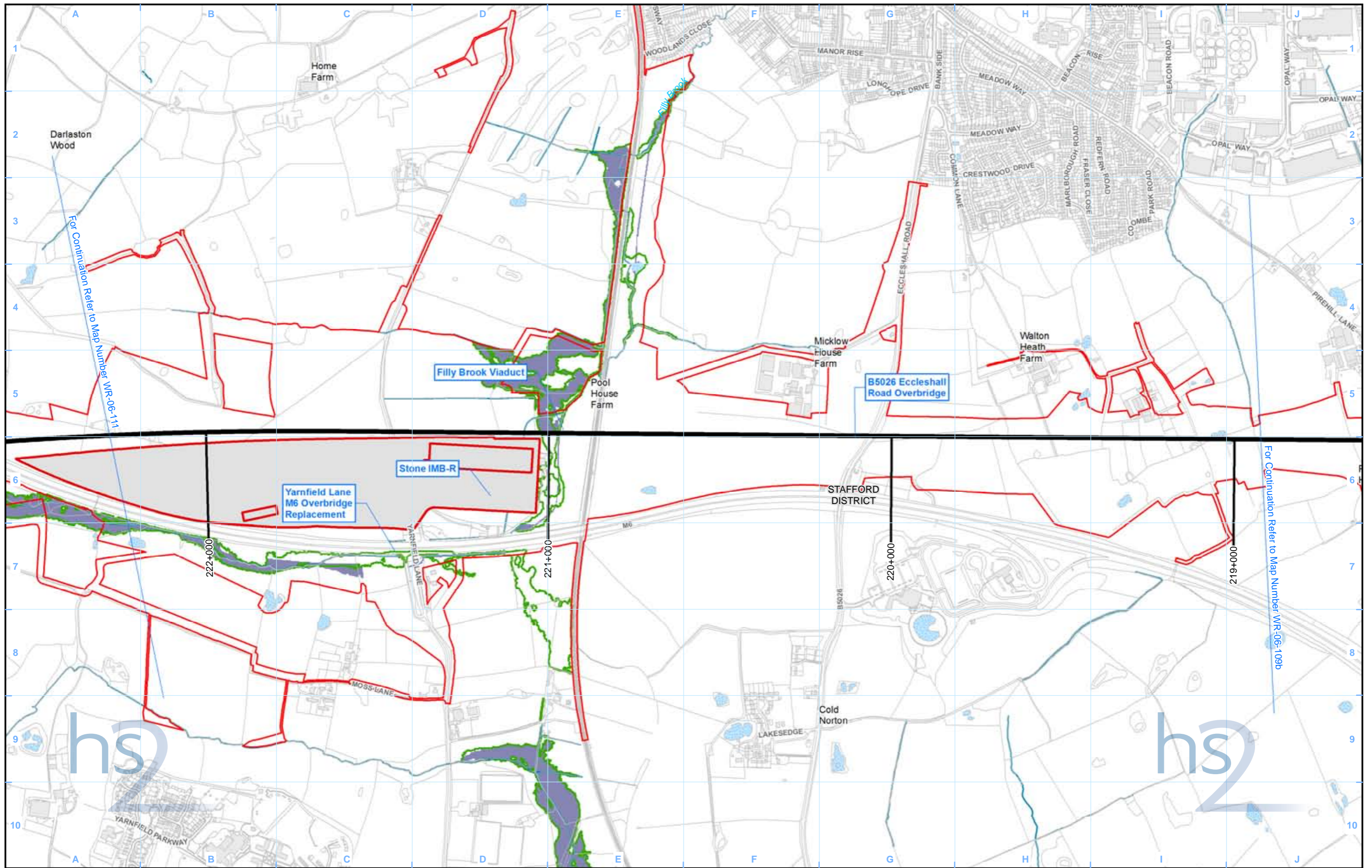
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Date: 14/06/17



- Legend**
- Route in tunnel
 - Route on surface
 - Depot, station, headhouse or portal building
 - Land potentially required during construction
 - Community area boundary
 - County boundary
 - District/Borough boundary
 - Watercourse
 - Culverted watercourse
 - Canal
 - Canal tunnel
 - Open water
 - Registered Park and Garden
 - Modelled Baseline Flood Extent 1 in 20 (5%) Annual Probability of River Flooding
 - Modelled Post Development Flood Extent 1 in 20 (5%) Annual Probability of River Flooding

Map Number
WR-06-110

Map Name
Modelled Baseline and Post Development Flood Extent 1 in 20 (5%) Annual Probability of River Flooding

Community Area 3:
Stone and Swynnerton

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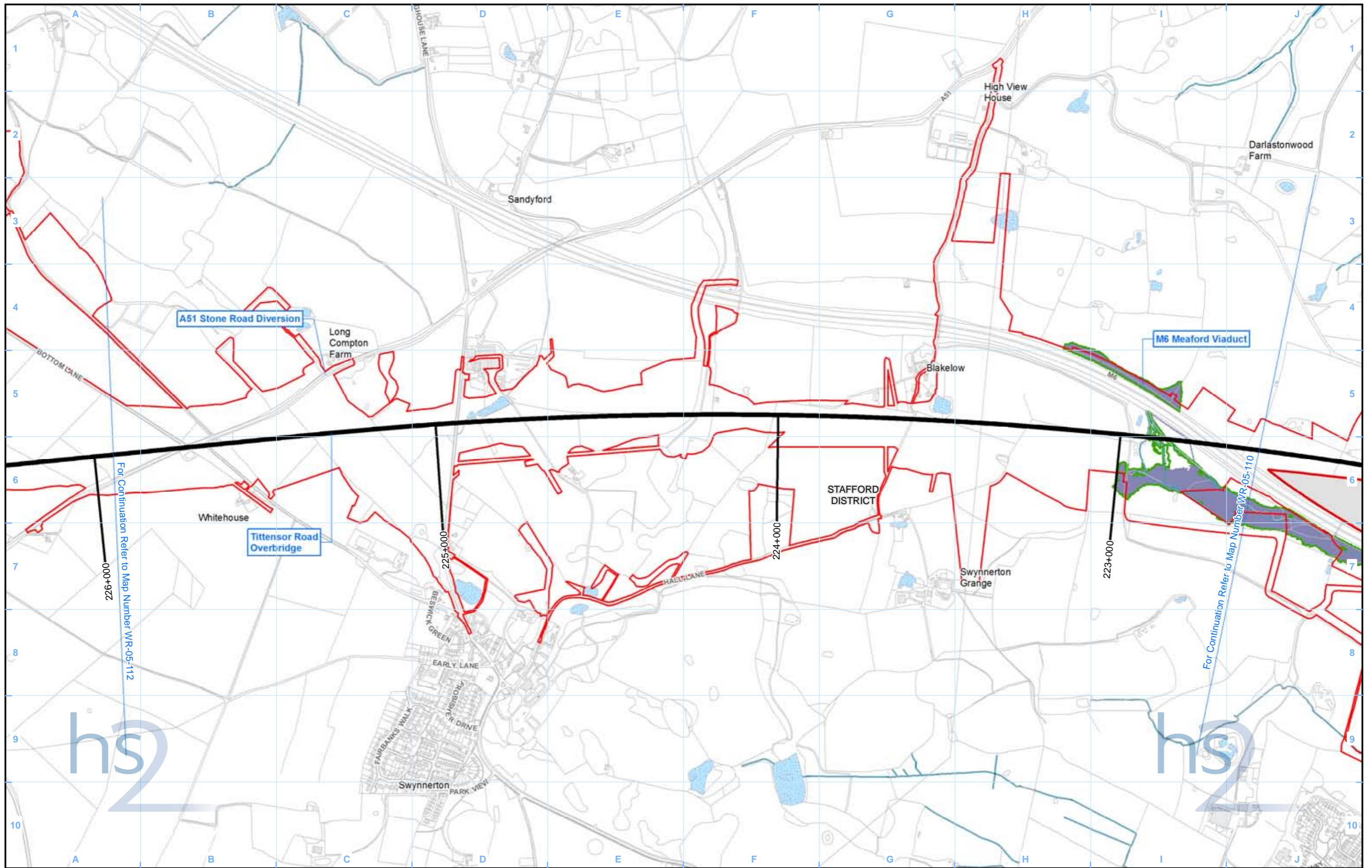
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Date: 14/06/17



Legend

Route in tunnel	District/Borough boundary	Modelled Baseline Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding
Route on surface	Watercourse	Modelled Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding
Depot, station, headhouse or portal building	Culverted watercourse	
Land potentially required during construction	Canal	
Community area boundary	Canal tunnel	
County boundary	Open water	
	Registered Park and Garden	

Map Number	WR-05-111
Map Name	Modelled Baseline and Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding
Community Area 3: Stone and Swynnerton	

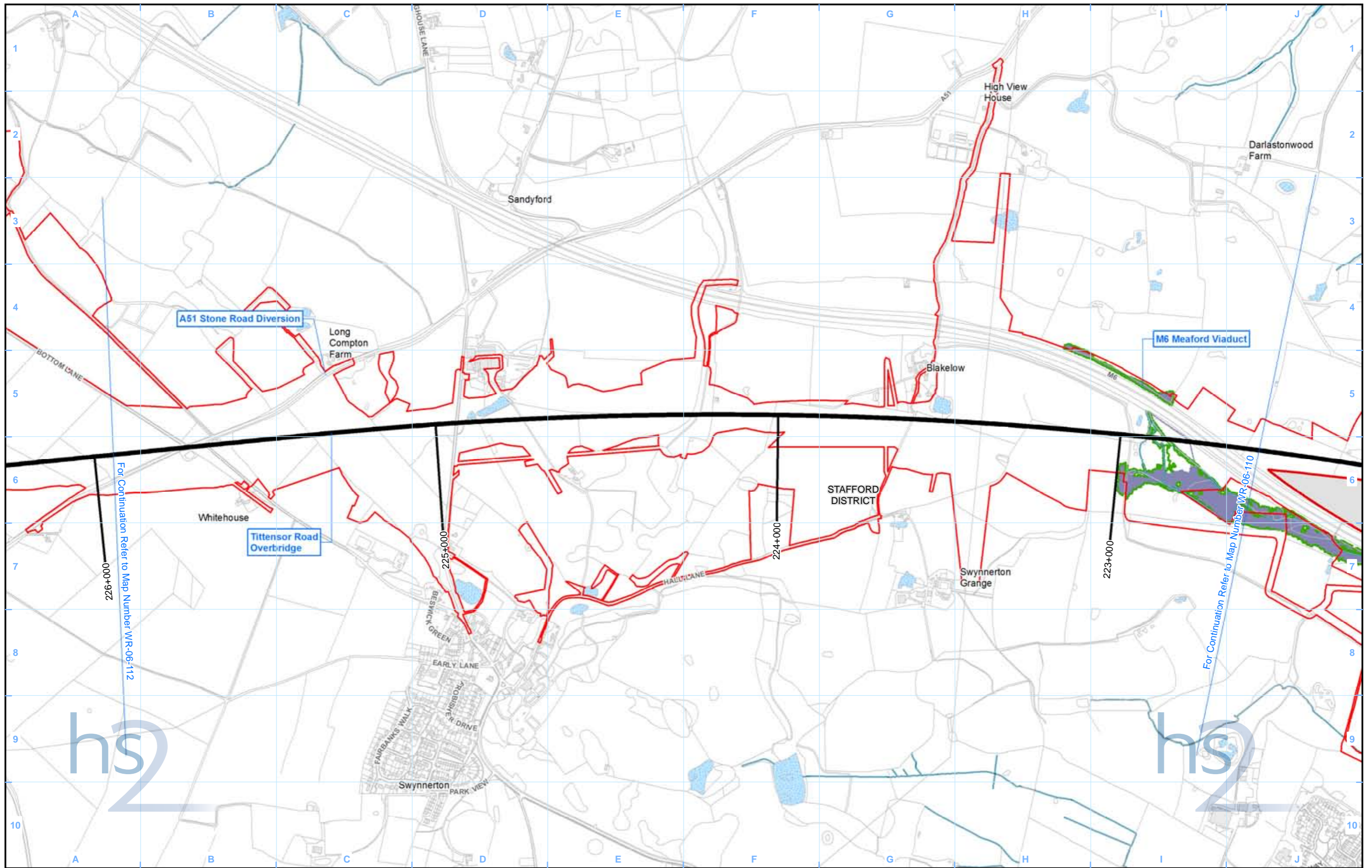
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- Legend**
- Route in tunnel
 - Route on surface
 - Depot, station, headhouse or portal building
 - Land potentially required during construction
 - Community area boundary
 - County boundary
 - District/Borough boundary
 - Watercourse
 - Culverted watercourse
 - Canal
 - Canal tunnel
 - Open water
 - Registered Park and Garden
 - Modelled Baseline Flood Extent 1 in 20 (5%) Annual Probability of River Flooding
 - Modelled Post Development Flood Extent 1 in 20 (5%) Annual Probability of River Flooding

Map Number
WR-06-111

Map Name
Modelled Baseline and Post Development Flood Extent 1 in 20 (5%) Annual Probability of River Flooding

Community Area 3:
Stone and Swynnerton

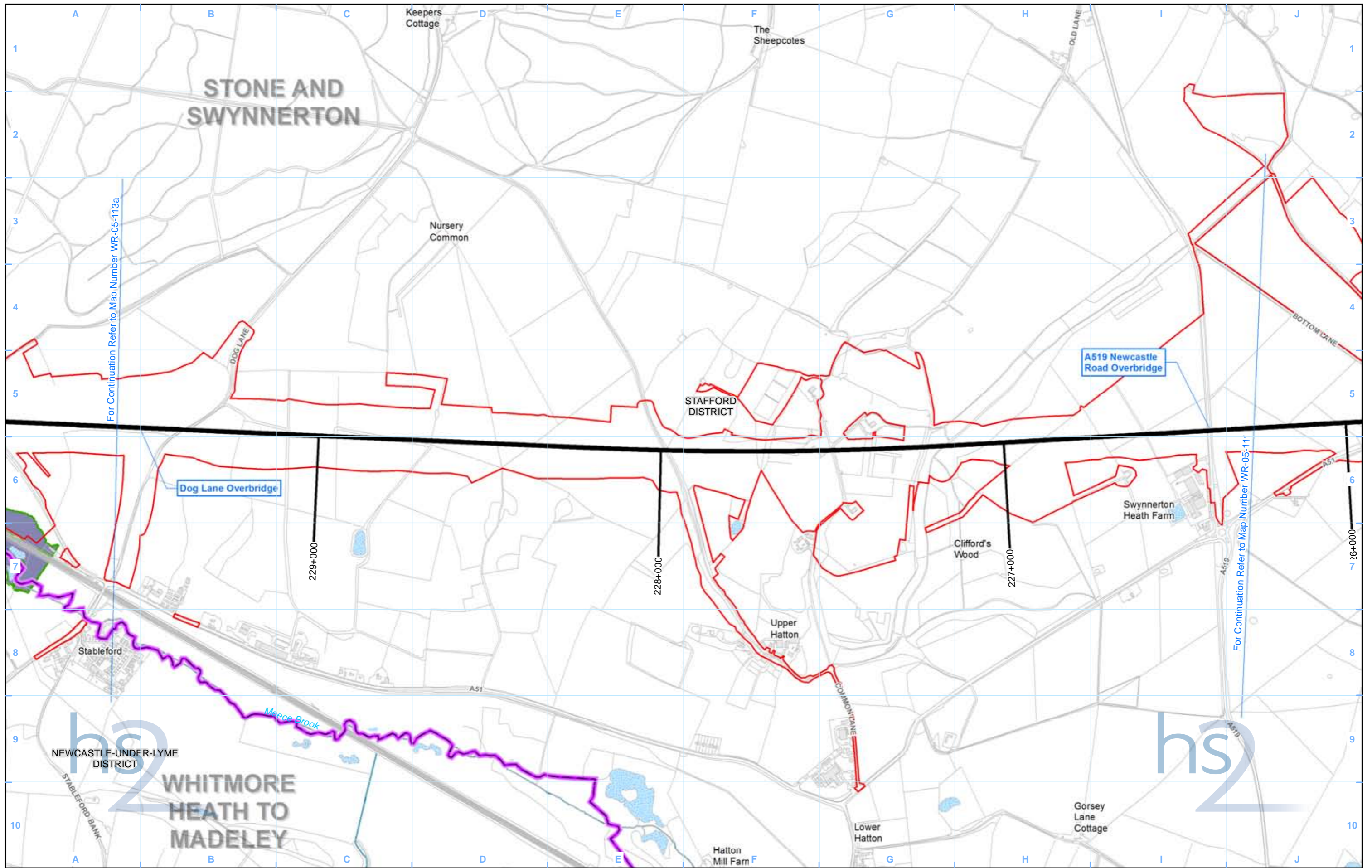
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- Legend**
- Route in tunnel
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 - Depot, station, headhouse or portal building
 - Land potentially required during construction
 - Community area boundary
 - County boundary
 - District/Borough boundary
 - Watercourse
 - Culverted watercourse
 - Canal
 - Canal tunnel
 - Open water
 - Registered Park and Garden
 - Modelled Baseline Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding
 - Modelled Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding

Map Number: WR-05-112

Map Name: Modelled Baseline and Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding

Community Area 3: Stone and Swynnerton

Map Number: WR-05-112

Map Name: Modelled Baseline and Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding

Community Area 3: Stone and Swynnerton

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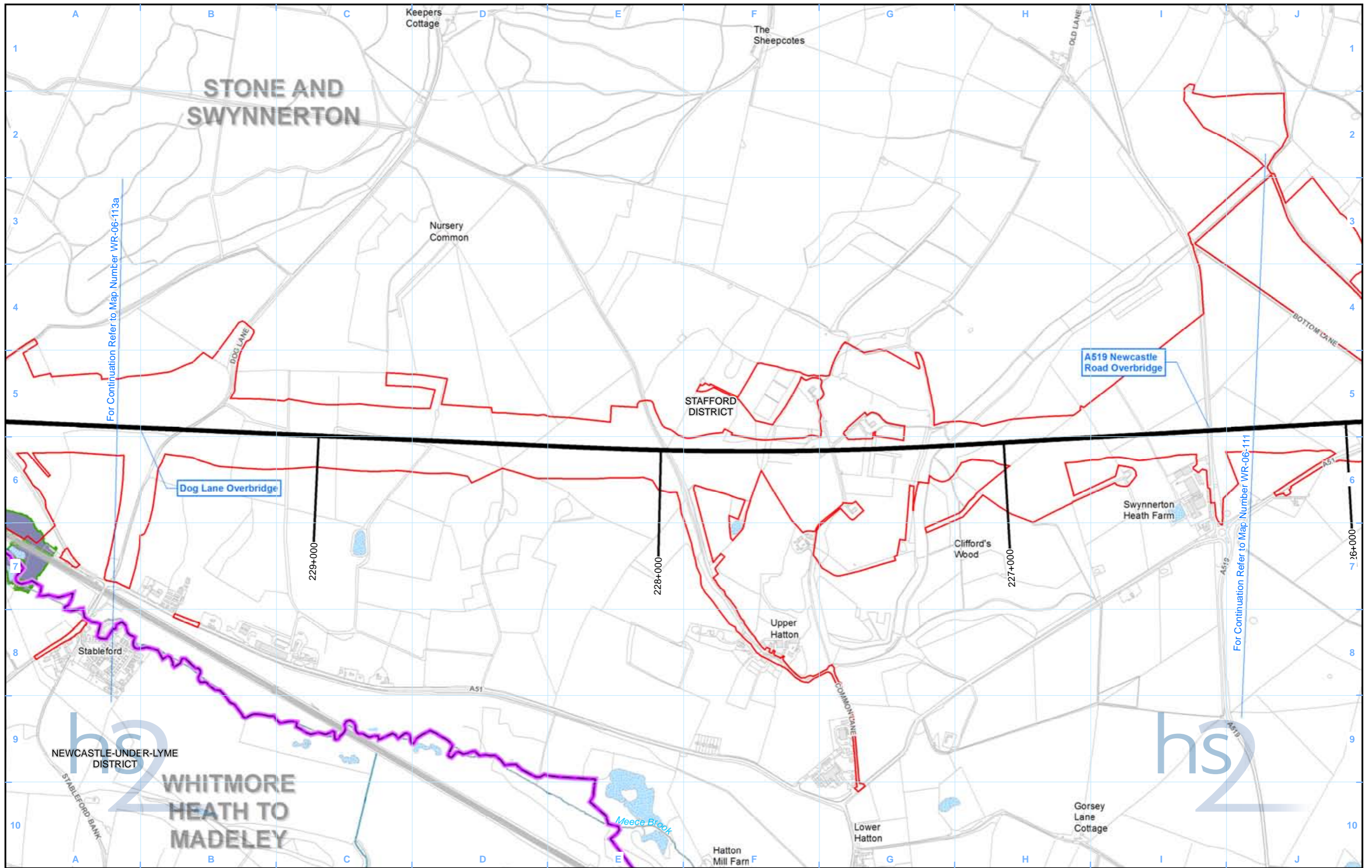
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Date: 14/06/17

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0 100 200 300 400 Metres



- Legend**
- Route in tunnel
 - Route on surface
 - Depot, station, headhouse or portal building
 - Land potentially required during construction
 - Community area boundary
 - County boundary
 - District/Borough boundary
 - Watercourse
 - Culverted watercourse
 - Canal
 - Canal tunnel
 - Open water
 - Registered Park and Garden
 - Modelled Baseline Flood Extent 1 in 20 (5%) Annual Probability of River Flooding
 - Modelled Post Development Flood Extent 1 in 20 (5%) Annual Probability of River Flooding

Map Number
WR-06-112

Map Name
Modelled Baseline and Post Development Flood Extent 1 in 20 (5%) Annual Probability of River Flooding

Community Area 3:
Stone and Swynnerton

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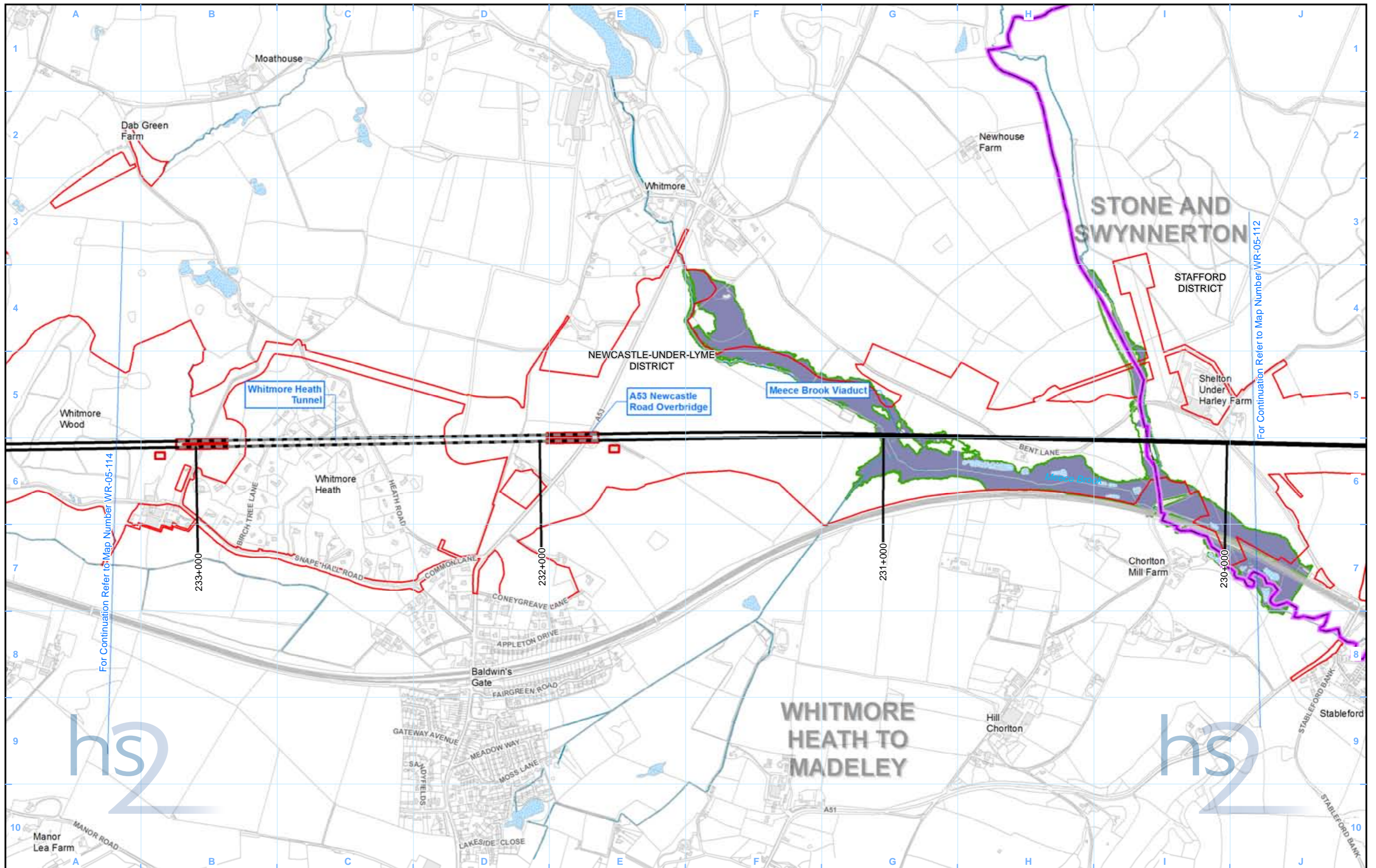
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Date: 14/06/17



For Continuation Refer to Map Number WR-05-114

For Continuation Refer to Map Number WR-05-112

Legend	
	District/Borough boundary
	Watercourse
	Culverted watercourse
	Canal
	Canal tunnel
	Open water
	Registered Park and Garden

	Modelled Baseline Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding
	Modelled Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding

Map Number	WR-05-113a
Map Name	Modelled Baseline and Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding
Community Area 3:	Stone and Swynnerton

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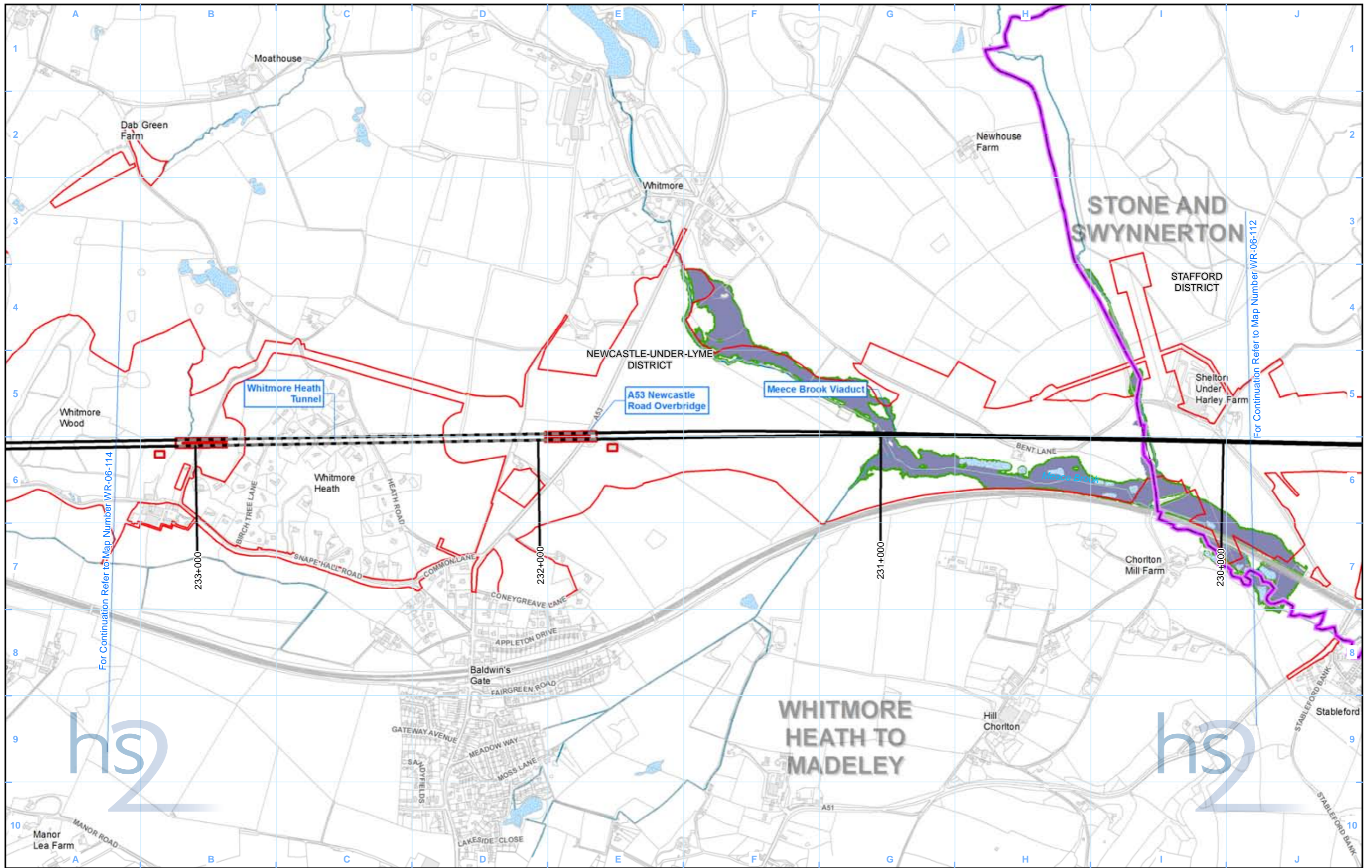
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Metres

Date: 14/06/17



For Continuation Refer to Map Number WR-06-112

For Continuation Refer to Map Number WR-06-114

Legend	
	Route in tunnel
	Route on surface
	Depot, station, headhouse or portal building
	Land potentially required during construction
	Community area boundary
	County boundary
	District/Borough boundary
	Watercourse
	Culverted watercourse
	Canal
	Canal tunnel
	Open water
	Registered Park and Garden
	Modelled Baseline Flood Extent 1 in 20 (5%) Annual Probability of River Flooding
	Modelled Post Development Flood Extent 1 in 20 (5%) Annual Probability of River Flooding

Map Number	WR-06-113a
Map Name	Modelled Baseline and Post Development Flood Extent 1 in 20 (5%) Annual Probability of River Flooding
Community Area 3:	Stone and Swynnerton

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High Speed Rail (West Midlands-Crewe)

Environmental Statement

CA4 Whitmore Heath to Madeley

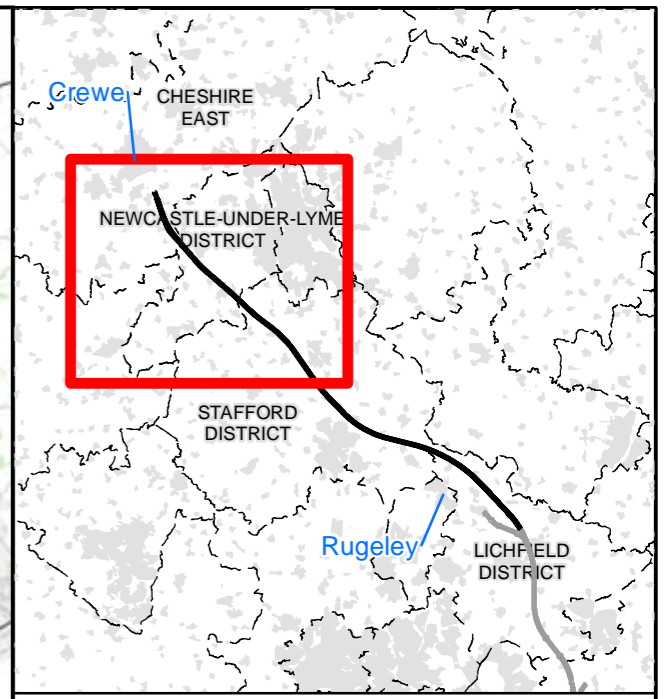
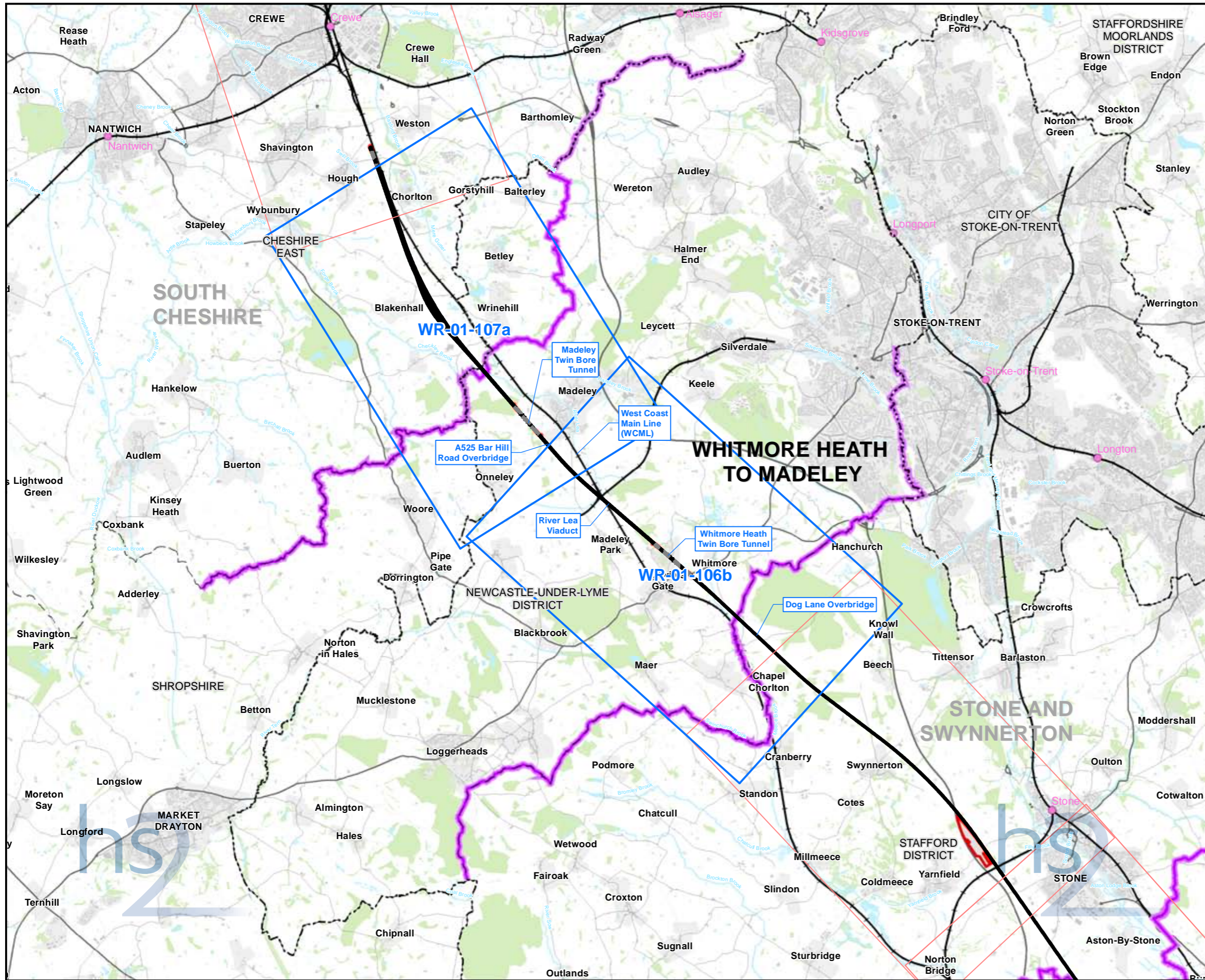
WR-01 - Surface Water Baseline

WR-02 - Groundwater Baseline

WR-03 - Water Framework Directive

**WR-05 - Modelled Baseline and Post Development Flood
Extent 1 in 100 (1%+CC) including Climate Change
Annual Probability of River Flooding**

**WR-06 - Modelled Baseline and Post Development Flood
Extent 1 in 20 (5%) Annual Probability of River Flooding**



Map Series Information:

This map series shows surface water features such as rivers, streams, ponds, canals and reservoirs, flood zones, and surface water abstractions as referred to in the ES.

All points where the alignment crosses a watercourse are also shown and labelled with their reference in the text. These are shown as "Surface Water Crossings (SWC)".

The design of the Proposed Scheme will be informed through stakeholder engagement and further engineering and environmental studies

Main Map Legend

- Route in tunnel
- Route on surface
- Depot, station, headhouse or portal building
- Community area boundary
- Existing railway station
- County boundary
- District/Borough boundary
- Map sheets included in this community area
- Map sheets not included in this community area

Map Number **WR-01-INDEX-CA4**

Map Name **Index Map of:
Surface Water Baseline**

Community Area 4:
Whitmore Heath to Madeley

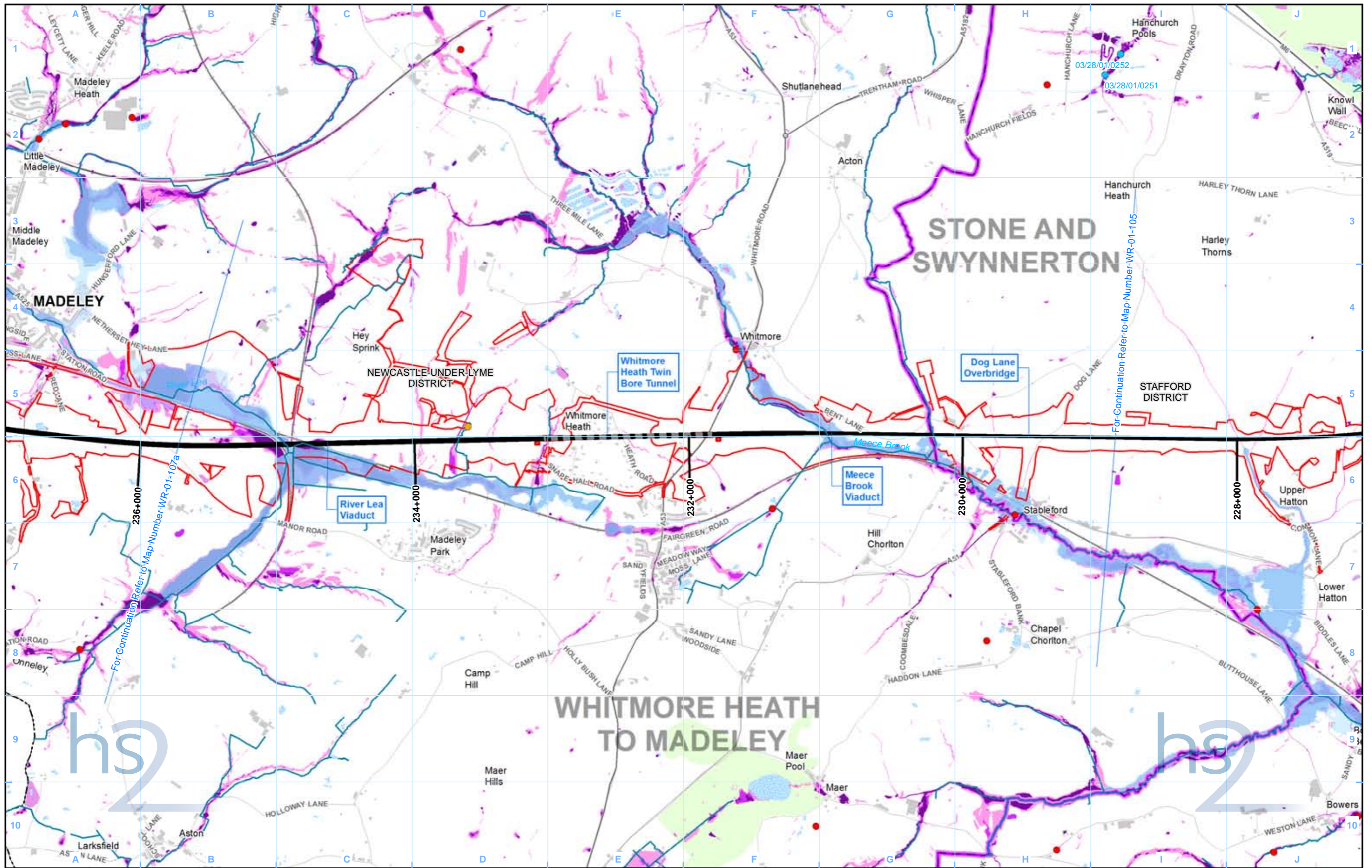
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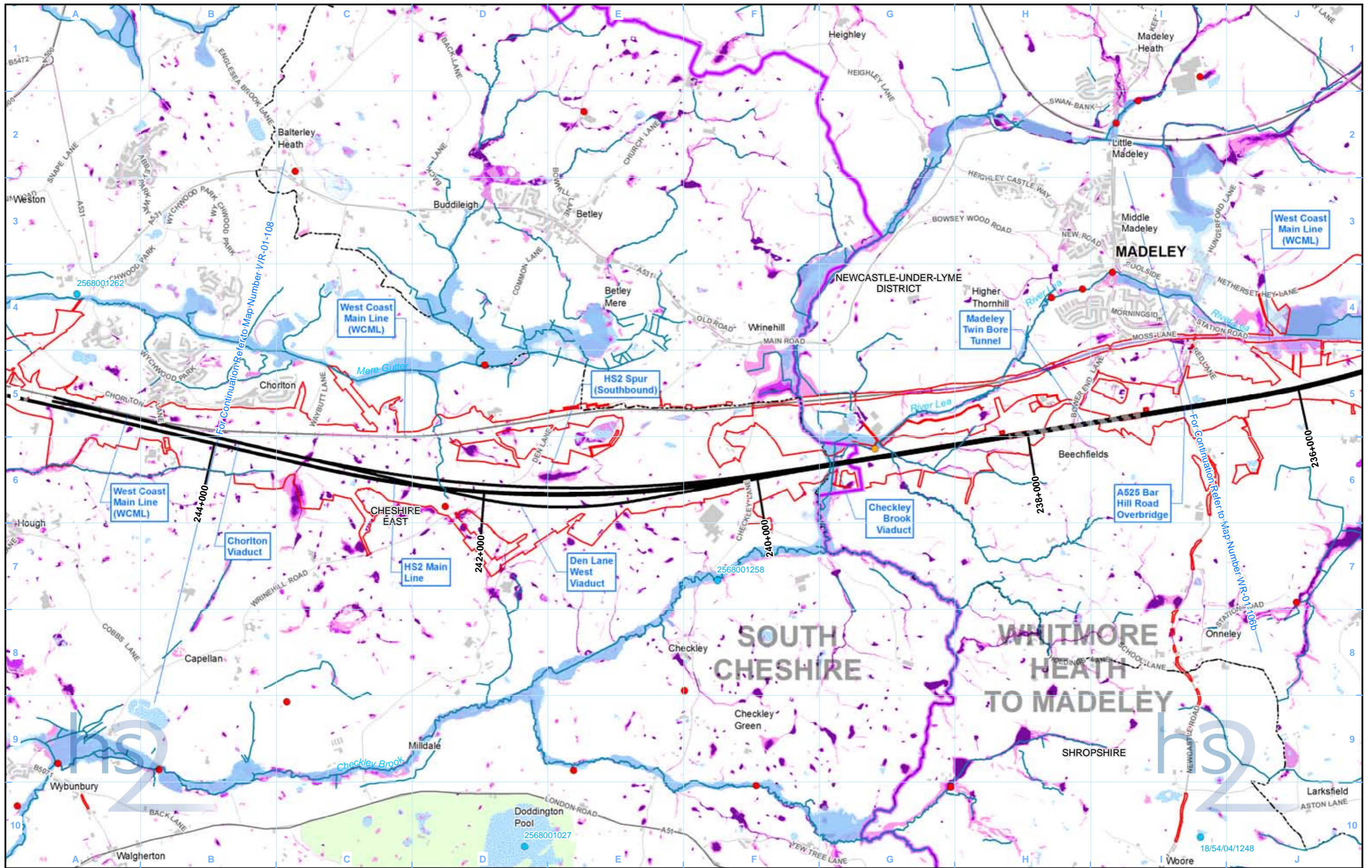
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Doc Number: C861-ARP-EV-MAP-000-151004-P04 **Date: 14/06/17**



Legend <ul style="list-style-type: none"> Route in bored tunnel Route on surface Depot, station, headhouse or portal building Land potentially required during construction Community area boundary County boundary District/Borough boundary Licensed surface water abstraction (excluding public water supplies) Unlicensed private surface water abstractions Consented discharge to surface water Watercourse Culverted watercourse Canal Canal tunnel Lakes & Reservoirs Historic flooding area Flood Zone 2 Flood Zone 3 High - chance of flooding greater than 1 in 30 (3.33%) Medium - chance of flooding between 1 in 100 (1%) and 1 in 30 (3.33%) Low - chance of flooding between 1 in 1000 (0.1%) and 1 in 100 (1%) 		<p>Map Number WR-01-106b</p> <p>Map Name Surface Water Baseline</p> <p>Community Area 4: Whitmore Heath to Madeley</p>	<p></p> <p>Registered in England. Registration number 06791686. Registered office: 2 Snowhill, Queensway, Birmingham B4 6GA</p> <p>Scale at A3: 1:25,000</p> <p>© Crown copyright and database rights 2017. Ordnance Survey Licence Number 100049190.</p> <p>Doc Number: C861-ARP-EV-MAP-000-151306-P04</p> <p>Date: 14/06/17</p>
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Legend	
	Route in bored tunnel
	Route on surface
	Depot, station, headhouse or portal building
	Land potentially required during construction
	Community area boundary
	County boundary
	District/Borough boundary
	Licensed surface water abstraction (excluding public water supplies)
	Unlicensed private surface water abstractions
	Consented discharge to surface water
	Watercourse
	Culverted watercourse
	Canal
	Canal tunnel
	Lakes & Reservoirs
	Historic flooding area
	Flood Zone 2
	Flood Zone 3
	High - chance of flooding greater than 1 in 30 (3.33%)
	Medium - chance of flooding between 1 in 100 (1%) and 1 in 30 (3.33%)
	Low - chance of flooding between 1 in 1000 (0.1%) and 1 in 100 (1%)

Map Number	WR-01-107a
Map Name	Surface Water Baseline
Community Area 4: Whitmore Heath to Madeley	

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Date: 14/06/17

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Superficial Deposits

- Alluvium [ALV-CZPS] (Secondary A)
- Alluvium [ALV-XCZSV] (Secondary A)
- River terrace deposits, 1 to 2 [T1T2-XSV] (Secondary A)
- Enfield silt member [ESI-XCZ] (Non-Productive)
- Glaciofluvial deposits, devensian [GFDUD-XSV] (Secondary A)
- Glaciolacustrine deposits, devensian [GLLDD-XCZ] (Non-Productive)
- Kempton park gravel formation [KPGR-XSV] (Secondary A)
- Langley silt member [LASI-XCZ] (Non-Productive)
- Shepperton gravel member [SHGR-XSV] (Principal)
- Till, devensian [TILLD-DMTN] (Non-Productive)
- Till, devensian [TILLD-XDSV] (Non-Productive)
- Finsbury gravel member [FIGR-XSV] (Secondary A)
- Hackney gravel member [HAGR-XSV] (Secondary A)
- Lynch hill gravel member [LHGR-XSV] (Secondary A)
- Taplow gravel formation [TPGR-XSV] (Principal/ Secondary A)
- Boyn hill gravel member [BHT-XSV] (Secondary A)
- Bosworth clay member [BOSW-XCZ] (Non-Productive)
- Black park gravel member [BPGR-XSV] (Secondary A)
- Dunsmore gravel [DMG-XSV] (Secondary A)
- Lowestoft formation [LOFT-DMTN] (Non-Productive)
- Oadby member [ODT-DMTN] (Non-Productive)
- Thrusington member [THT-DMTN] (Non-Productive)
- Winter hill gravel (lacustrine deposits) [WHGLD-XSV] (Secondary A)
- Winter hill gravel [WHG-XSV] (Secondary A)
- Westmill gravel member [WLGR-XSV] (Secondary A)
- Dollis hill gravel member [DHGR-XSV] (Secondary A)
- Gerrards cross gravel [GCGR-XSV] (Secondary A)
- Glaciofluvial deposits, mid pleistocene [GFDMP-XSV] (Secondary A)
- Glaciofluvial sheet deposits, mid pleistocene [GFSMP-XSV] (Secondary A)
- Glaciofluvial terrace deposits, mid pleistocene [GFTMP-XSV] (Secondary A)
- Glaciolacustrine deposits, mid pleistocene [GLLMP-XCZ] (Non-Productive)
- Till, mid pleistocene [TILMP-DMTN] (Non-Productive)
- Beaconsfield gravel [BDGR-XSV] (Secondary A)
- Baginton sand and gravel formation [BGSG-XSV] (Secondary A)
- Chorleywood gravel formation [CWGR-XSV] (Secondary A)
- Glacial deposits [GDU-XCZS] ()
- Glaciolacustrine deposits [GLLD-XCZ] (Non-Productive)
- Holme pierrepont sand and gravel member [HPSG-XSV] (Secondary A)
- Interglacial lacustrine deposits [IGLD-XCZ] (Non-Productive)
- Kesgrave catchment subgroup [KGCX-XSV] ()
- Princes risborough sand and gravel [PRSG-XSV] ()
- Stanmore gravel formation [STGR-XSV] (Secondary A)
- Wasperton sand and gravel member [WAT-XSV] (Secondary A)
- Westland green gravel [WGGR-XSV] (Secondary A)
- Alluvial fan deposits [ALF-V] (Secondary A)
- Glaciofluvial deposits [GFDU-XSV] (Secondary A)
- Head [HEAD-V] (Secondary (Undifferentiated))
- Head [HEAD-XCZ] (Secondary (Undifferentiated))
- Head [HEAD-XCZSV] (Secondary (Undifferentiated))
- Head, 1 [HEAD1-XCZSV] (Secondary (Undifferentiated))
- Lacustrine deposits [LDE-XCZS] (Non-Productive)
- Peat [PEAT-P] (N/A Aquifer)
- River terrace deposits, 1 [RTD1-XSV] (Secondary A)
- River terrace deposits, 2 [RTD2-XSV] (Secondary A)
- River terrace deposits, 3 [RTD3-XSV] (Secondary A)
- River terrace deposits, 4 [RTD4-XSV] (Secondary A)
- River terrace deposits (undifferentiated) [RTDU-XSV] (Secondary A)
- Sand and gravel of uncertain age and origin [SGAO-XSV] (Secondary A)
- Tufa [TUFA-CATUFA] (Aquifer)
- Wolston sand and gravel [WOSG-XSV] (Secondary A)
- Clay-with-flints formation [CWF-XCZSV] (Non-Productive)

Bedrock Geology

- Bagshot formation - sand [BGS-SANDU] (Secondary A)
- Claygate member - clay, silt and sand [CLGB-CLSISA] (Secondary A)
- Claygate member - sand, silt and clay [CLGB-SSCL] (Secondary A)
- London clay formation - clay and silt [LC-CLSI] (Non-Productive)
- London clay formation - clay, silt and sand [LC-CLSISA] (Non-Productive)
- Thanet formation - sand [TAB-SANDU] (Secondary A)
- Lambeth group - clay, silt and sand [LMBE-CLSISA] (Secondary A)
- Seaford chalk formation and newhaven chalk formation (undifferentiated) - chalk [SNCK-CHLK] (Principal)
- Chalk rock member - chalk [CKR-CHLK] (Principal)
- Lewes nodular chalk formation - chalk [LECH-CHLK] (Principal)
- Lewes nodular chalk formation and seaford chalk formation (undifferentiated) - chalk [LESE-CHLK] (Principal)
- Lewes nodular chalk formation and newhaven chalk formation (undifferentiated) - chalk [LSNCK-CHLK] (Principal)
- New pit chalk formation - chalk [NPCH-CHLK] (Principal)
- Glauconitic marl member - sandstone, glauconitic [GLML-GLSST] (Principal)
- Holywell nodular chalk formation - chalk [HCK-CHLK] (Principal)
- Holywell nodular chalk formation and new pit chalk formation (undifferentiated) - chalk [HNCK-CHLK] (Principal)
- Melbourn rock member - chalk [MR-CHLK] (Principal)
- Totterhoe stone member - chalk [TTST-CHLK] (Principal)
- West melbury marly chalk formation - chalk [WMCH-CHLK] (Principal)
- West melbury marly chalk formation and zig zag chalk formation (undifferentiated) - chalk [WZCK-CHLK] (Principal)
- Zig zag chalk formation - chalk [ZZCH-CHLK] (Principal)
- Gault formation - mudstone [GLT-MDST] (Non-Productive)
- Gault formation and upper greensand formation (undifferentiated) - mudstone, siltstone and sandstone [GUGS-MDSS] (Non-Productive)
- Upper greensand formation - siltstone and sandstone [UGS-SISD] (Non-Productive)
- Lower greensand group - sandstone [LGS-SDST] (Secondary A)
- Whitchurch sand formation - mudstone [WHS-MDST] (Secondary A)
- Whitchurch sand formation - sandstone [WHS-SDST] (Secondary A)
- Purbeck group - limestone and [subequal/subordinate] argillaceous rocks, interbedded [PB-LMAR] (Principal)
- Portland group - limestone and calcareous sandstone [PL-LMCS] (Principal)
- Portland sand formation - sandstone, calcareous [POSA-CALSST] (Secondary A)
- Portland sand formation - limestone and calcareous sandstone [POSA-LMCS] (Secondary A)
- Portland stone formation - limestone [POST-LMST] (Principal)
- Kimmeridge clay formation - mudstone [KC-MDST] (Non-Productive)
- Kimmeridge clay formation - siltstone and sandstone [KC-SISD] (Non-Productive)
- Amgrove spiculite member - sandstone [AGSP-SDST] (Secondary A)
- Amphill clay formation - mudstone [AMC-MDST] (Non-Productive)
- Oakley member - limestone and mudstone, interbedded [OKLY-LSMD] (Secondary A)
- Weymouth member - mudstone [WEY-MDST] (Non-Productive)
- West walton formation and amphill clay formation (undifferentiated) - mudstone [WWAC-MDST] (Non-Productive)
- West walton formation - limestone and [subequal/subordinate] argillaceous rocks, interbedded [WWB-LMAR] (Non-Productive)
- West walton formation - mudstone [WWB-MDST] (Non-Productive)
- Kellaways formation - sandstone, siltstone and mudstone [KLB-SDSM] (Secondary A)
- Kellaways clay member - mudstone [KLC-MDST] (Secondary A)
- Kellaways sand member - sandstone and siltstone, interbedded [KLS-SDSL] (Secondary A)
- Peterborough member - mudstone [PET-MDST] (Non-Productive)
- Stewartby member - mudstone [SBY-MDST] (Non-Productive)
- Bladon member - limestone [BLAD-LMST] (Principal)
- Bladon member - mudstone and limestone, interbedded [BLAD-MDLM] (Principal)
- Blisworth clay formation - mudstone [BWC-MDST] (Principal)
- Blisworth limestone formation - limestone [BWL-LMST] (Principal)
- Combrash formation - limestone [CB-LMST] (Secondary A)
- Forest marble formation - limestone [FMB-LMST] (Secondary A)
- Forest marble formation - limestone and mudstone, interbedded [FMB-LSMD] (Secondary A)
- Great oolite group - limestone and [subequal/subordinate] argillaceous rocks, interbedded [GOG-LMAR] (Principal To Secondary B)
- Sharp's hill formation - argillaceous rocks with subordinate sandstone and limestone [SHHB-ARSL] (Secondary A)
- Taynton limestone formation - limestone, ooidal [TY-LMOOL] (Principal)
- Wellingborough limestone member - limestone [WBRO-LMST] (Secondary A)
- White limestone formation - limestone [WHL-LMST] (Principal)
- Horsehay sand formation - sandstone [HYSA-SDST] (Secondary A)
- Rutland formation - mudstone [RLD-MDST] (Secondary B)
- Stamford member - sandstone and siltstone, interbedded [STAM-SDSL] (Secondary A)
- Northampton sand formation - sandstone, limestone and ironstone [NS-SDLI] (Secondary A)
- Whitby mudstone formation - mudstone [WHM-MDST] (Non-Productive)
- Dyrham formation - siltstone and mudstone, interbedded [DYS-SIMD] (Secondary (Undifferentiated))
- Marlstone rock formation - ferruginous limestone and ironstone [MRB-FLIR] (Secondary A)
- Marlstone rock formation - limestone, ferruginous [MRB-FLMST] (Secondary A)
- Charmouth mudstone formation - limestone [CHAM-LMST] (Secondary (Undifferentiated))
- Charmouth mudstone formation - mudstone [CHAM-MDST] (Non-Productive)
- Rugby limestone member - mudstone and limestone, interbedded [RLS-MDLM] (Secondary A)
- Langport member - limestone [LPMB-LMST] (Secondary (Undifferentiated))
- Penarth group - argillaceous rock and [subequal/subordinate] limestone, interbedded [PNG-AROCLS] (Secondary B)
- Penarth group - mudstone [PNG-MDST] (Secondary B)
- Salford shale member - limestone [SASH-LMST] (Secondary B)

- Salford shale member - mudstone [SASH-MDST] (Secondary B)
- Westbury formation - mudstone [WBY-MDST] (Secondary (Undifferentiated))
- Westbury formation - sandstone [WBY-SDST] (Secondary (Undifferentiated))
- Wilmcote limestone member - mudstone and limestone, interbedded [WCT-MDLM] (Secondary (Undifferentiated))
- Blue anchor formation - mudstone and siltstone [BAN-MDSI] (Secondary (Undifferentiated))
- Blue anchor formation - mudstone [BAN-MDST] (Secondary (Undifferentiated))
- Arden sandstone formation - mudstone [AS-MDST] (Secondary (Undifferentiated))
- Arden sandstone formation - sandstone, siltstone and mudstone [AS-SDSM] (Secondary A)
- Arden sandstone formation - siltstone and sandstone [AS-SISD] (Secondary A)
- Weatheroak sandstone member - sandstone [WKSA-SDST] ()
- Gunthorpe member - siltstone, dolomitic [GUN-DSLST] ()
- Gunthorpe member - mudstone [GUN-MDST] ()
- Tarporley siltstone formation - siltstone, mudstone and sandstone [TPSF-SIMS] (Secondary B)
- Bromsgrove sandstone formation - mudstone [BMS-MDST] (Principal)
- Bromsgrove sandstone formation - sandstone, pebbly (gravelly) [BMS-PESST] (Principal)
- Bromsgrove sandstone formation - sandstone [BMS-SDST] (Principal)
- Kidderminster formation - conglomerate [KDM-CONG] (Principal)
- Kidderminster formation - mudstone [KDM-MDST] (Principal)
- Kidderminster formation - sandstone and conglomerate, interbedded [KDM-SCON] (Principal)
- Mercia mudstone group - siltstone, dolomitic [MMG-DSLST] (Secondary (Undifferentiated))
- Mercia mudstone group - mudstone [MMG-MDST] (Secondary B)
- Wildmoor sandstone formation - sandstone [WRS-SDST] (Principal)
- Ashow formation - mudstone and sandstone [AW-MDSD] (Principal)
- Ashow formation - sandstone [AW-SDST] (Principal)
- Clent formation - argillaceous rocks and [subequal/subordinate] breccia, interbedded [CLT-ARBR] (Secondary A)
- Gibbet hill conglomerate bed - conglomerate [GHC-CONG] (Principal)
- Hopwas breccia formation - breccia [HPBR-BREC] (Principal)
- Hopwas breccia formation - breccia and sandstone, interbedded [HPBR-BRSS] (Principal)
- Kenilworth sandstone formation - breccia [KHS-BREC] (Principal)
- Kenilworth sandstone formation - mudstone [KHS-MDST] (Principal)
- Kenilworth sandstone formation - sandstone [KHS-SDST] (Principal)
- Alveley member - limestone [ALY-LMST] (Secondary A)
- Alveley member - mudstone and sandstone [ALY-MDSD] (Secondary A)
- Alveley member - mudstone [ALY-MDST] (Secondary A)
- Alveley member - sandstone [ALY-SDST] (Secondary A)
- Alveley member - sandstone and mudstone [ALY-STMD] (Secondary A)
- Allesley member - argillaceous rocks and [subordinate/subequal] sandstone and conglomerate, interbedded [ASY-ARSC] (Principal)
- Allesley member - conglomerate [ASY-CONG] (Principal)
- Allesley member - sandstone [ASY-SDST] (Principal)
- Enville member - conglomerate [EN-CONG] (Secondary A)
- Enville member - sandstone, conglomerate and [subordinate] argillaceous rocks [EN-SCAR] (Secondary A)
- Enville member - sandstone with subordinate conglomerate, siltstone and mudstone [EN-SCSM] (Secondary A)
- Enville member - sandstone [EN-SDST] (Secondary A)
- Halesowen formation - limestone [HA-LMST] (Secondary A)
- Halesowen formation - mudstone, siltstone and sandstone [HA-MDSS] (Secondary A)
- Halesowen formation - sandstone [HA-SDST] (Secondary A)
- Keresley member - argillaceous rocks and [subordinate/subequal] sandstone and conglomerate, interbedded [KRS-ARSC] (Principal)
- Keresley member - conglomerate [KRS-CONG] (Principal)
- Keresley member - limestone [KRS-LMST] (Principal)
- Keresley member - sandstone [KRS-SDST] (Principal)
- Tile hill mudstone formation - argillaceous rocks and [subequal/subordinate] sandstone, interbedded [TLM-ARSD] (Principal)
- Tile hill mudstone formation - sandstone [TLM-SDST] (Principal)
- Whitacre member - conglomerate [WIT-CONG] (Principal)
- Whitacre member - limestone [WIT-LMST] (Principal)
- Whitacre member - mudstone and sandstone [WIT-MDSD] (Principal)
- Whitacre member - sandstone [WIT-SDST] (Principal)
- Pennine middle coal measures formation - mudstone, siltstone and sandstone [PMCM-MDSS] (Secondary A)
- Pennine middle coal measures formation - sandstone [PMCM-SDST] (Secondary A)
- Thick coal (south staffordshire) - coal [THIC-COAL] (Secondary A)
- Pennine lower coal measures formation - mudstone, siltstone and sandstone [PLCM-MDSS] (Secondary A)
- Pennine lower coal measures formation - sandstone [PLCM-SDST] (Secondary A)
- Pennine lower coal measures formation and pennine middle coal measures formation (undifferentiated) - mudstone, siltstone and sandstone [PLMC-MDSS] (Secondary A Aquifer)
- Etruria formation - conglomerate [ETM-CONG] (Secondary A)
- Etruria formation - mudstone, sandstone and conglomerate [ETM-MDSC] (Secondary A)
- Etruria formation - sandstone [ETM-SDST] (Secondary A)
- Unnamed igneous intrusion, westphalian - microgabro [UICW-MCGB] ()
- Rough rock - sandstone [RR-SDST] ()
- Millstone grit group [see also migr] - mudstone, siltstone and sandstone [MG-MDSS] ()
- Millstone grit group [see also migr] - sandstone [MG-SDST] ()
- Coalbrookdale formation - mudstone [CBRD-MDST] (Secondary B)
- Rubery sandstone member - sandstone [RBS-SDST] (Secondary B)
- Midlands minor intrusive suite - lamprophyres [MMI-LMPY] ()
- Monks park shale formation - mudstone [MPSH-MDST] (Secondary B)
- Merevale shale formation - mudstone [MVSH-MDST] (Secondary B)

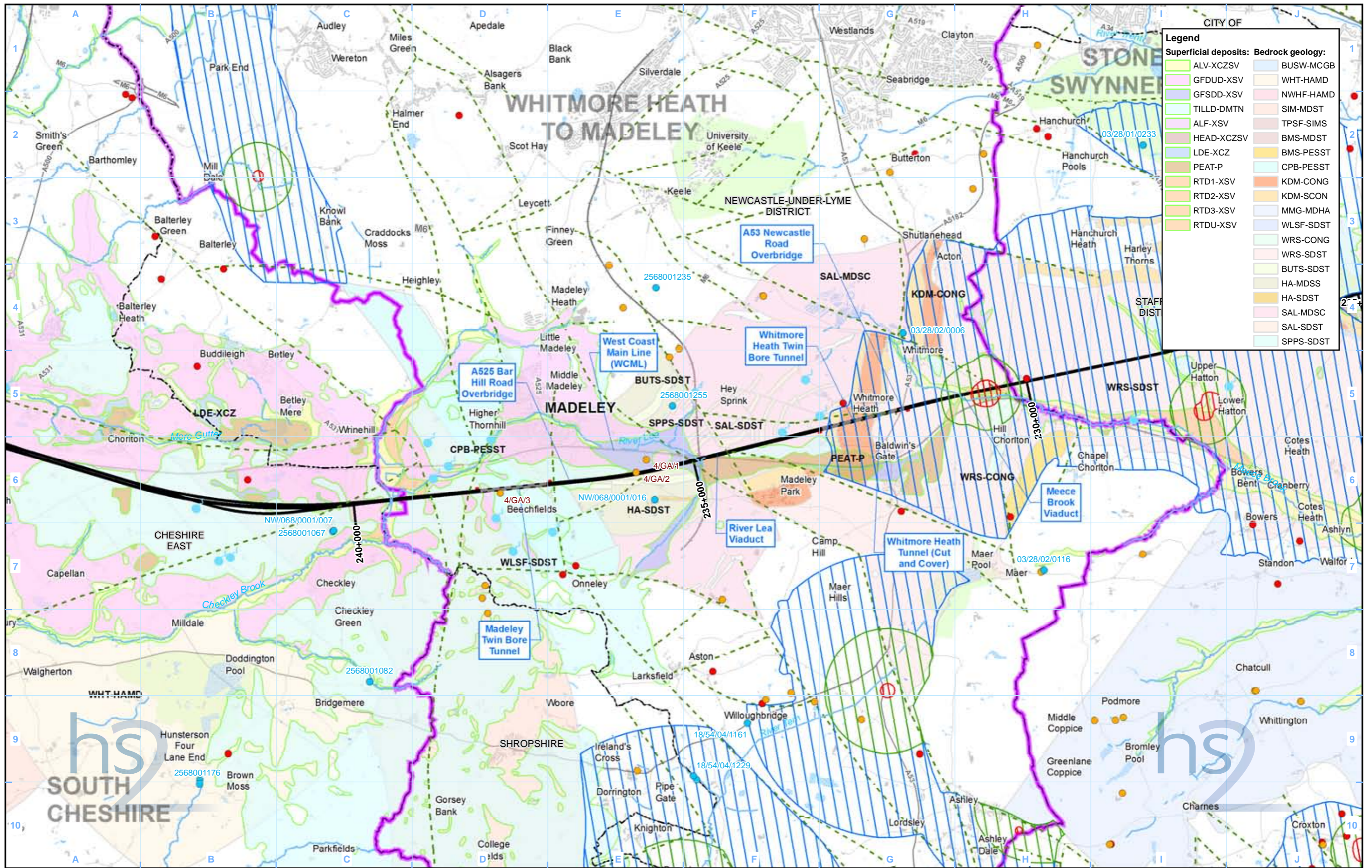
Map Number	WR-02 - Legend
Map Name	WR-02 - Full Geological Legend with Rock Unit Names and Aquifer Status



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Legend	
Superficial deposits:	Bedrock geology:
ALV-XCZSV	BUSW-MCGB
GFDUD-XSV	WHT-HAMD
GFSDD-XSV	NWHF-HAMD
TILLD-DMTN	SIM-MDST
ALF-XSV	TPSF-SIMS
HEAD-XCZSV	BMS-MDST
LDE-XCZ	BMS-PESST
PEAT-P	CPB-PESST
RTD1-XSV	KDM-CONG
RTD2-XSV	KDM-SCON
RTD3-XSV	MMG-MDHA
RTDU-XSV	WLSF-SDST
	WRS-CONG
	WRS-SDST
	BUTS-SDST
	HA-MDSS
	HA-SDST
	SAL-MDSC
	SAL-SDST
	SPPS-SDST

Legend		
		Groundwater source protection zone:

For full geological legend including strata names and aquifer status please refer to WR-02 - Legend

Map Number	WR-02-204
Map Name	Groundwater Baseline
Community Area 4: Whitmore Heath to Madeley	

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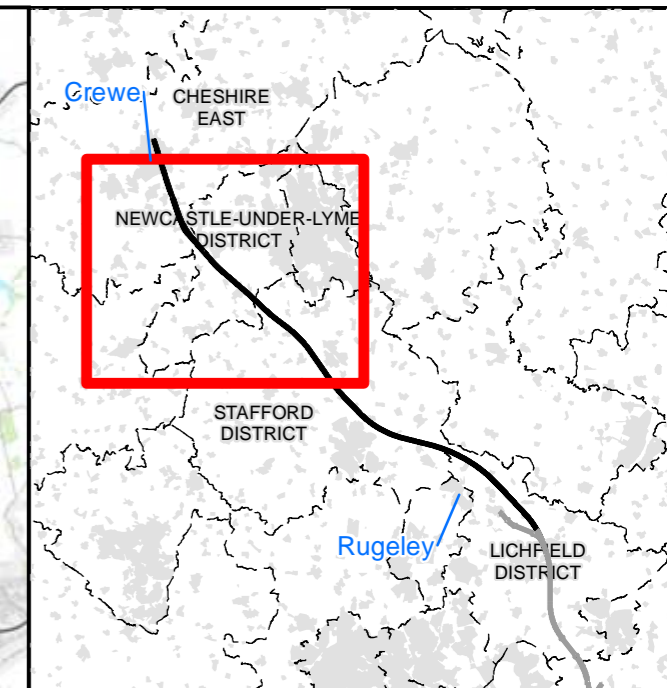
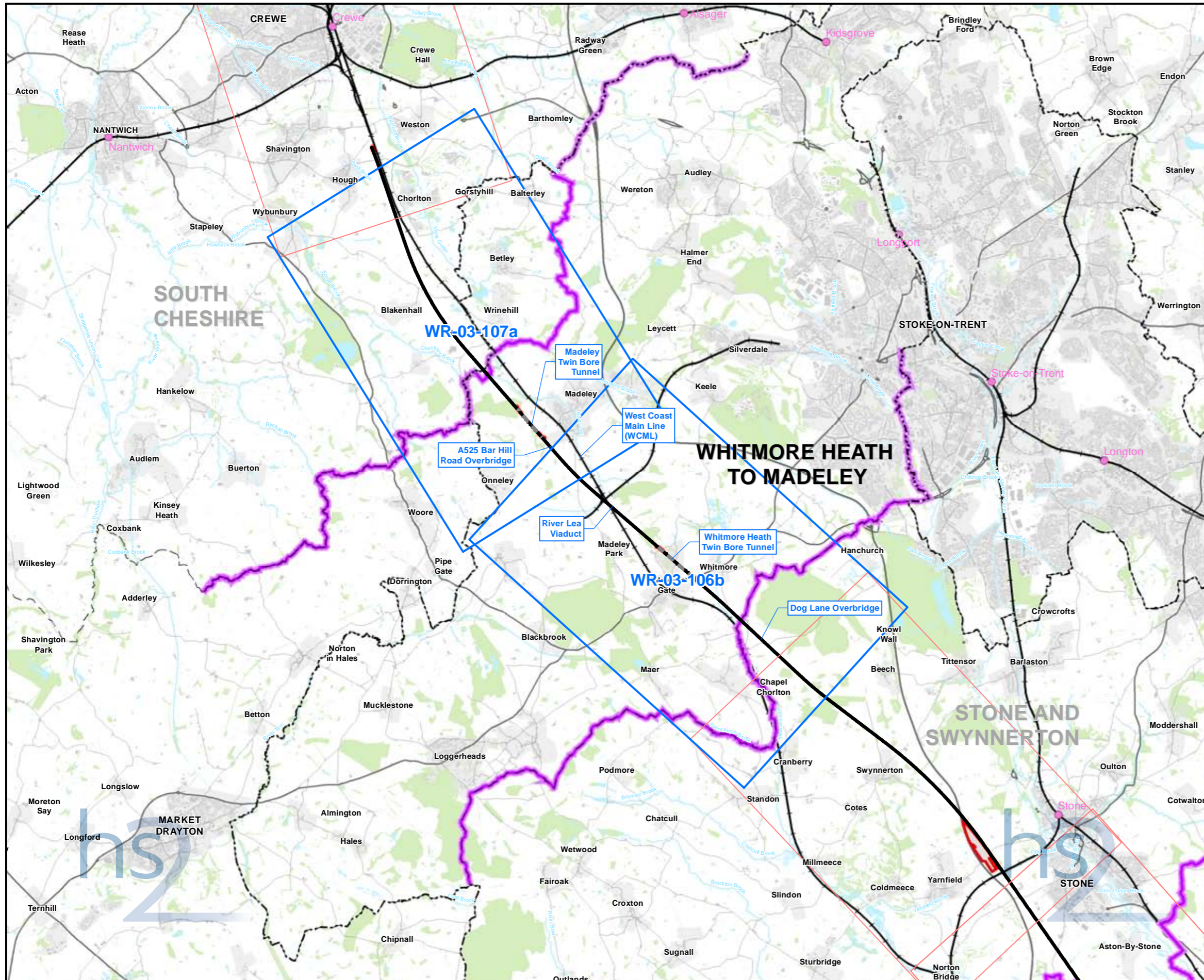
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Date: 14/06/17



Map Series Information:

This map series shows water bodies, their Water Framework Directive current status and associated ecological features.

Main Map Legend

- Route in tunnel
- Route on surface
- Depot, station, headhouse or portal building
- Community area boundary
- Existing railway station
- County boundary
- District/Borough boundary
- Map sheets included in this community area
- Map sheets not included in this community area

Map Number **WR-03-INDEX-CA4**

Map Name **Index Map of:
Water Framework Directive**

Community Area 4:
Whitmore Heath to Madeley

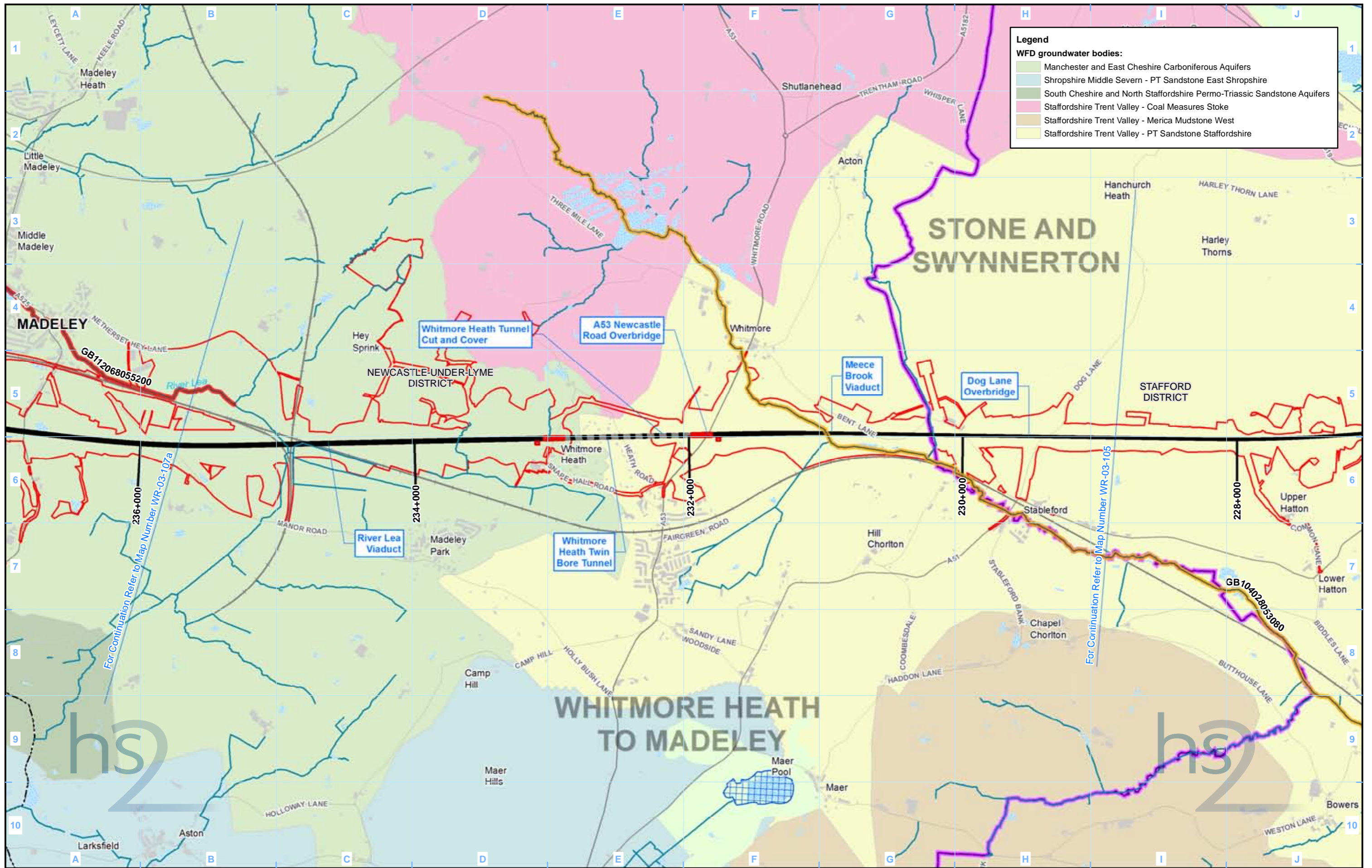
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Legend

WFD groundwater bodies:

- Manchester and East Cheshire Carboniferous Aquifers
- Shropshire Middle Severn - PT Sandstone East Shropshire
- South Cheshire and North Staffordshire Permo-Triassic Sandstone Aquifers
- Staffordshire Trent Valley - Coal Measures Stoke
- Staffordshire Trent Valley - Merica Mudstone West
- Staffordshire Trent Valley - PT Sandstone Staffordshire

Legend

- Route in tunnel
- Route on surface
- Depot, station, headhouse or portal building
- Land potentially required during construction
- Community area boundary
- County boundary
- District/Borough boundary

WFD Surface Water Bodies

Overall Status Classification (2015 RBMP Cycle 2)

- Good
- Moderate
- Poor
- Bad

WFD Lakes

Overall Status

- Good
- Moderate
- Poor
- Bad

Special Area of Conservation (SAC)

- Sites of Special Scientific Interest (SSSI)

Water Features:

- Canal
- Canal tunnel
- Watercourse
- Culverted watercourse
- Open water

Map Number: WR-03-106b

Map Name: Water Framework Directive

Community Area 4: Whitmore Heath to Madeley

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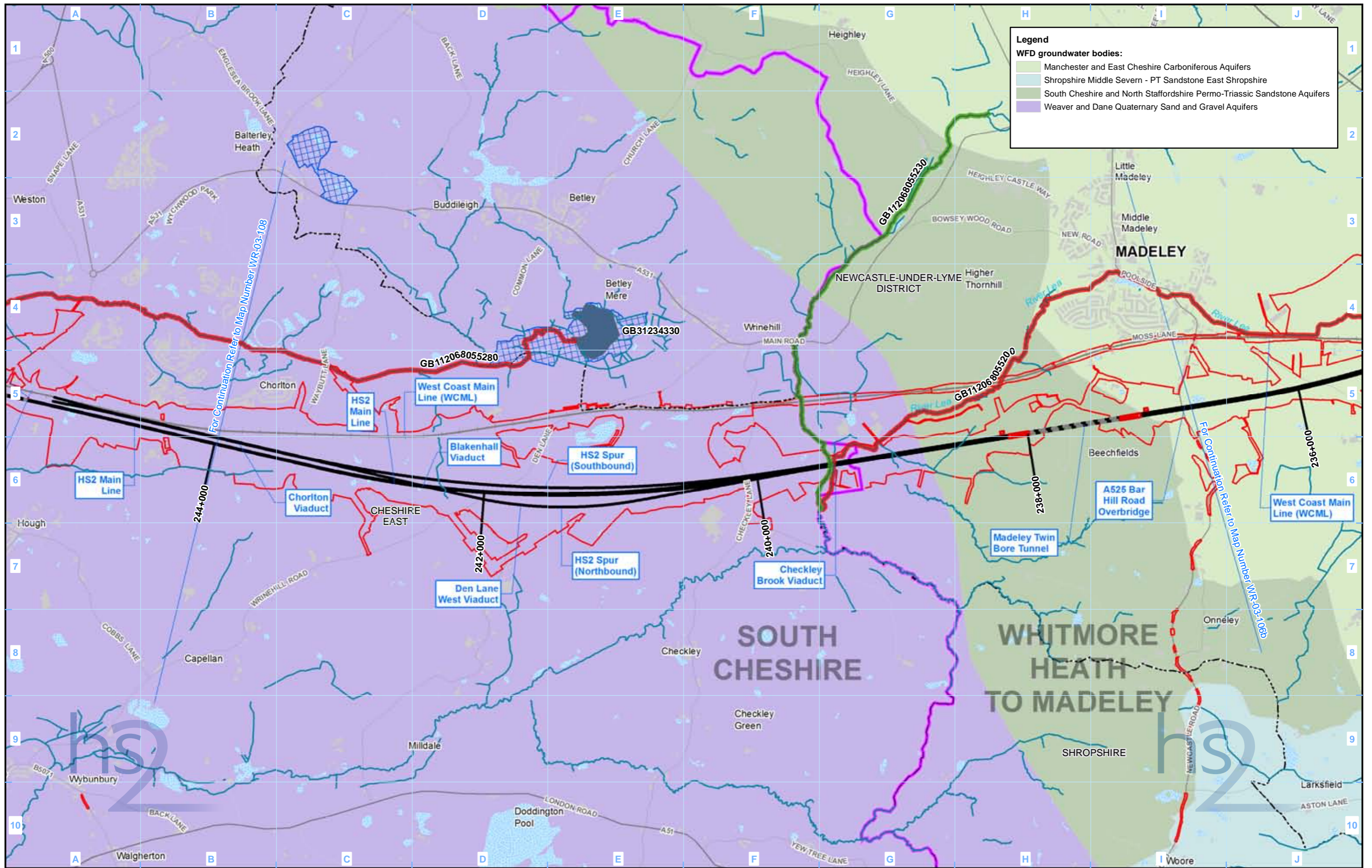
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Doc Number: C861-ARP-EV-MAP-000-153306-P04

Date: 14/06/17



Legend

WFD groundwater bodies:

- Manchester and East Cheshire Carboniferous Aquifers
- Shropshire Middle Severn - PT Sandstone East Shropshire
- South Cheshire and North Staffordshire Permo-Triassic Sandstone Aquifers
- Weaver and Dane Quaternary Sand and Gravel Aquifers

Legend

- Route in tunnel
- Route on surface
- Depot, station, headhouse or portal building
- Land potentially required during construction
- Community area boundary
- County boundary
- District/Borough boundary
- Canal
- Canal tunnel
- Watercourse
- Culverted watercourse
- Open water
- WFD Surface Water Bodies Overall Status Classification (2015 RBMP Cycle 2)
- Good
- Moderate
- Poor
- Bad
- WFD Lakes Overall Status
- Good
- Moderate
- Poor
- Bad
- Special Area of Conservation (SAC)
- Sites of Special Scientific Interest (SSSI)

Map Number: WR-03-107a

Map Name: Water Framework Directive

Community Area 4: Whitmore Heath to Madeley

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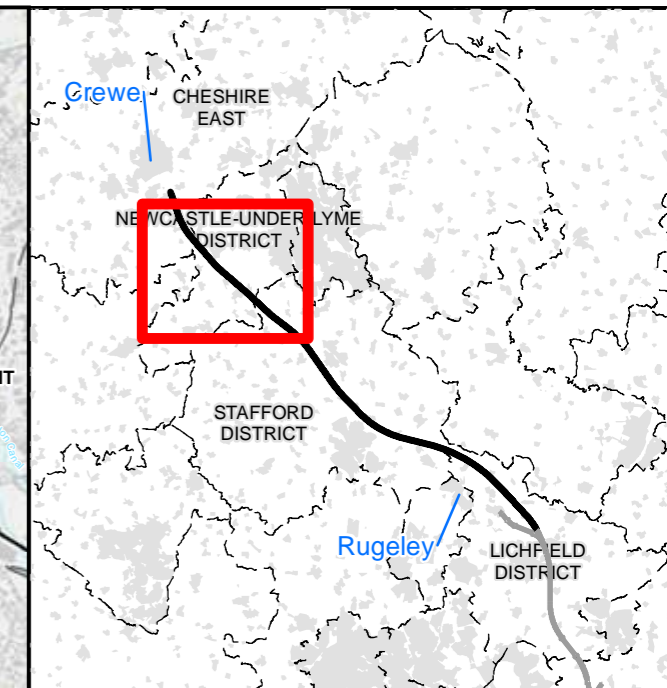
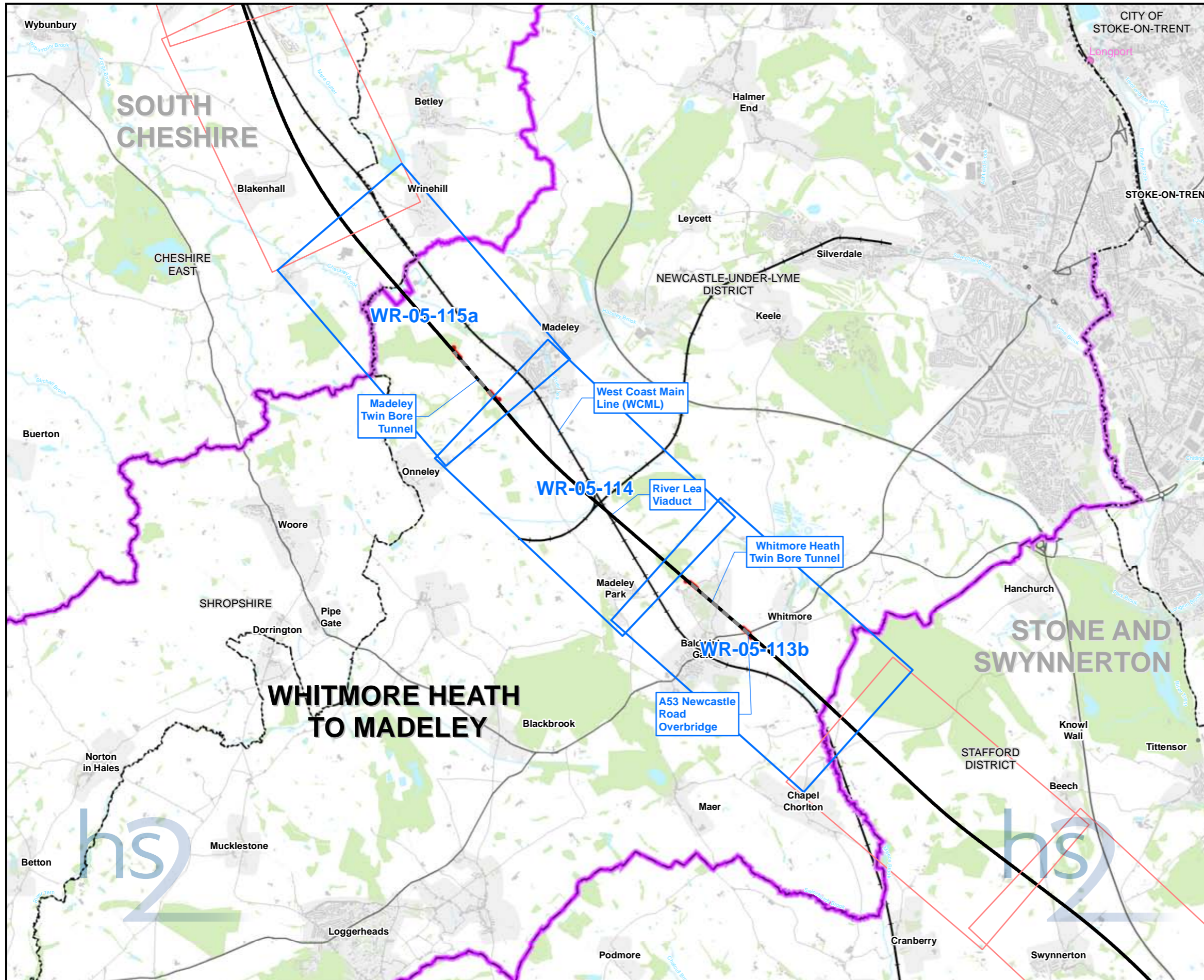
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Map Series Information:

The map shows the output from hydraulic modelling of specific crossing locations and the effect the scheme has on flood extent at 1 in 100 years inclusive of climate change (20%) return period.

Main Map Legend

Route in tunnel	Map sheets included in this community area
Route on surface	Map sheets not included in this community area
Depot, station, headhouse or portal building	Community area boundary
Existing railway station	County boundary
District/Borough boundary	

Map Number	WR-05-INDEX-CA4
Map Name	Index Map of: Modelled Baseline and Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding
	Community Area 4: Whitmore Heath to Madeley

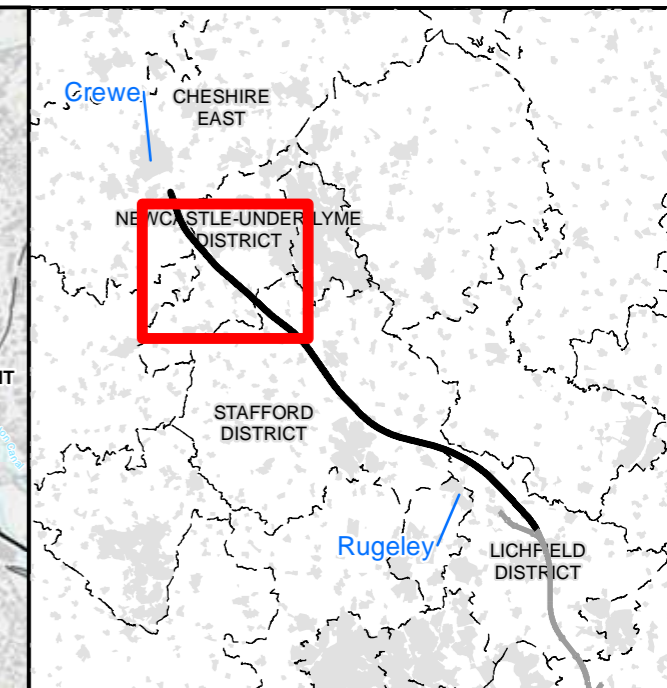
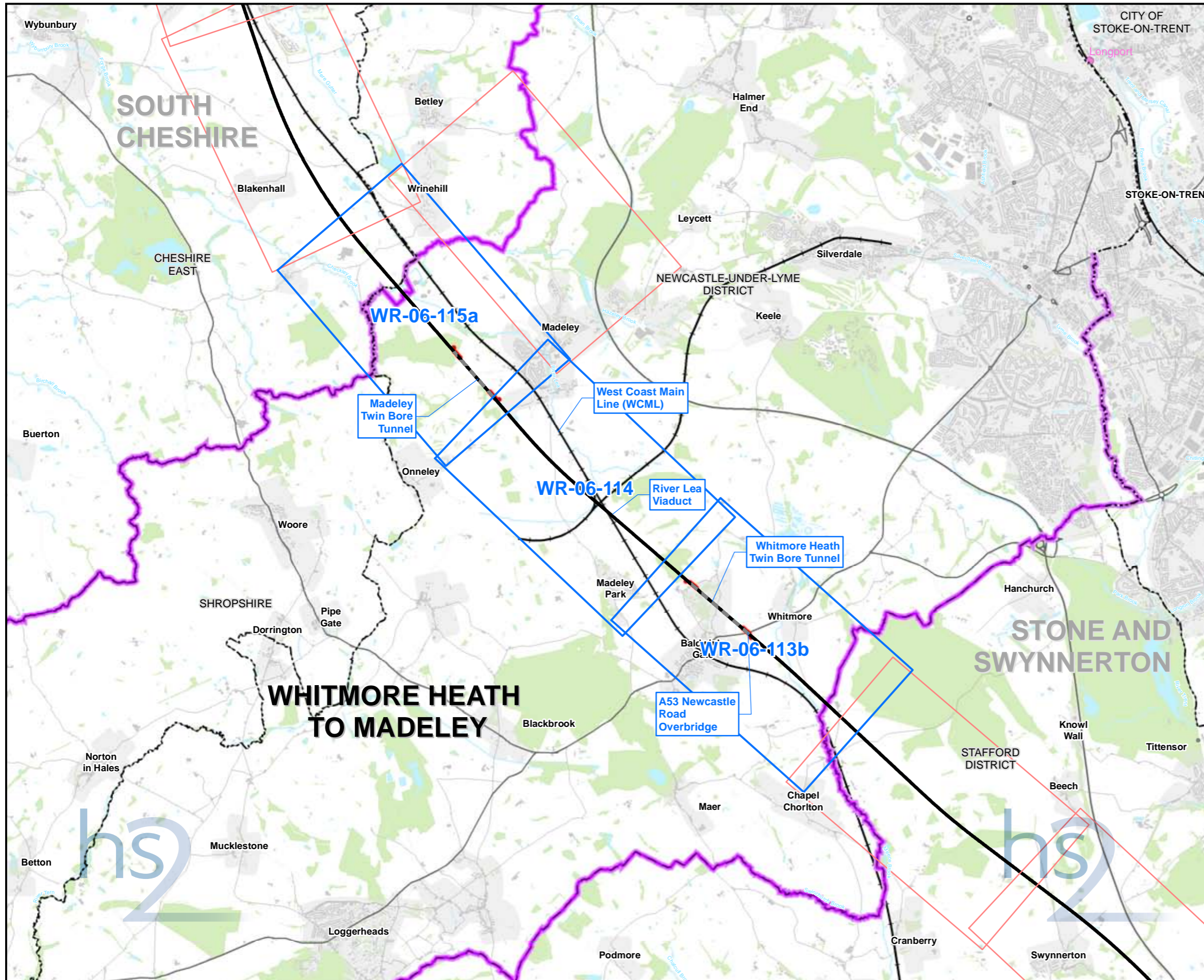
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Doc Number: C861-ARP-EV-MAP-000-155004-P04 **Date: 14/06/17**



Map Series Information:

The map shows the output from hydraulic modelling of specific crossing locations and the effect the scheme has on flood extent at 1 in 20 year return period.

Main Map Legend

Route in tunnel	Map sheets included in this community area
Route on surface	Map sheets not included in this community area
Depot, station, headhouse or portal building	Community area boundary
Community area boundary	Existing railway station
County boundary	District/Borough boundary

Map Number	WR-06-INDEX-CA4
Map Name	Index Map of: Modelled Baseline and Post Development Flood Extent 1 in 20 (5%) Annual Probability of River Flooding
	Community Area 4: Whitmore Heath to Madeley

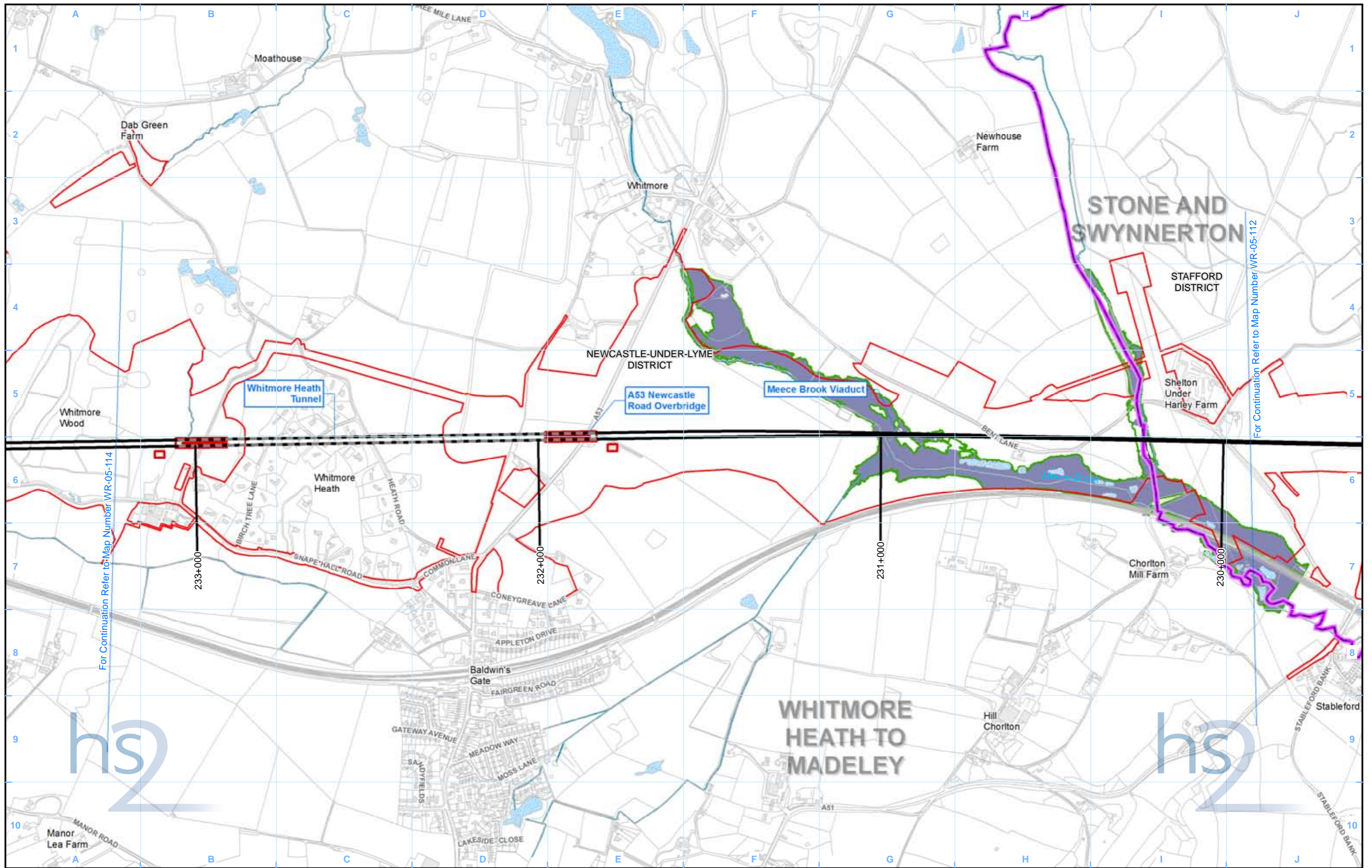
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Doc Number: C861-ARP-EV-MAP-000-156004-P04 **Date: 14/06/17**



For Continuation Refer to Map Number WR-05-114

For Continuation Refer to Map Number WR-05-112

Legend	
	Route in tunnel
	Route on surface
	Depot, station, headhouse or portal building
	Land potentially required during construction
	Community area boundary
	County boundary
	District/Borough boundary
	Watercourse
	Culverted watercourse
	Canal
	Canal tunnel
	Open water
	Registered Park and Garden
	Modelled Baseline Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding
	Modelled Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding

Map Number	WR-05-113b
Map Name	Modelled Baseline and Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding
Community Area 4:	Whitmore Heath to Madeley

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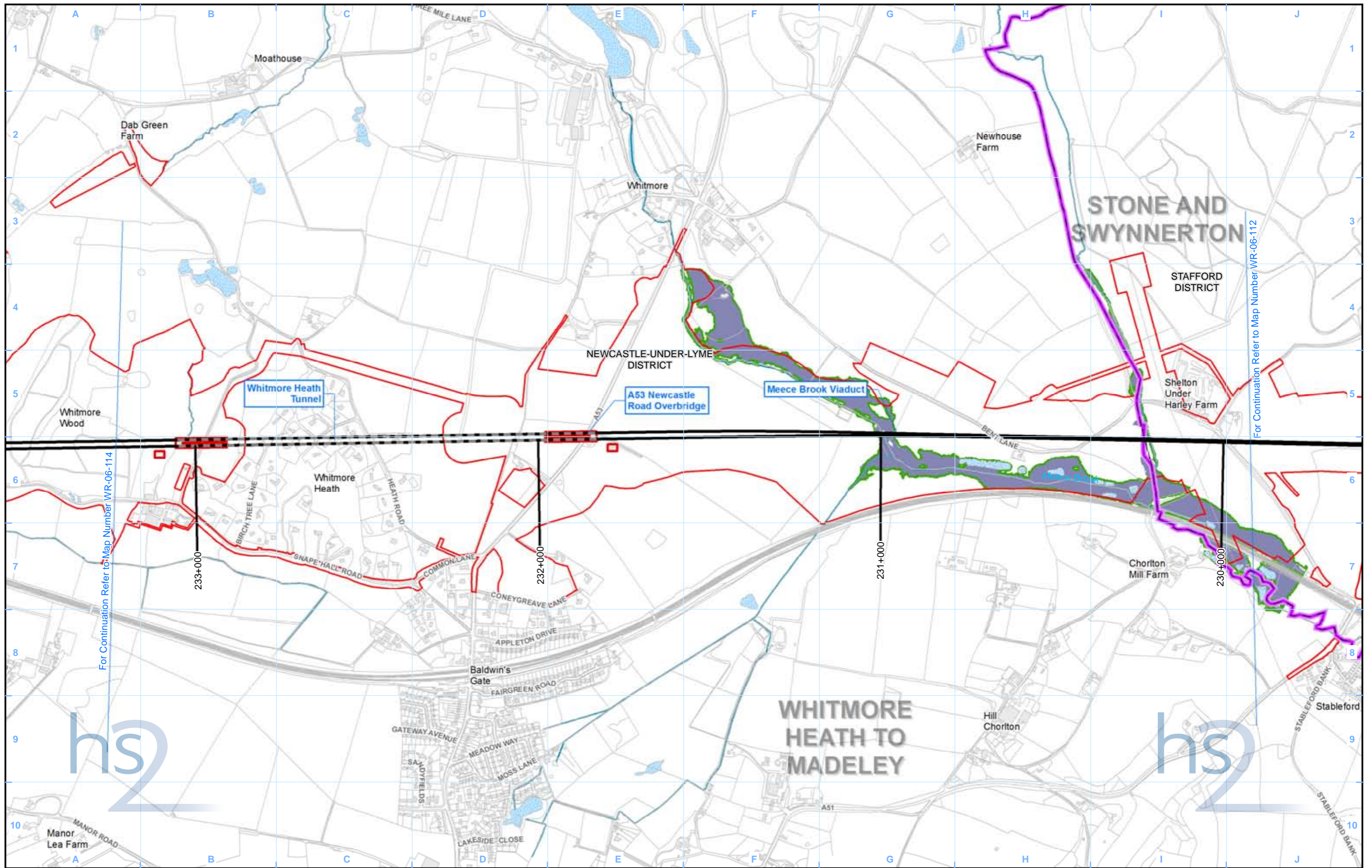
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Doc Number: C861-ARP-EV-MAP-000-155313-P04

Date: 14/06/17



- Legend**
- Route in tunnel
 - Route on surface
 - Depot, station, headhouse or portal building
 - Land potentially required during construction
 - Community area boundary
 - County boundary
 - District/Borough boundary
 - Watercourse
 - Culverted watercourse
 - Canal
 - Canal tunnel
 - Open water
 - Registered Park and Garden
 - Modelled Baseline Flood Extent 1 in 20 (5%) Annual Probability of River Flooding
 - Modelled Post Development Flood Extent 1 in 20 (5%) Annual Probability of River Flooding

Map Number: WR-06-113b

Map Name: Modelled Baseline and Post Development Flood Extent 1 in 20 (5%) Annual Probability of River Flooding

Community Area 4: Whitmore Heath to Madeley

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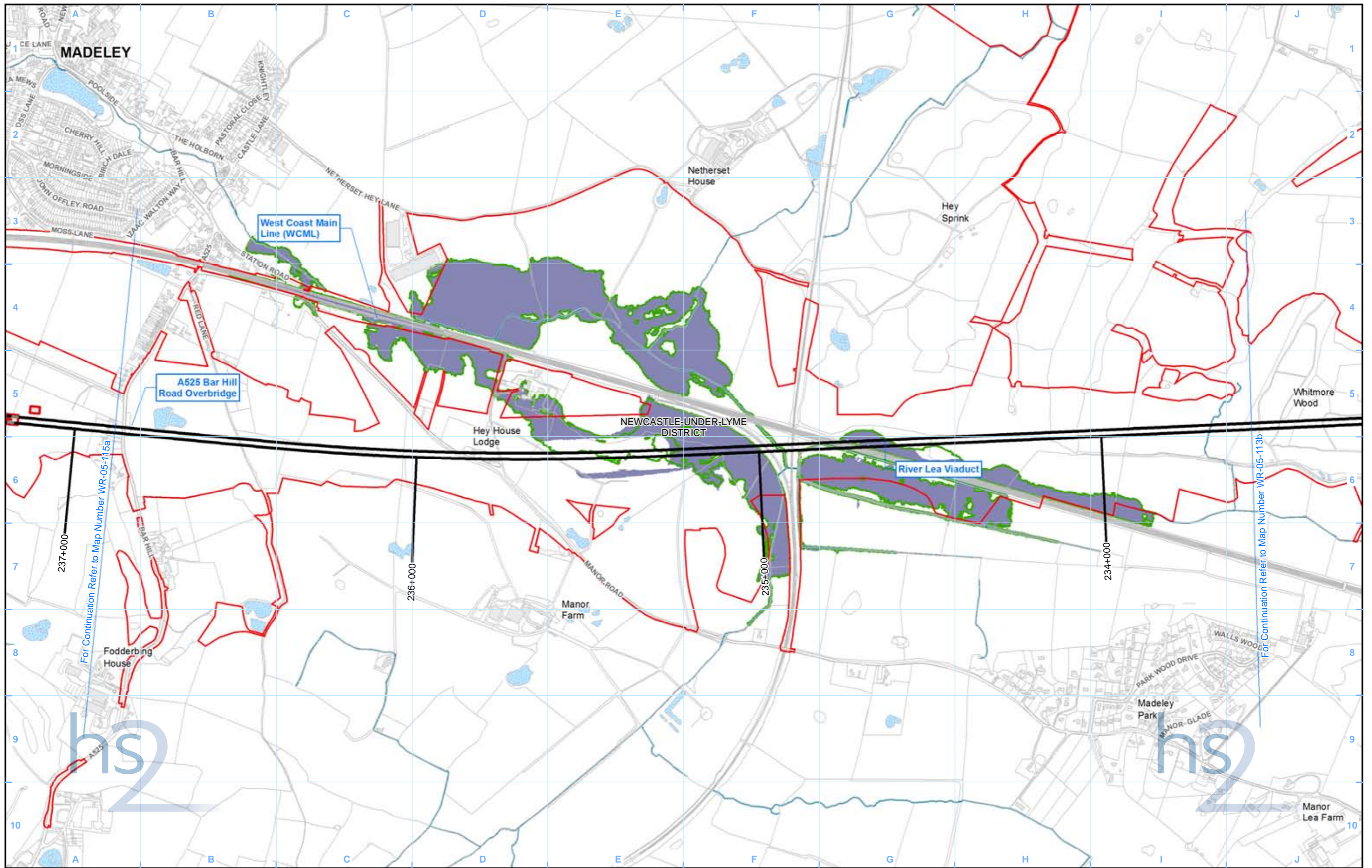
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Doc Number: C861-ARP-EV-MAP-000-156313-P04

Date: 14/06/17

For Continuation Refer to Map Number WR-06-114

For Continuation Refer to Map Number WR-06-112



- Legend**
- Route in tunnel
 - Route on surface
 - Depot, station, headhouse or portal building
 - Land potentially required during construction
 - Community area boundary
 - County boundary
 - District/Borough boundary
 - Watercourse
 - Culverted watercourse
 - Canal
 - Canal tunnel
 - Open water
 - Registered Park and Garden
 - Modelled Baseline Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding
 - Modelled Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding

Map Number: WR-05-114

Map Name: Modelled Baseline and Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding

Community Area 4: Whitmore Heath to Madeley

Map Number: WR-05-114

Map Name: Modelled Baseline and Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding

Community Area 4: Whitmore Heath to Madeley

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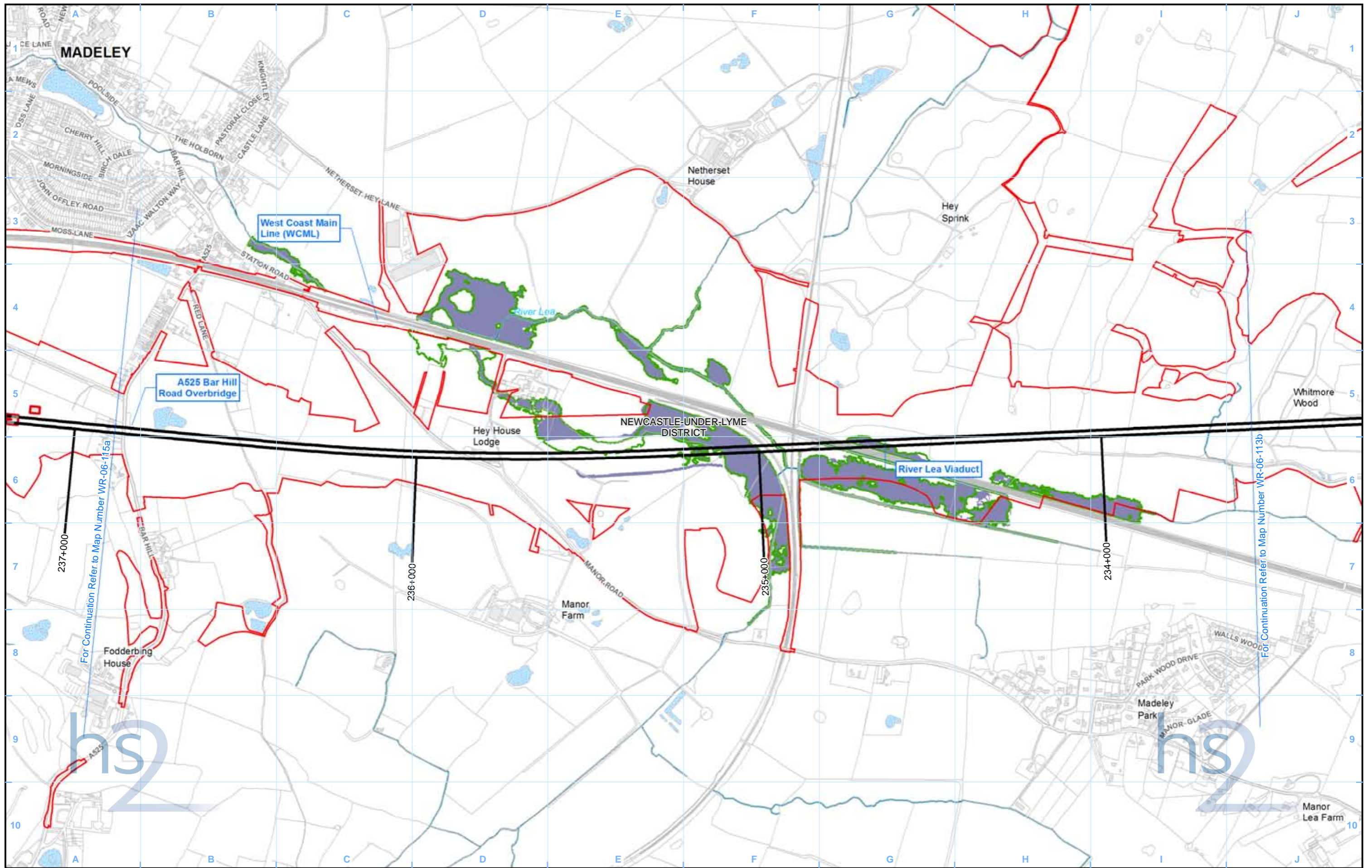
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- Legend**
- Route in tunnel
 - Route on surface
 - Depot, station, headhouse or portal building
 - Land potentially required during construction
 - Community area boundary
 - County boundary
 - District/Borough boundary
 - Watercourse
 - Culverted watercourse
 - Canal
 - Canal tunnel
 - Open water
 - Registered Park and Garden
 - Modelled Baseline Flood Extent 1 in 20 (5%) Annual Probability of River Flooding
 - Modelled Post Development Flood Extent 1 in 20 (5%) Annual Probability of River Flooding

Map Number
WR-06-114

Map Name
Modelled Baseline and Post Development Flood Extent 1 in 20 (5%) Annual Probability of River Flooding

Community Area 4:
Whitmore Heath to Madeley

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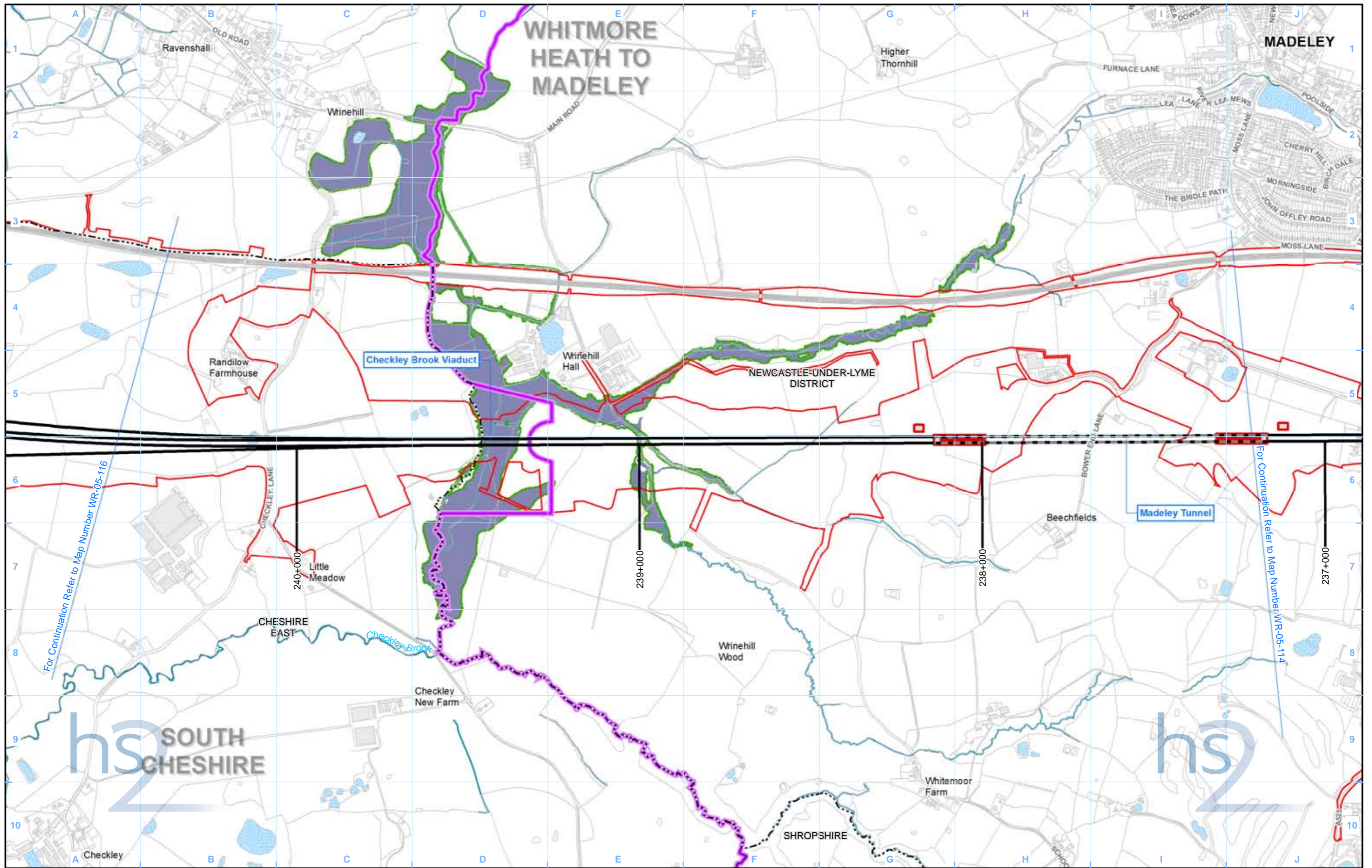
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0 100 200 300 400 Metres

Doc Number: C861-ARP-EV-MAP-000-156214-P04

Date: 14/06/17



- Legend**
- Route in tunnel
 - Route on surface
 - Depot, station, headhouse or portal building
 - Land potentially required during construction
 - Community area boundary
 - County boundary
 - District/Borough boundary
 - Watercourse
 - Culverted watercourse
 - Canal
 - Canal tunnel
 - Open water
 - Registered Park and Garden
 - Modelled Baseline Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding
 - Modelled Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding

Map Number
WR-05-115a

Map Name
Modelled Baseline and Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding

Community Area 4:
Whitmore Heath to Madeley

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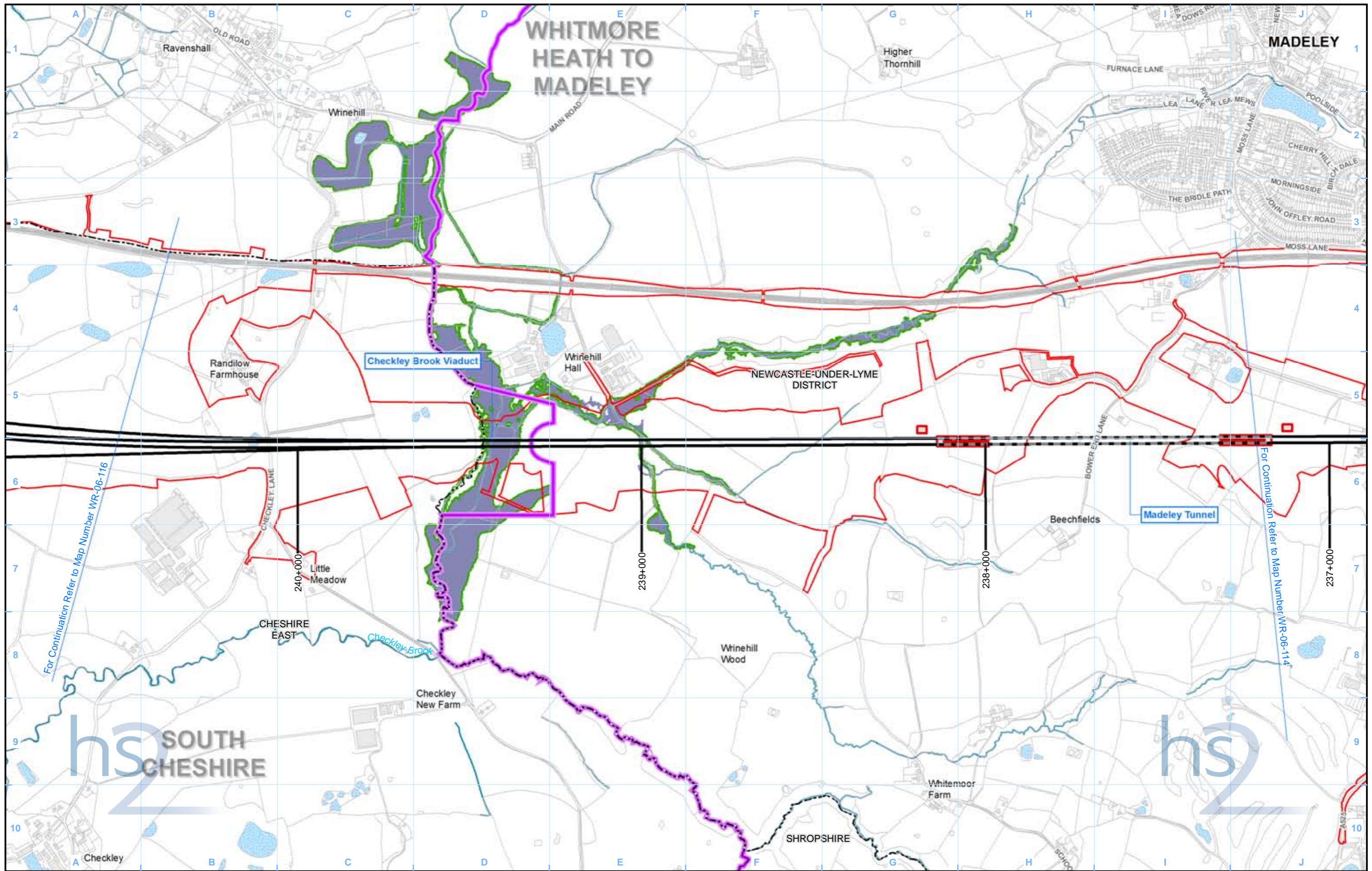
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Date: 14/06/17



Legend

Route in tunnel	District/Borough boundary	Modelled Baseline Flood Extent 1 in 20 (5%) Annual Probability of River Flooding
Route on surface	Watercourse	Modelled Post Development Flood Extent 1 in 20 (5%) Annual Probability of River Flooding
Depot, station, headhouse or portal building	Culverted watercourse	
Land potentially required during construction	Canal	
Community area boundary	Canal tunnel	
County boundary	Open water	
	Registered Park and Garden	

Map Number	WR-06-115a
Map Name	Modelled Baseline and Post Development Flood Extent 1 in 20 (5%) Annual Probability of River Flooding
Community Area 4:	Whitmore Heath to Madeley

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Scale at A3: 1:10,000
 Metres

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High Speed Rail (West Midlands-Crewe)

Environmental Statement

CA5 South Cheshire

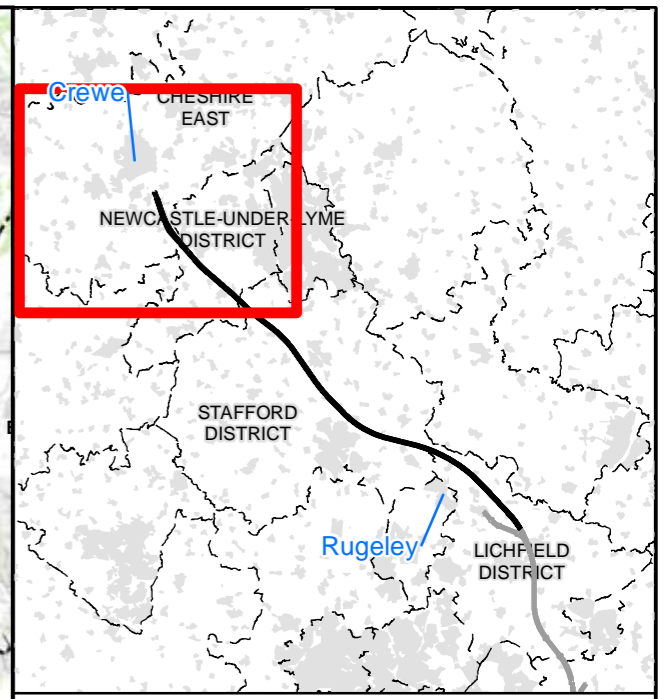
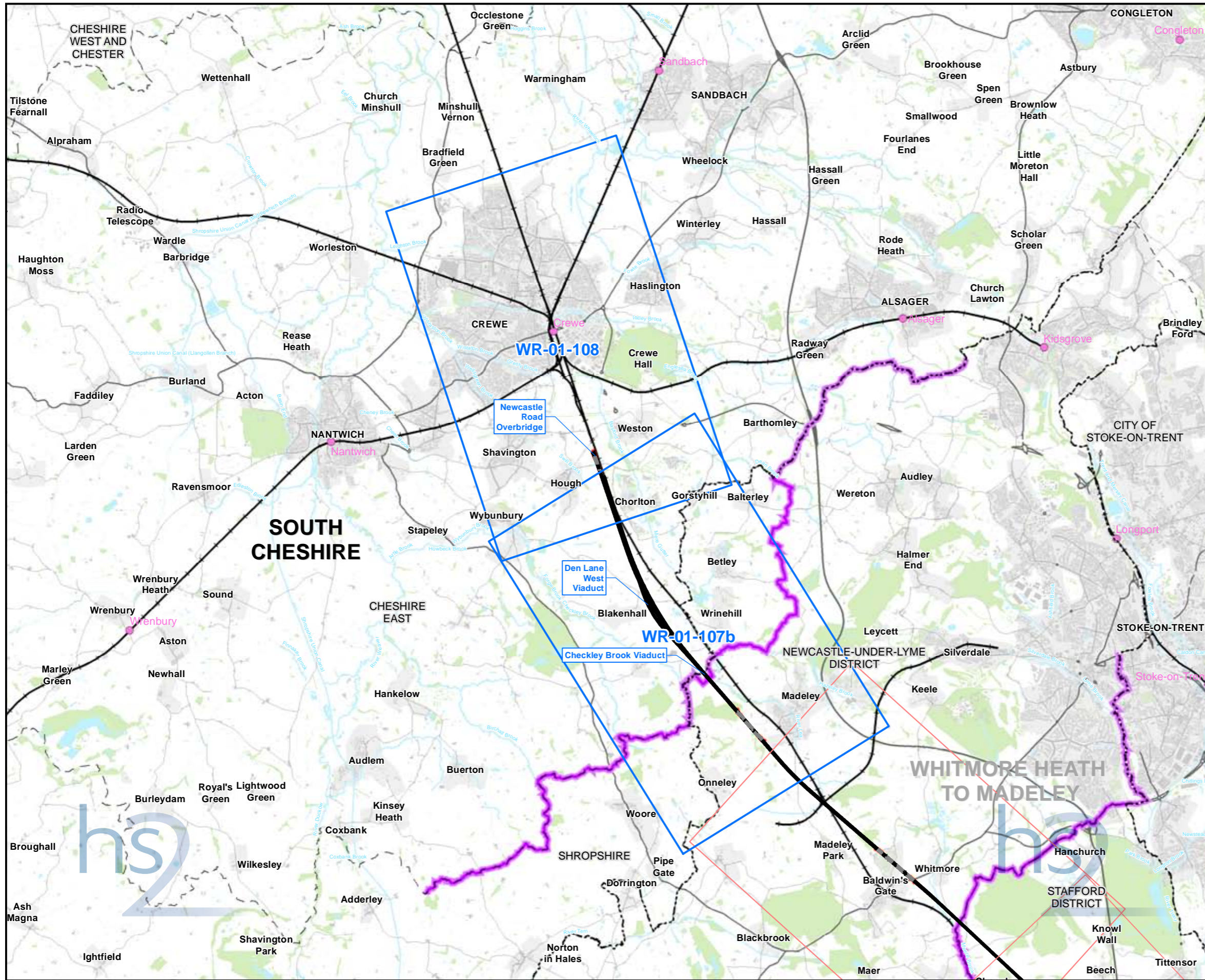
WR-01 - Surface Water Baseline

WR-02 - Groundwater Baseline

WR-03 - Water Framework Directive

**WR-05 - Modelled Baseline and Post Development Flood
Extent 1 in 100 (1%+CC) including Climate Change
Annual Probability of River Flooding**

**WR-06 - Modelled Baseline and Post Development Flood
Extent 1 in 20 (5%) Annual Probability of River Flooding**



Map Series Information:

This map series shows surface water features such as rivers, streams, ponds, canals and reservoirs, flood zones, and surface water abstractions as referred to in the ES.

All points where the alignment crosses a watercourse are also shown and labelled with their reference in the text. These are shown as "Surface Water Crossings (SWC)".

The design of the Proposed Scheme will be informed through stakeholder engagement and further engineering and environmental studies

Main Map Legend

- Route in tunnel
- Route on surface
- Depot, station, headhouse or portal building
- Community area boundary
- Existing railway station
- County boundary
- District/Borough boundary
- Map sheets included in this community area
- Map sheets not included in this community area

Map Number: **WR-01-INDEX-CA5**

Map Name: **Index Map of: Surface Water Baseline**

Community Area 5: **South Cheshire**

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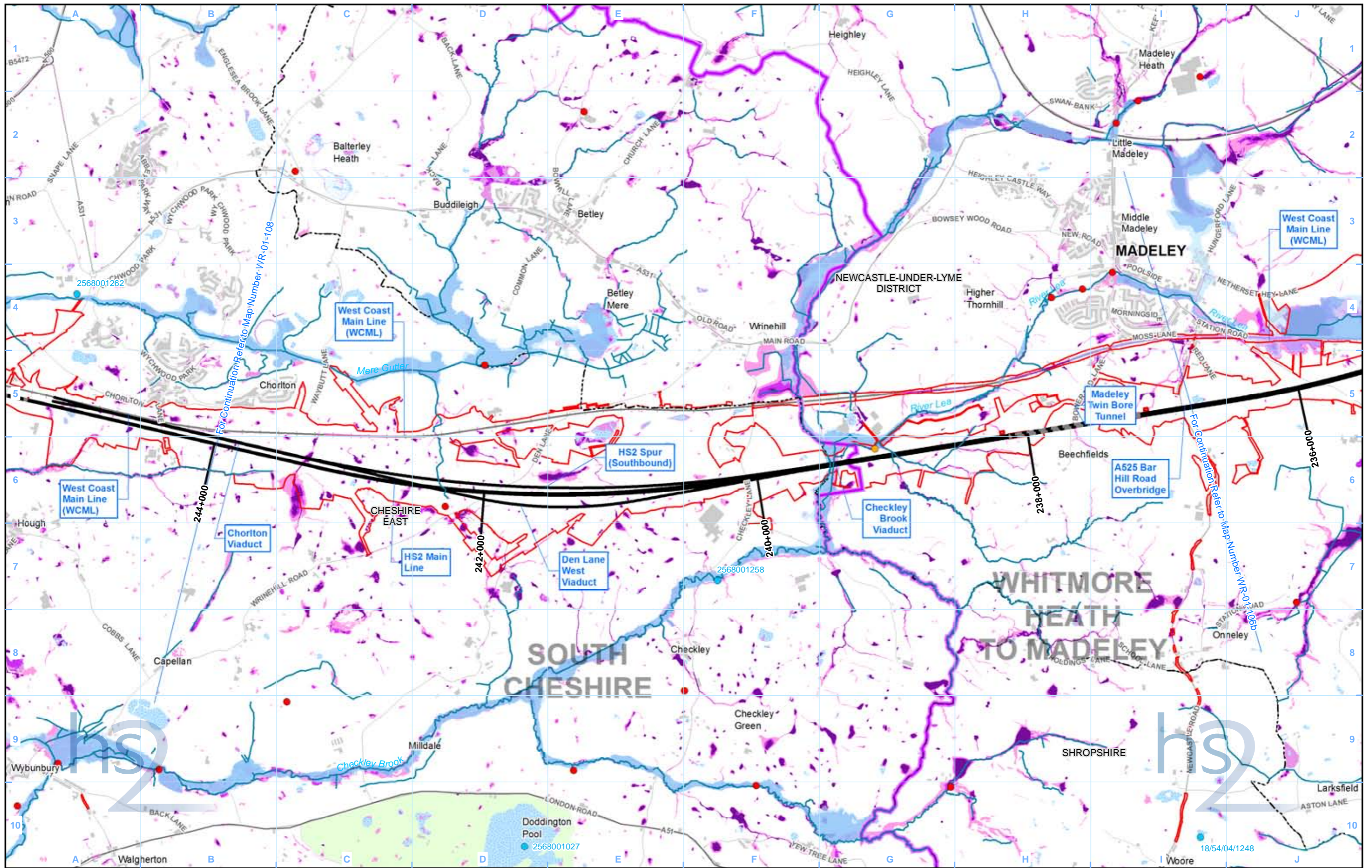
Doc Number: C861-ARP-EV-MAP-000-151005-P04

Date: 14/06/17

Note: Not all data layers in the legend are represented on every map.

Scale at A3: 1:100,000

0 1,000 2,000 3,000 4,000 Metres



Legend	
	Route in bored tunnel
	Route on surface
	Depot, station, headhouse or portal building
	Land potentially required during construction
	Community area boundary
	County boundary
	District/Borough boundary
	Licensed surface water abstraction (excluding public water supplies)
	Unlicensed private surface water abstractions
	Consented discharge to surface water
	Watercourse
	Culverted watercourse
	Canal
	Canal tunnel
	Lakes & Reservoirs
	Historic flooding area
	Flood Zone 2
	Flood Zone 3
	High - chance of flooding greater than 1 in 30 (3.33%)
	Medium - chance of flooding between 1 in 100 (1%) and 1 in 30 (3.33%)
	Low - chance of flooding between 1 in 1000 (0.1%) and 1 in 100 (1%)

Map Number	WR-01-107b
Map Name	Surface Water Baseline
Community Area 5: South Cheshire	

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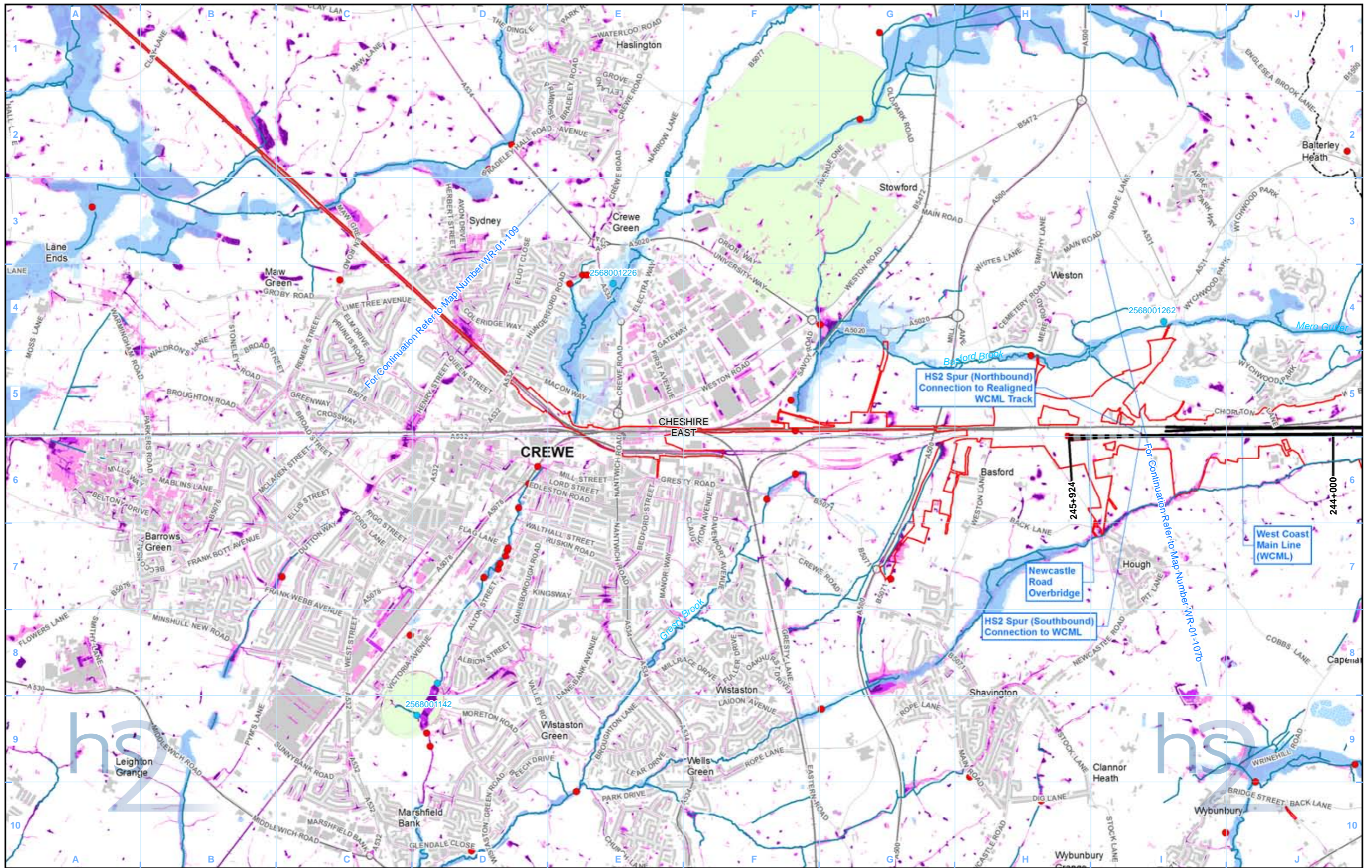
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- Legend**
- Route in bored tunnel
 - Route on surface
 - Depot, station, headhouse or portal building
 - Land potentially required during construction
 - Community area boundary
 - County boundary
 - District/Borough boundary
 - Licensed surface water abstraction (excluding public water supplies)
 - Unlicensed private surface water abstractions
 - Consented discharge to surface water
 - Watercourse
 - Culverted watercourse
 - Canal
 - Canal tunnel
 - Lakes & Reservoirs
 - Historic flooding area
 - Flood Zone 2
 - Flood Zone 3
 - High - chance of flooding greater than 1 in 30 (3.33%)
 - Medium - chance of flooding between 1 in 100 (1%) and 1 in 30 (3.33%)
 - Low - chance of flooding between 1 in 1000 (0.1%) and 1 in 100 (1%)

Map Number: **WR-01-108**

Map Name: **Surface Water Baseline**

Community Area 5:
South Cheshire

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Superficial Deposits

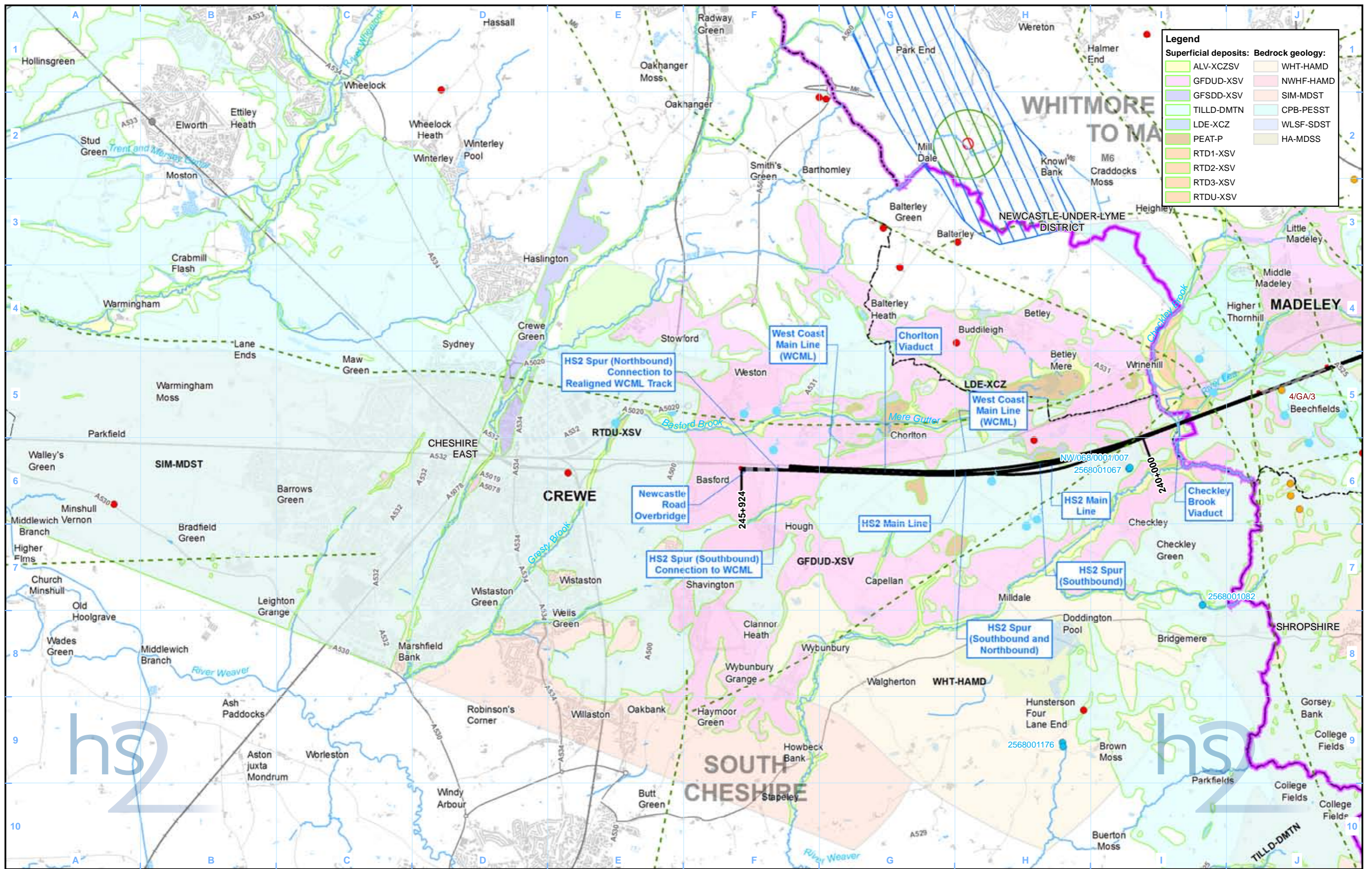
- Alluvium [ALV-CZPS] (Secondary A)
- Alluvium [ALV-XCZSV] (Secondary A)
- River terrace deposits, 1 to 2 [T1T2-XSV] (Secondary A)
- Enfield silt member [ESI-XCZ] (Non-Productive)
- Glaciofluvial deposits, devensian [GFDUD-XSV] (Secondary A)
- Glaciolacustrine deposits, devensian [GLLDD-XCZ] (Non-Productive)
- Kempton park gravel formation [KPGR-XSV] (Secondary A)
- Langley silt member [LASI-XCZ] (Non-Productive)
- Shepperton gravel member [SHGR-XSV] (Principal)
- Till, devensian [TILLD-DMTN] (Non-Productive)
- Till, devensian [TILLD-XDSV] (Non-Productive)
- Finsbury gravel member [FIGR-XSV] (Secondary A)
- Hackney gravel member [HAGR-XSV] (Secondary A)
- Lynch hill gravel member [LHGR-XSV] (Secondary A)
- Taplow gravel formation [TPGR-XSV] (Principal/ Secondary A)
- Boyn hill gravel member [BHT-XSV] (Secondary A)
- Bosworth clay member [BOSW-XCZ] (Non-Productive)
- Black park gravel member [BPGR-XSV] (Secondary A)
- Dunsmore gravel [DMG-XSV] (Secondary A)
- Lowestoft formation [LOFT-DMTN] (Non-Productive)
- Oadby member [ODT-DMTN] (Non-Productive)
- Thrusington member [THT-DMTN] (Non-Productive)
- Winter hill gravel (lacustrine deposits) [WHGLD-XSV] (Secondary A)
- Winter hill gravel [WHG-XSV] (Secondary A)
- Westmill gravel member [WLGR-XSV] (Secondary A)
- Dollis hill gravel member [DHGR-XSV] (Secondary A)
- Gerrards cross gravel [GCGR-XSV] (Secondary A)
- Glaciofluvial deposits, mid pleistocene [GFDMP-XSV] (Secondary A)
- Glaciofluvial sheet deposits, mid pleistocene [GFSMP-XSV] (Secondary A)
- Glaciofluvial terrace deposits, mid pleistocene [GFTMP-XSV] (Secondary A)
- Glaciolacustrine deposits, mid pleistocene [GLLMP-XCZ] (Non-Productive)
- Till, mid pleistocene [TILMP-DMTN] (Non-Productive)
- Beaconsfield gravel [BDGR-XSV] (Secondary A)
- Baginton sand and gravel formation [BGSX-XSV] (Secondary A)
- Chorleywood gravel formation [CWGR-XSV] (Secondary A)
- Glacial deposits [GDU-XCZS] ()
- Glaciolacustrine deposits [GLLD-XCZ] (Non-Productive)
- Holme pierrepoint sand and gravel member [HPSG-XSV] (Secondary A)
- Interglacial lacustrine deposits [IGLD-XCZ] (Non-Productive)
- Kesgrave catchment subgroup [KGCA-XSV] ()
- Princes risborough sand and gravel [PRSG-XSV] ()
- Stanmore gravel formation [STGR-XSV] (Secondary A)
- Wasperton sand and gravel member [WAT-XSV] (Secondary A)
- Westland green gravel [WGGR-XSV] (Secondary A)
- Alluvial fan deposits [ALF-V] (Secondary A)
- Glaciofluvial deposits [GFDU-XSV] (Secondary A)
- Head [HEAD-V] (Secondary (Undifferentiated))
- Head [HEAD-XCZ] (Secondary (Undifferentiated))
- Head [HEAD-XCZSV] (Secondary (Undifferentiated))
- Head, 1 [HEAD1-XCZSV] (Secondary (Undifferentiated))
- Lacustrine deposits [LDE-XCZS] (Non-Productive)
- Peat [PEAT-P] (N/A Aquifer)
- River terrace deposits, 1 [RTD1-XSV] (Secondary A)
- River terrace deposits, 2 [RTD2-XSV] (Secondary A)
- River terrace deposits, 3 [RTD3-XSV] (Secondary A)
- River terrace deposits, 4 [RTD4-XSV] (Secondary A)
- River terrace deposits (undifferentiated) [RTDU-XSV] (Secondary A)
- Sand and gravel of uncertain age and origin [SGAO-XSV] (Secondary A)
- Tufa [TUFA-CATUFA] (Aquifer)
- Wolston sand and gravel [WOSG-XSV] (Secondary A)
- Clay-with-flints formation [CWF-XCZSV] (Non-Productive)

Bedrock Geology

- Bagshot formation - sand [BGS-SANDU] (Secondary A)
- Claygate member - clay, silt and sand [CLGB-CLSISA] (Secondary A)
- Claygate member - sand, silt and clay [CLGB-SSCL] (Secondary A)
- London clay formation - clay and silt [LC-CLS] (Non-Productive)
- London clay formation - clay, silt and sand [LC-CLSISA] (Non-Productive)
- Thanet formation - sand [TAB-SANDU] (Secondary A)
- Lambeth group - clay, silt and sand [LMBE-CLSISA] (Secondary A)
- Seaford chalk formation and newhaven chalk formation (undifferentiated) - chalk [SNCK-CHLK] (Principal)
- Chalk rock member - chalk [CKR-CHLK] (Principal)
- Lewes nodular chalk formation - chalk [LECH-CHLK] (Principal)
- Lewes nodular chalk formation and seaford chalk formation (undifferentiated) - chalk [LESE-CHLK] (Principal)
- Lewes nodular chalk formation and newhaven chalk formation (undifferentiated) - chalk [LSNCK-CHLK] (Principal)
- New pit chalk formation - chalk [NPCH-CHLK] (Principal)
- Glauconitic marl member - sandstone, glauconitic [GLML-GLSST] (Principal)
- Holywell nodular chalk formation - chalk [HCK-CHLK] (Principal)
- Holywell nodular chalk formation and new pit chalk formation (undifferentiated) - chalk [HNCK-CHLK] (Principal)
- Melbourn rock member - chalk [MR-CHLK] (Principal)
- Totterhoe stone member - chalk [TTST-CHLK] (Principal)
- West melbury marly chalk formation - chalk [WMCH-CHLK] (Principal)
- West melbury marly chalk formation and zig zag chalk formation (undifferentiated) - chalk [WZCK-CHLK] (Principal)
- Zig zag chalk formation - chalk [ZZCH-CHLK] (Principal)
- Gault formation - mudstone [GLT-MDST] (Non-Productive)
- Gault formation and upper greensand formation (undifferentiated) - mudstone, siltstone and sandstone [GUGS-MDSS] (Non-Productive)
- Upper greensand formation - siltstone and sandstone [UGS-SISD] (Non-Productive)
- Lower greensand group - sandstone [LGS-SDST] (Secondary A)
- Whitchurch sand formation - mudstone [WHS-MDST] (Secondary A)
- Whitchurch sand formation - sandstone [WHS-SDST] (Secondary A)
- Purbeck group - limestone and [subequal/subordinate] argillaceous rocks, interbedded [PB-LMAR] (Principal)
- Portland group - limestone and calcareous sandstone [PL-LMCS] (Principal)
- Portland sand formation - sandstone, calcareous [POSA-CALSST] (Secondary A)
- Portland sand formation - limestone and calcareous sandstone [POSA-LMCS] (Secondary A)
- Portland stone formation - limestone [POST-LMST] (Principal)
- Kimmeridge clay formation - mudstone [KC-MDST] (Non-Productive)
- Kimmeridge clay formation - siltstone and sandstone [KC-SISD] (Non-Productive)
- Amgrove spiculite member - sandstone [AGSP-SDST] (Secondary A)
- Amphill clay formation - mudstone [AMC-MDST] (Non-Productive)
- Oakley member - limestone and mudstone, interbedded [OKLY-LSMD] (Secondary A)
- Weymouth member - mudstone [WEY-MDST] (Non-Productive)
- West walton formation and amphill clay formation (undifferentiated) - mudstone [WWAC-MDST] (Non-Productive)
- West walton formation - limestone and [subequal/subordinate] argillaceous rocks, interbedded [WWWB-LMAR] (Non-Productive)
- West walton formation - mudstone [WWWB-MDST] (Non-Productive)
- Kellaways formation - sandstone, siltstone and mudstone [KLB-SDSM] (Secondary A)
- Kellaways clay member - mudstone [KLC-MDST] (Secondary A)
- Kellaways sand member - sandstone and siltstone, interbedded [KLS-SDSL] (Secondary A)
- Peterborough member - mudstone [PET-MDST] (Non-Productive)
- Stewartby member - mudstone [SBY-MDST] (Non-Productive)
- Bladon member - limestone [BLAD-LMST] (Principal)
- Bladon member - mudstone and limestone, interbedded [BLAD-MDLM] (Principal)
- Blisworth clay formation - mudstone [BWC-MDST] (Principal)
- Blisworth limestone formation - limestone [BWL-LMST] (Principal)
- Combrash formation - limestone [CB-LMST] (Secondary A)
- Forest marble formation - limestone [FMB-LMST] (Secondary A)
- Forest marble formation - limestone and mudstone, interbedded [FMB-LSMD] (Secondary A)
- Great oolite group - limestone and [subequal/subordinate] argillaceous rocks, interbedded [GOG-LMAR] (Principal To Secondary B)
- Sharp's hill formation - argillaceous rocks with subordinate sandstone and limestone [SHHB-ARSL] (Secondary A)
- Taynton limestone formation - limestone, ooidal [TY-LMOOL] (Principal)
- Wellingborough limestone member - limestone [WBRO-LMST] (Secondary A)
- White limestone formation - limestone [WHL-LMST] (Principal)
- Horsehay sand formation - sandstone [HYSA-SDST] (Secondary A)
- Rutland formation - mudstone [RLD-MDST] (Secondary B)
- Stamford member - sandstone and siltstone, interbedded [STAM-SDSL] (Secondary A)
- Northampton sand formation - sandstone, limestone and ironstone [NS-SDLI] (Secondary A)
- Whitby mudstone formation - mudstone [WHM-MDST] (Non-Productive)
- Dyrham formation - siltstone and mudstone, interbedded [DYS-SIMD] (Secondary (Undifferentiated))
- Marlstone rock formation - ferruginous limestone and ironstone [MRB-FLIR] (Secondary A)
- Marlstone rock formation - limestone, ferruginous [MRB-FLMST] (Secondary A)
- Charmouth mudstone formation - limestone [CHAM-LMST] (Secondary (Undifferentiated))
- Charmouth mudstone formation - mudstone [CHAM-MDST] (Non-Productive)
- Rugby limestone member - mudstone and limestone, interbedded [RLS-MDLM] (Secondary A)
- Langport member - limestone [LPMB-LMST] (Secondary (Undifferentiated))
- Penarth group - argillaceous rock and [subequal/subordinate] limestone, interbedded [PNG-AROCLS] (Secondary B)
- Penarth group - mudstone [PNG-MDST] (Secondary B)
- Salford shale member - limestone [SASH-LMST] (Secondary B)

- Salford shale member - mudstone [SASH-MDST] (Secondary B)
- Westbury formation - mudstone [WBY-MDST] (Secondary (Undifferentiated))
- Westbury formation - sandstone [WBY-SDST] (Secondary (Undifferentiated))
- Wilmore limestone member - mudstone and limestone, interbedded [WCT-MDLM] (Secondary (Undifferentiated))
- Blue anchor formation - mudstone and siltstone [BAN-MDSI] (Secondary (Undifferentiated))
- Blue anchor formation - mudstone [BAN-MDST] (Secondary (Undifferentiated))
- Arden sandstone formation - mudstone [AS-MDST] (Secondary (Undifferentiated))
- Arden sandstone formation - sandstone, siltstone and mudstone [AS-SDSM] (Secondary A)
- Arden sandstone formation - siltstone and sandstone [AS-SISD] (Secondary A)
- Weatheroak sandstone member - sandstone [WKSA-SDST] ()
- Gunthorpe member - siltstone, dolomitic [GUN-DSLST] ()
- Gunthorpe member - mudstone [GUN-MDST] ()
- Tarporley siltstone formation - siltstone, mudstone and sandstone [TPSF-SIMS] (Secondary B)
- Bromsgrove sandstone formation - mudstone [BMS-MDST] (Principal)
- Bromsgrove sandstone formation - sandstone, pebbly (gravelly) [BMS-PESST] (Principal)
- Bromsgrove sandstone formation - sandstone [BMS-SDST] (Principal)
- Kidderminster formation - conglomerate [KDM-CONG] (Principal)
- Kidderminster formation - mudstone [KDM-MDST] (Principal)
- Kidderminster formation - sandstone and conglomerate, interbedded [KDM-SCON] (Principal)
- Mercia mudstone group - siltstone, dolomitic [MMG-DSLST] (Secondary (Undifferentiated))
- Mercia mudstone group - mudstone [MMG-MDST] (Secondary B)
- Wildmoor sandstone formation - sandstone [WRS-SDST] (Principal)
- Ashaw formation - mudstone and sandstone [AW-MDSD] (Principal)
- Ashaw formation - sandstone [AW-SDST] (Principal)
- Clent formation - argillaceous rocks and [subequal/subordinate] breccia, interbedded [CLT-ARBR] (Secondary A)
- Gibbet hill conglomerate bed - conglomerate [GHC-CONG] (Principal)
- Hopwas breccia formation - breccia [HPBR-BREC] (Principal)
- Hopwas breccia formation - breccia and sandstone, interbedded [HPBR-BRSS] (Principal)
- Kenilworth sandstone formation - breccia [KHS-BREC] (Principal)
- Kenilworth sandstone formation - mudstone [KHS-MDST] (Principal)
- Kenilworth sandstone formation - sandstone [KHS-SDST] (Principal)
- Alveley member - limestone [ALY-LMST] (Secondary A)
- Alveley member - mudstone and sandstone [ALY-MDSD] (Secondary A)
- Alveley member - mudstone [ALY-MDST] (Secondary A)
- Alveley member - sandstone [ALY-SDST] (Secondary A)
- Alveley member - sandstone and mudstone [ALY-STMD] (Secondary A)
- Allesley member - argillaceous rocks and [subordinate/subequal] sandstone and conglomerate, interbedded [ASY-ARSC] (Principal)
- Allesley member - conglomerate [ASY-CONG] (Principal)
- Allesley member - sandstone [ASY-SDST] (Principal)
- Enville member - conglomerate [EN-CONG] (Secondary A)
- Enville member - sandstone, conglomerate and [subordinate] argillaceous rocks [EN-SCAR] (Secondary A)
- Enville member - sandstone with subordinate conglomerate, siltstone and mudstone [EN-SCSM] (Secondary A)
- Enville member - sandstone [EN-SDST] (Secondary A)
- Halesowen formation - limestone [HA-LMST] (Secondary A)
- Halesowen formation - mudstone, siltstone and sandstone [HA-MDSS] (Secondary A)
- Halesowen formation - sandstone [HA-SDST] (Secondary A)
- Keresley member - argillaceous rocks and [subordinate/subequal] sandstone and conglomerate, interbedded [KRS-ARSC] (Principal)
- Keresley member - conglomerate [KRS-CONG] (Principal)
- Keresley member - limestone [KRS-LMST] (Principal)
- Keresley member - sandstone [KRS-SDST] (Principal)
- Tile hill mudstone formation - argillaceous rocks and [subequal/subordinate] sandstone, interbedded [TLM-ARSD] (Principal)
- Tile hill mudstone formation - sandstone [TLM-SDST] (Principal)
- Whitacre member - conglomerate [WIT-CONG] (Principal)
- Whitacre member - limestone [WIT-LMST] (Principal)
- Whitacre member - mudstone and sandstone [WIT-MDSD] (Principal)
- Whitacre member - sandstone [WIT-SDST] (Principal)
- Pennine middle coal measures formation - mudstone, siltstone and sandstone [PMCM-MDSS] (Secondary A)
- Pennine middle coal measures formation - sandstone [PMCM-SDST] (Secondary A)
- Thick coal (south staffordshire) - coal [THIC-COAL] (Secondary A)
- Pennine lower coal measures formation - mudstone, siltstone and sandstone [PLCM-MDSS] (Secondary A)
- Pennine lower coal measures formation - sandstone [PLCM-SDST] (Secondary A)
- Pennine lower coal measures formation and pennine middle coal measures formation (undifferentiated) - mudstone, siltstone and sandstone [PLMC-MDSS] (Secondary A Aquifer)
- Etruria formation - conglomerate [ETM-CONG] (Secondary A)
- Etruria formation - mudstone, sandstone and conglomerate [ETM-MDSC] (Secondary A)
- Etruria formation - sandstone [ETM-SDST] (Secondary A)
- Unnamed igneous intrusion, westphalian - microgabro [UICW-MCGB] ()
- Rough rock - sandstone [RR-SDST] ()
- Millstone grit group [see also migr] - mudstone, siltstone and sandstone [MG-MDSS] ()
- Millstone grit group [see also migr] - sandstone [MG-SDST] ()
- Coalbrookdale formation - mudstone [CBRD-MDST] (Secondary B)
- Rubery sandstone member - sandstone [RBS-SDST] (Secondary B)
- Midlands minor intrusive suite - lamprophyres [MMI-LMPY] ()
- Monks park shale formation - mudstone [MPSH-MDST] (Secondary B)
- Merevale shale formation - mudstone [MVSH-MDST] (Secondary B)

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Map Name	WR-02 - Full Geological Legend with Rock Unit Names and Aquifer Status	
Doc Number: C861-ARP-EV-MAP-000-162206-P03		Date: 06/06/17



- Legend**
- Route in tunnel
 - Route on surface
 - Depot, station, headhouse or portal building
 - Community area boundary
 - County boundary
 - District/Borough boundary
 - Lakes & Reservoirs
 - Geological fault line
 - Licensed groundwater abstraction (excluding public water supplies)
 - Unlicensed private groundwater abstraction
 - Consented discharge to groundwater
 - Spring

- Groundwater source protection zone:**
- Zone 1
 - Zone 2
 - Zone 3

For full geological legend including strata names and aquifer status please refer to WR-02 - Legend

Map Number: WR-02-205
 Map Name: Groundwater Baseline
 Community Area 5: South Cheshire

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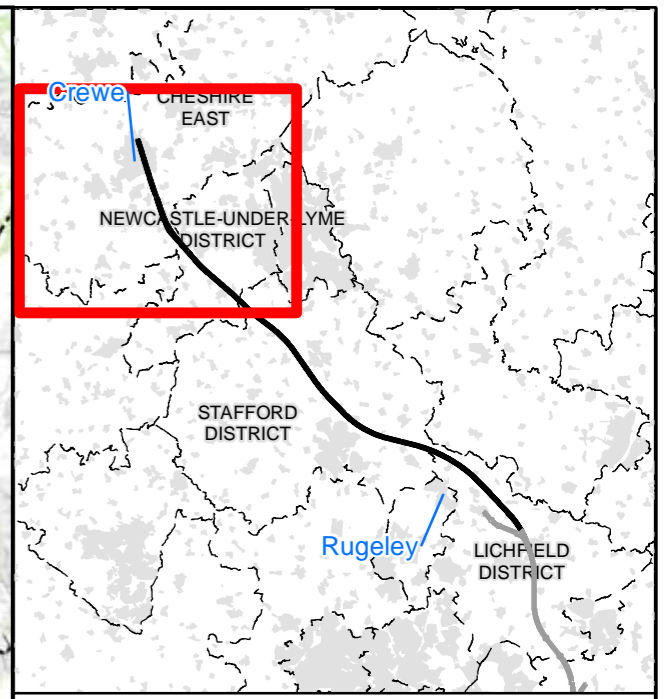
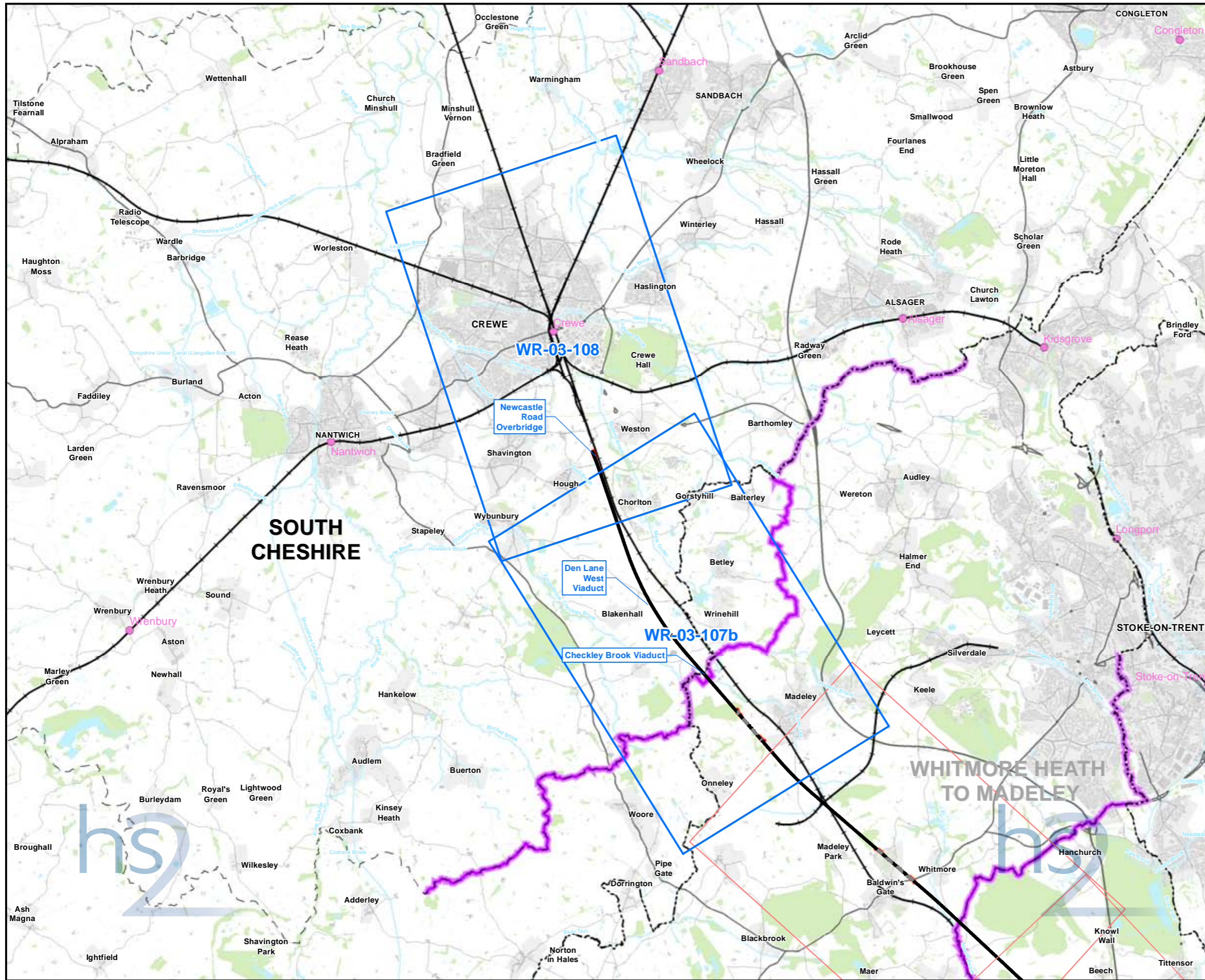
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Map Series Information:

This map series shows water bodies, their Water Framework Directive current status and associated ecological features.

Main Map Legend

- Route in tunnel
- Route on surface
- Depot, station, headhouse or portal building
- Community area boundary
- Existing railway station
- County boundary
- District/Borough boundary
- Map sheets included in this community area
- Map sheets not included in this community area

Map Number **WR-03-INDEX-CA5**

Map Name **Index Map of:
Water Framework Directive**

Community Area 5:
South Cheshire

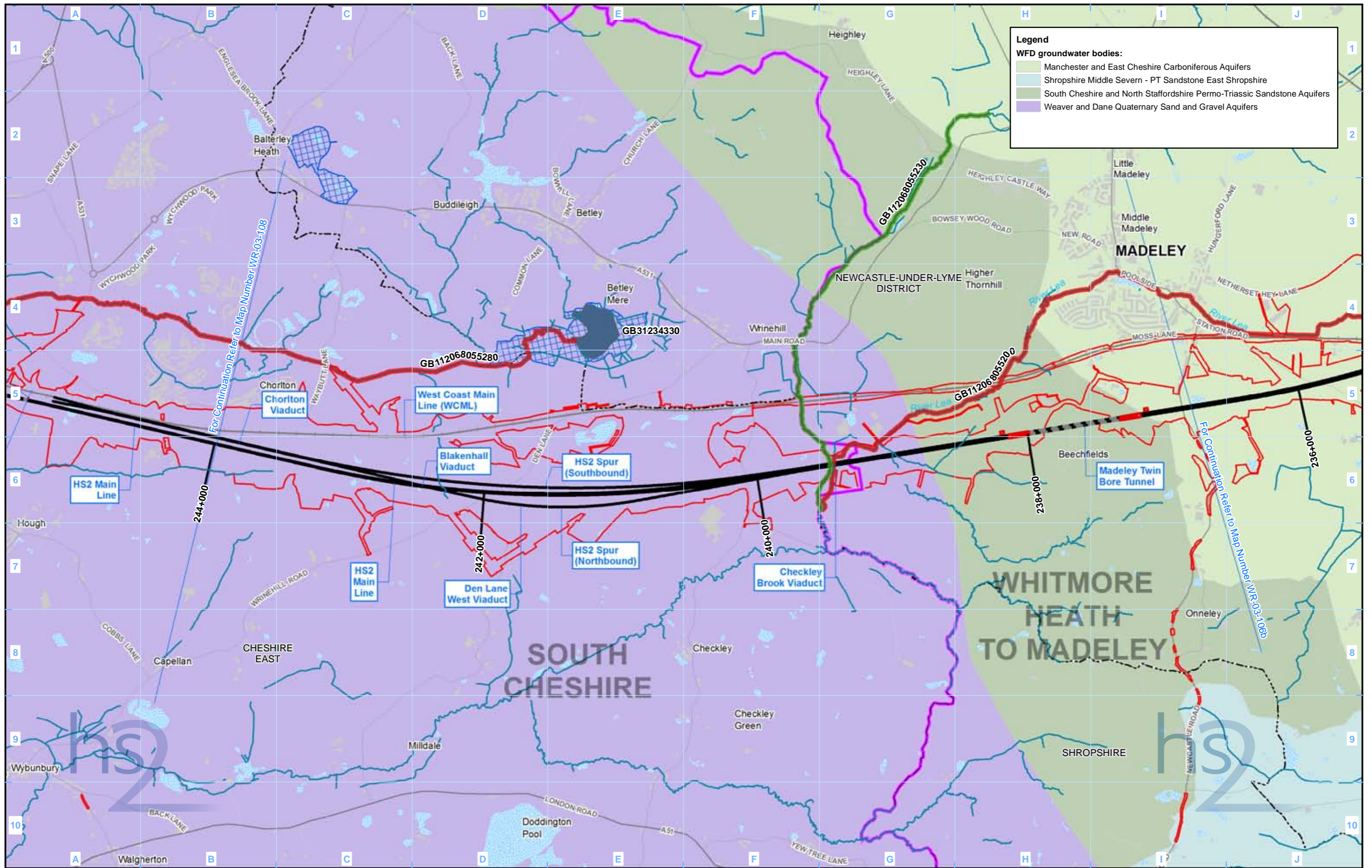
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Legend

WFD groundwaters bodies:

- Manchester and East Cheshire Carboniferous Aquifers
- Shropshire Middle Severn - PT Sandstone East Shropshire
- South Cheshire and North Staffordshire Permo-Triassic Sandstone Aquifers
- Weaver and Dane Quaternary Sand and Gravel Aquifers

Legend

- Route in tunnel
- Route on surface
- Depot, station, headhouse or portal building
- Land potentially required during construction
- Community area boundary
- County boundary
- District/Borough boundary
- Canal
- Canal tunnel
- Watercourse
- Culverted watercourse
- Open water
- WFD Surface Water Bodies Overall Status Classification (2015 RBMP Cycle 2)**
- Good
- Moderate
- Poor
- Bad
- WFD Lakes Overall Status**
- Good
- Moderate
- Poor
- Bad
- Special Area of Conservation (SAC)
- Sites of Special Scientific Interest (SSSI)

Map Number: WR-03-107b

Map Name: Water Framework Directive

Community Area 5: South Cheshire

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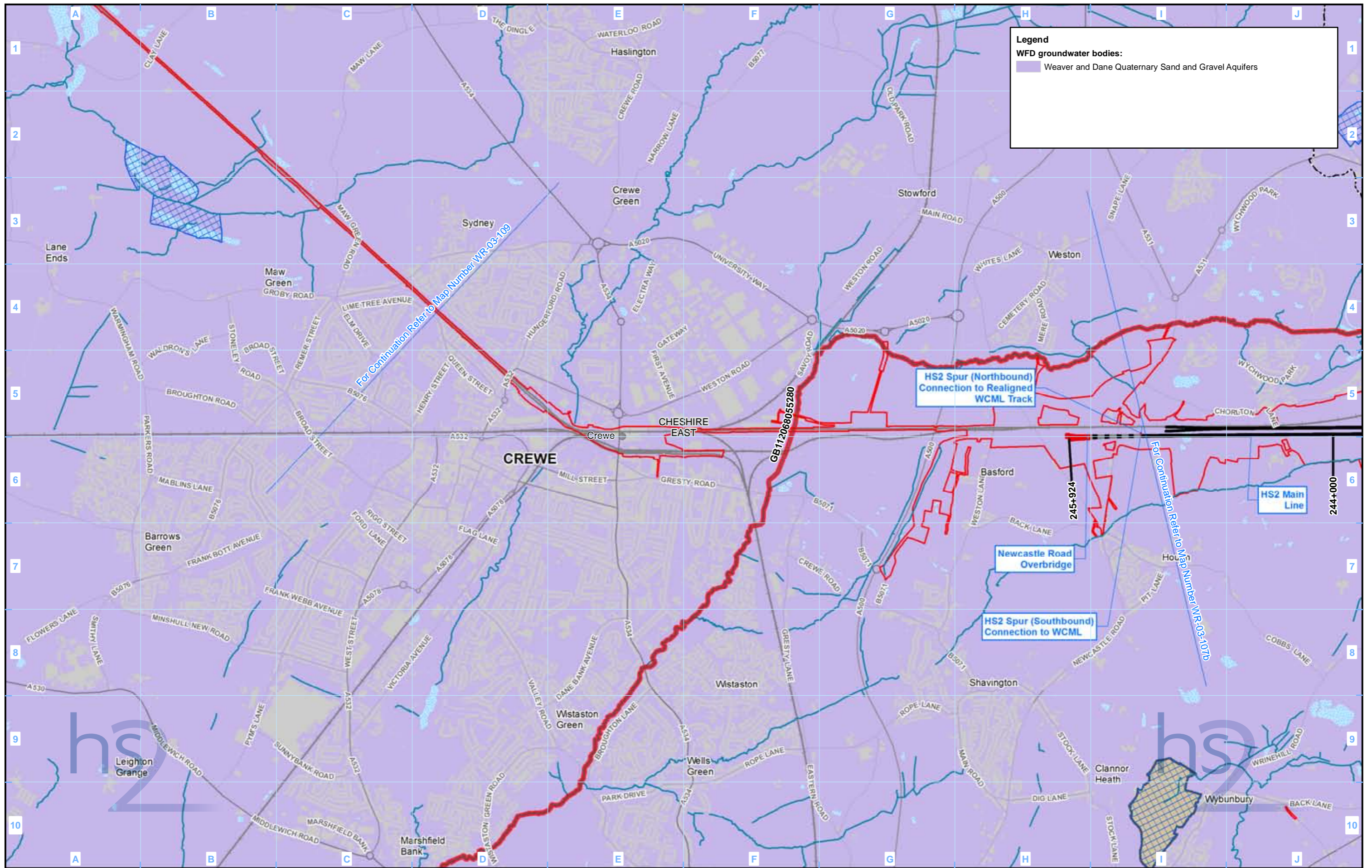
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Doc Number: C861-ARP-EV-MAP-000-153307-P04

Date: 14/06/17

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Metres



Legend

WFD groundwater bodies:

- Weaver and Dane Quaternary Sand and Gravel Aquifers

Legend

- Route in tunnel
- Route on surface
- Depot, station, headhouse or portal building
- Land potentially required during construction
- Community area boundary
- County boundary
- District/Borough boundary
- Canal
- Canal tunnel
- Watercourse
- Culverted watercourse
- Open water
- WFD Surface Water Bodies Overall Status Classification (2015 RBMP Cycle 2)**
- Good
- Moderate
- Poor
- Bad
- WFD Lakes Overall Status**
- Good
- Moderate
- Poor
- Bad
- Special Area of Conservation (SAC)
- Sites of Special Scientific Interest (SSSI)

Map Number: WR-03-108

Map Name: Water Framework Directive

Community Area 5: South Cheshire

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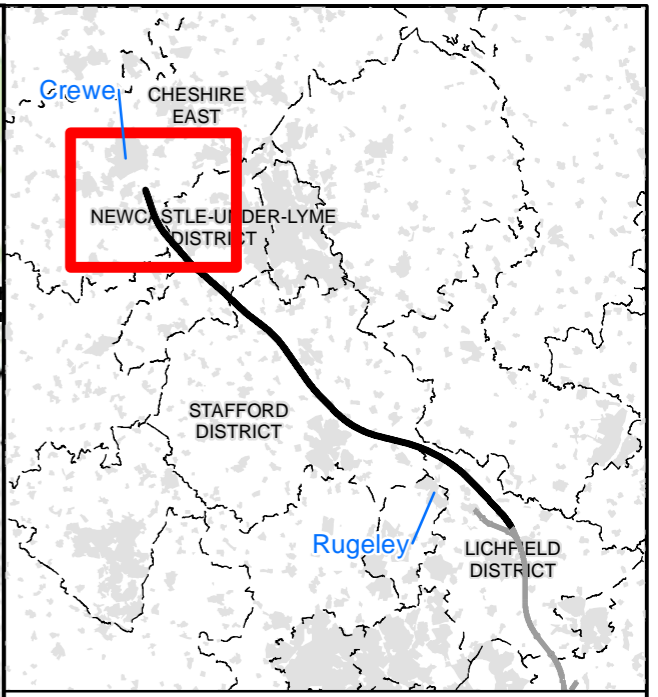
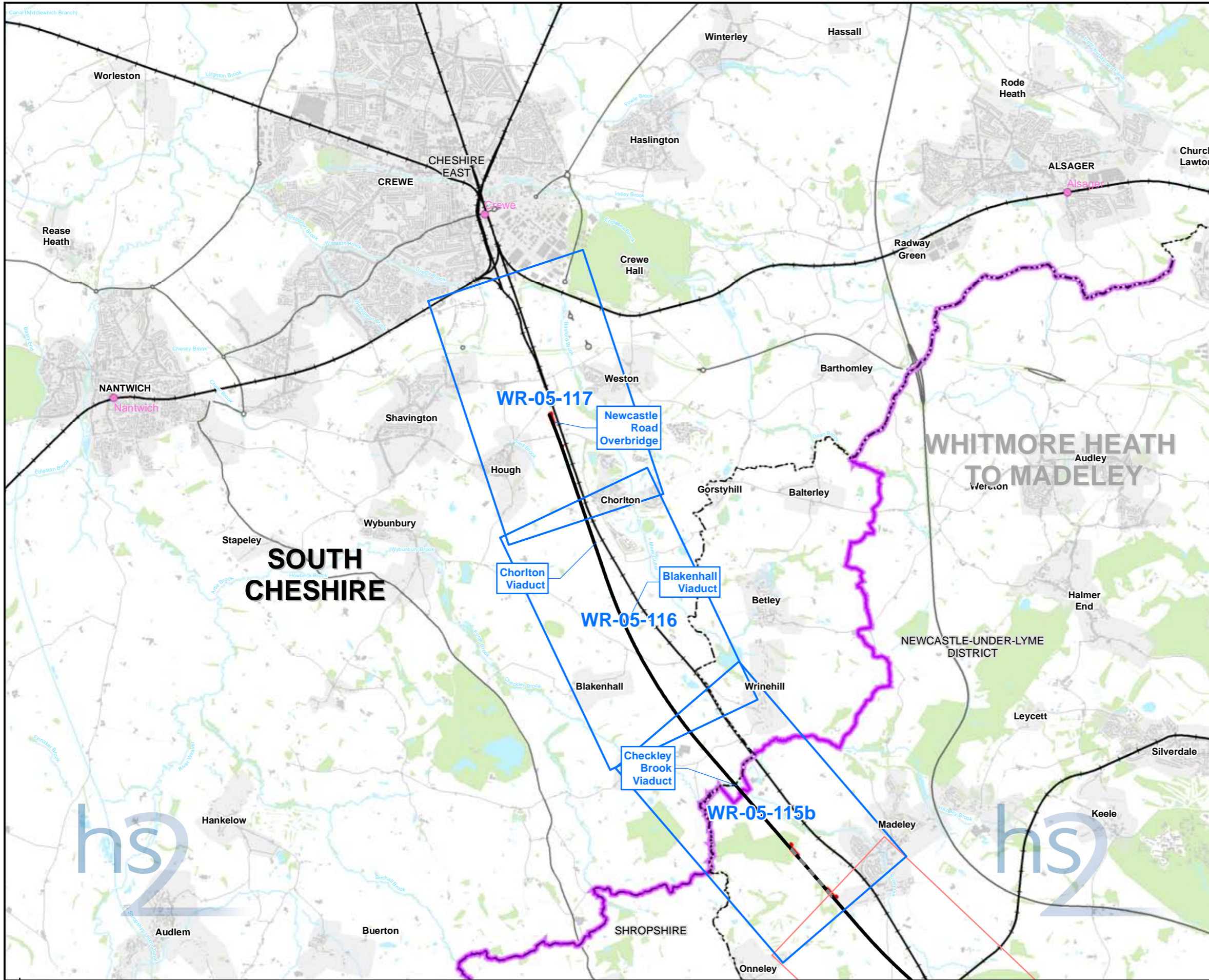
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Date: 14/06/17

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0 250 500 750 1,000 Metres

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Map Series Information:

The map shows the output from hydraulic modelling of specific crossing locations and the effect the scheme has on flood extent at 1 in 100 years inclusive of climate change (20%) return period.

Main Map Legend	
	Route in tunnel
	Route on surface
	Depot, station, headhouse or portal building
	Community area boundary
	Existing railway station
	County boundary
	District/Borough boundary
	Map sheets included in this community area
	Map sheets not included in this community area

Map Number	WR-05-INDEX-CA5
Map Name	Index Map of: Modelled Baseline and Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding
Community Area 5: South Cheshire	

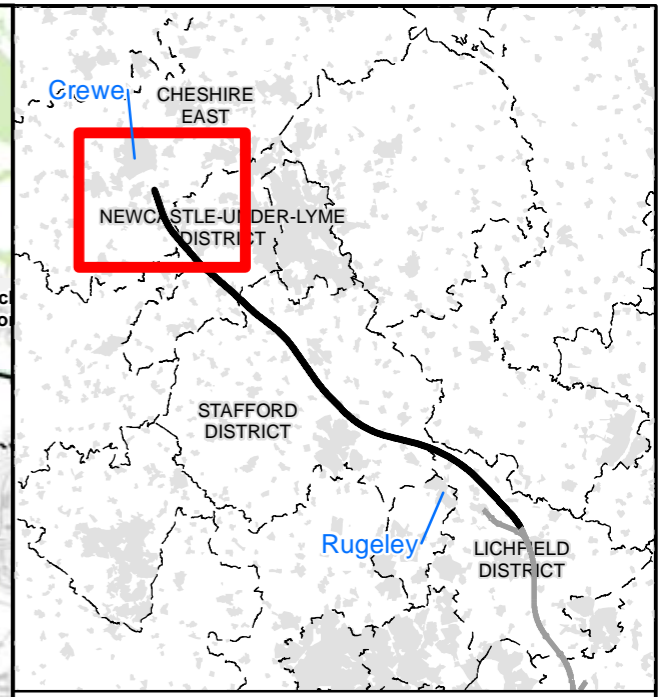
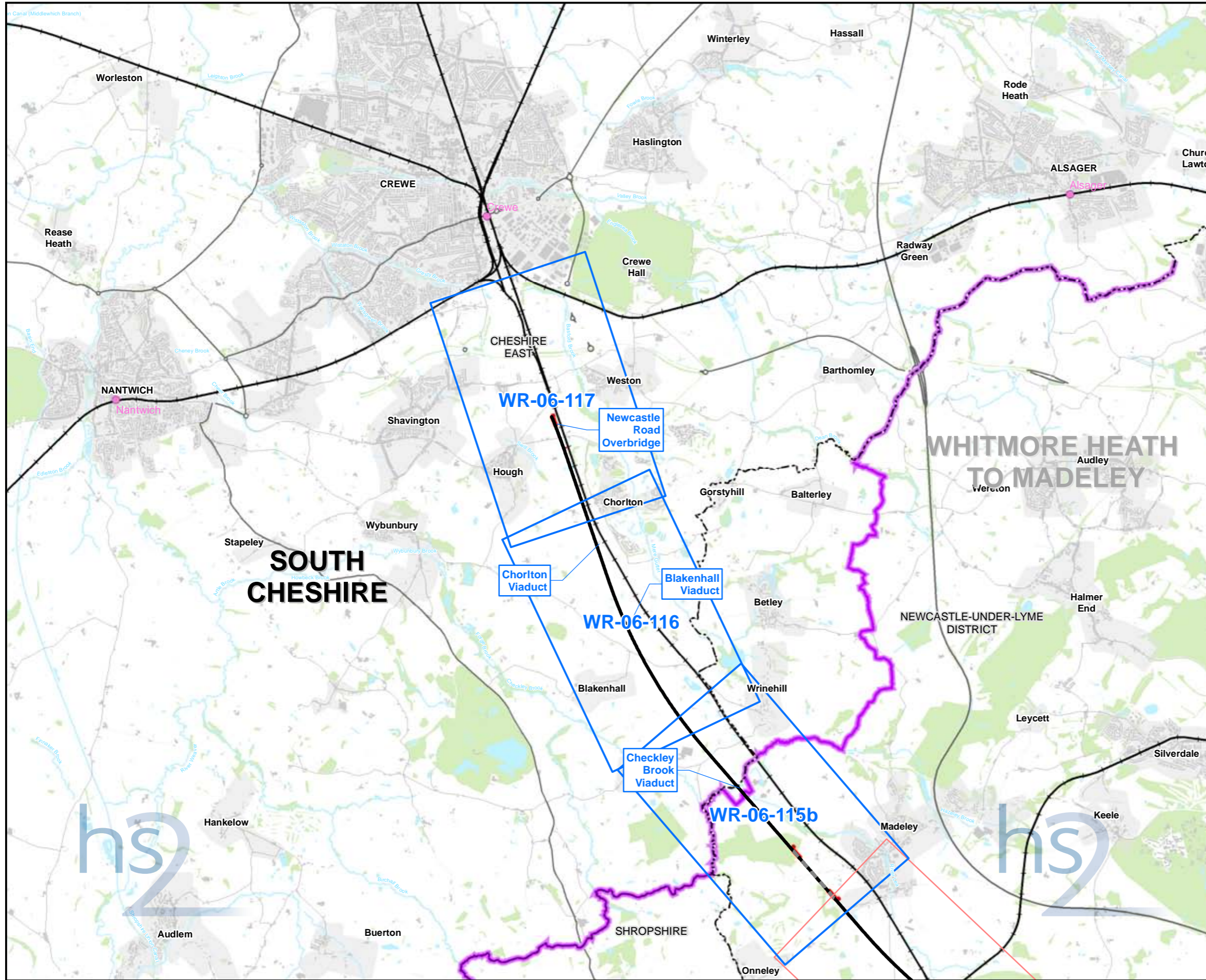
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Map Series Information:

The map shows the output from hydraulic modelling of specific crossing locations and the effect the scheme has on flood extent at 1 in 20 year return period.

Main Map Legend	
Route in tunnel	Map sheets included in this community area
Route on surface	Map sheets not included in this community area
Depot, station, headhouse or portal building	Community area boundary
Existing railway station	County boundary
District/Borough boundary	

Map Number	WR-06-INDEX-CA5
Map Name	Index Map of: Modelled Baseline and Post Development Flood Extent 1 in 20 (5%) Annual Probability of River Flooding
	Community Area 5: South Cheshire

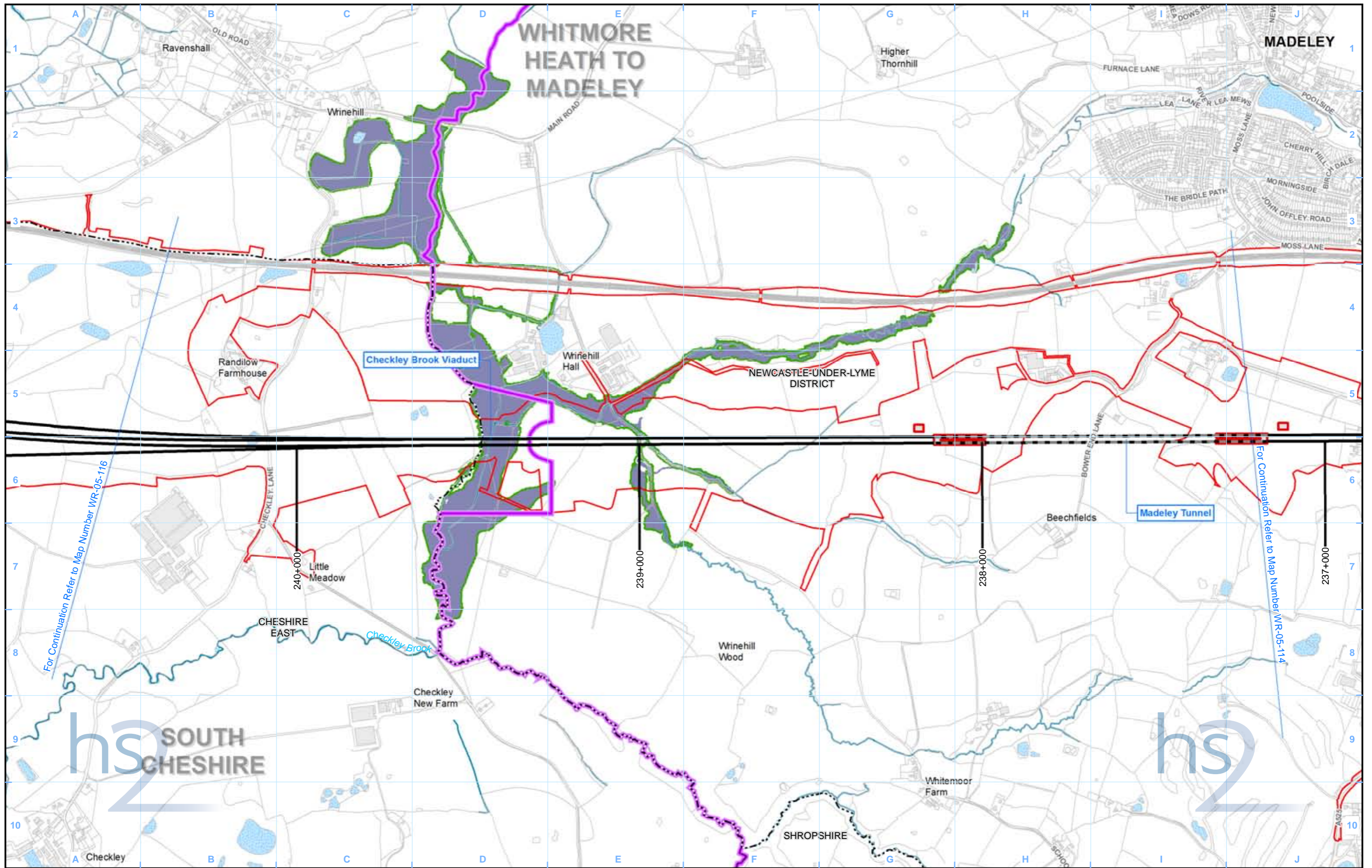
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Legend

Route in tunnel	District/Borough boundary	Modelled Baseline Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding
Route on surface	Watercourse	Modelled Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding
Depot, station, headhouse or portal building	Culverted watercourse	
Land potentially required during construction	Canal	
Community area boundary	Canal tunnel	
County boundary	Open water	
	Registered Park and Garden	

Map Number	WR-05-115b
Map Name	Modelled Baseline and Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding
Community Area	Community Area 5: South Cheshire

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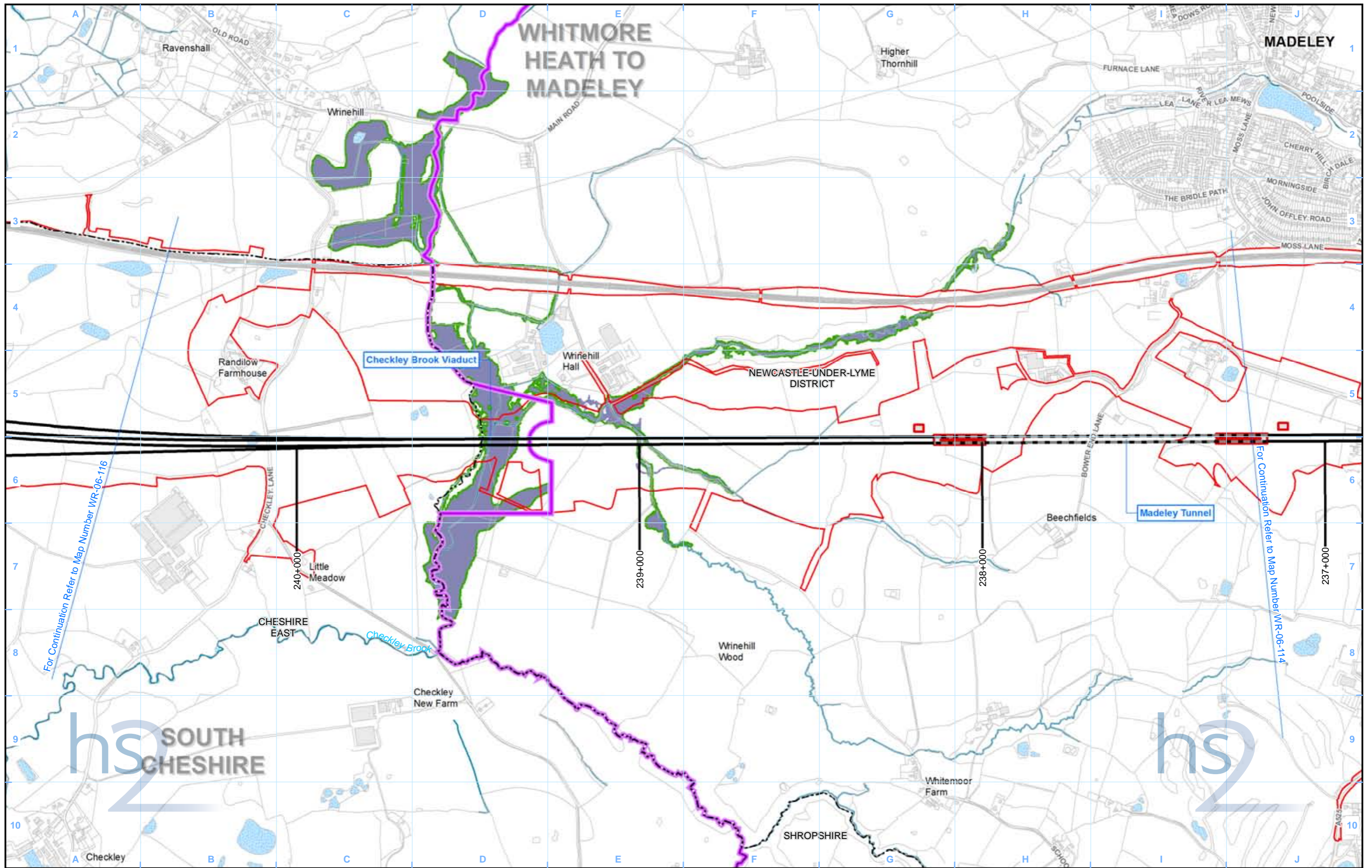
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Date: 14/06/17

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0 100 200 300 400 Metres



Legend

Route in tunnel	District/Borough boundary	Modelled Baseline Flood Extent 1 in 20 (5%) Annual Probability of River Flooding
Route on surface	Watercourse	Modelled Post Development Flood Extent 1 in 20 (5%) Annual Probability of River Flooding
Depot, station, headhouse or portal building	Culverted watercourse	
Land potentially required during construction	Canal	
Community area boundary	Canal tunnel	
County boundary	Open water	
	Registered Park and Garden	

Map Number WR-06-115b
Map Name Modelled Baseline and Post Development Flood Extent 1 in 20 (5%) Annual Probability of River Flooding
Community Area 5: South Cheshire

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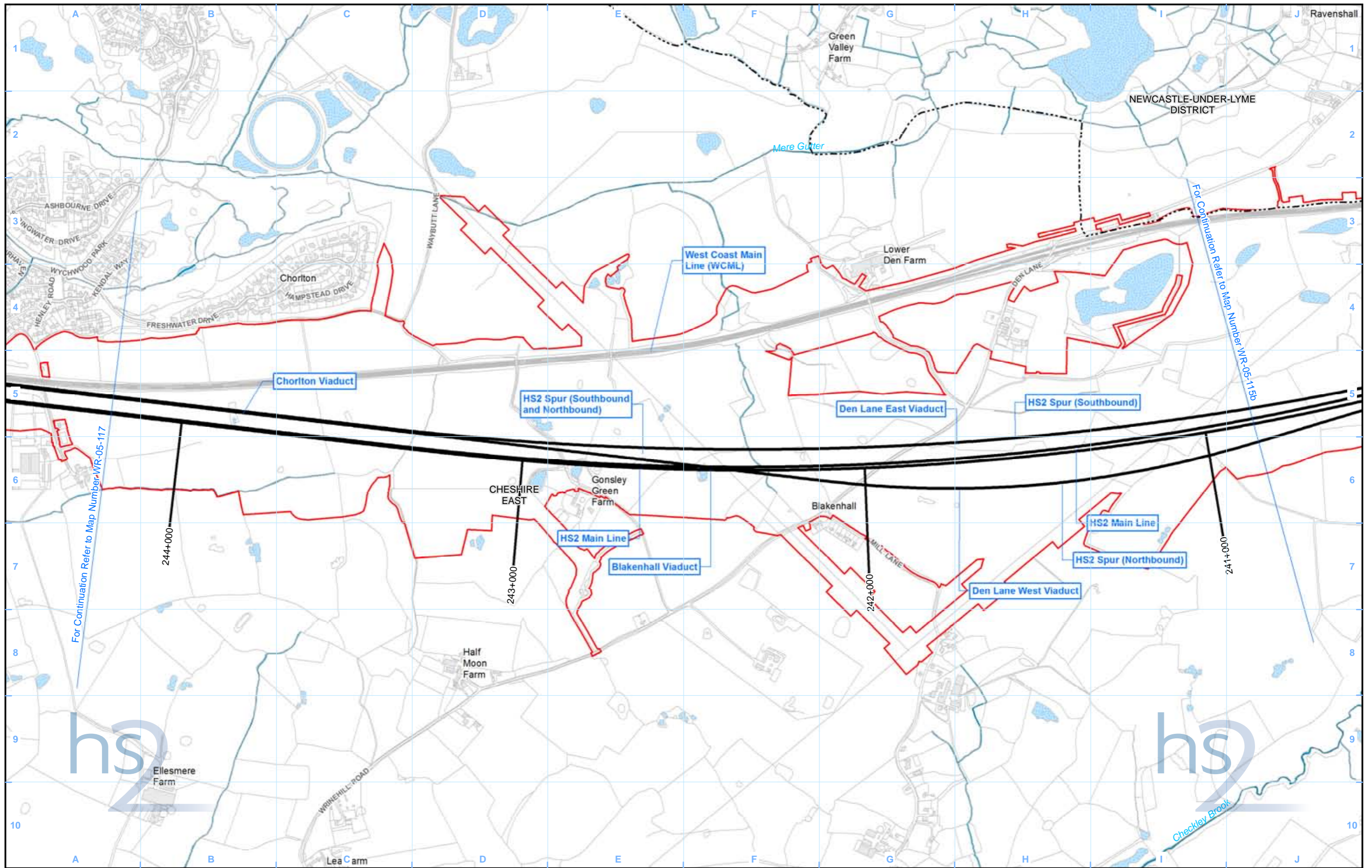
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Metres



Legend

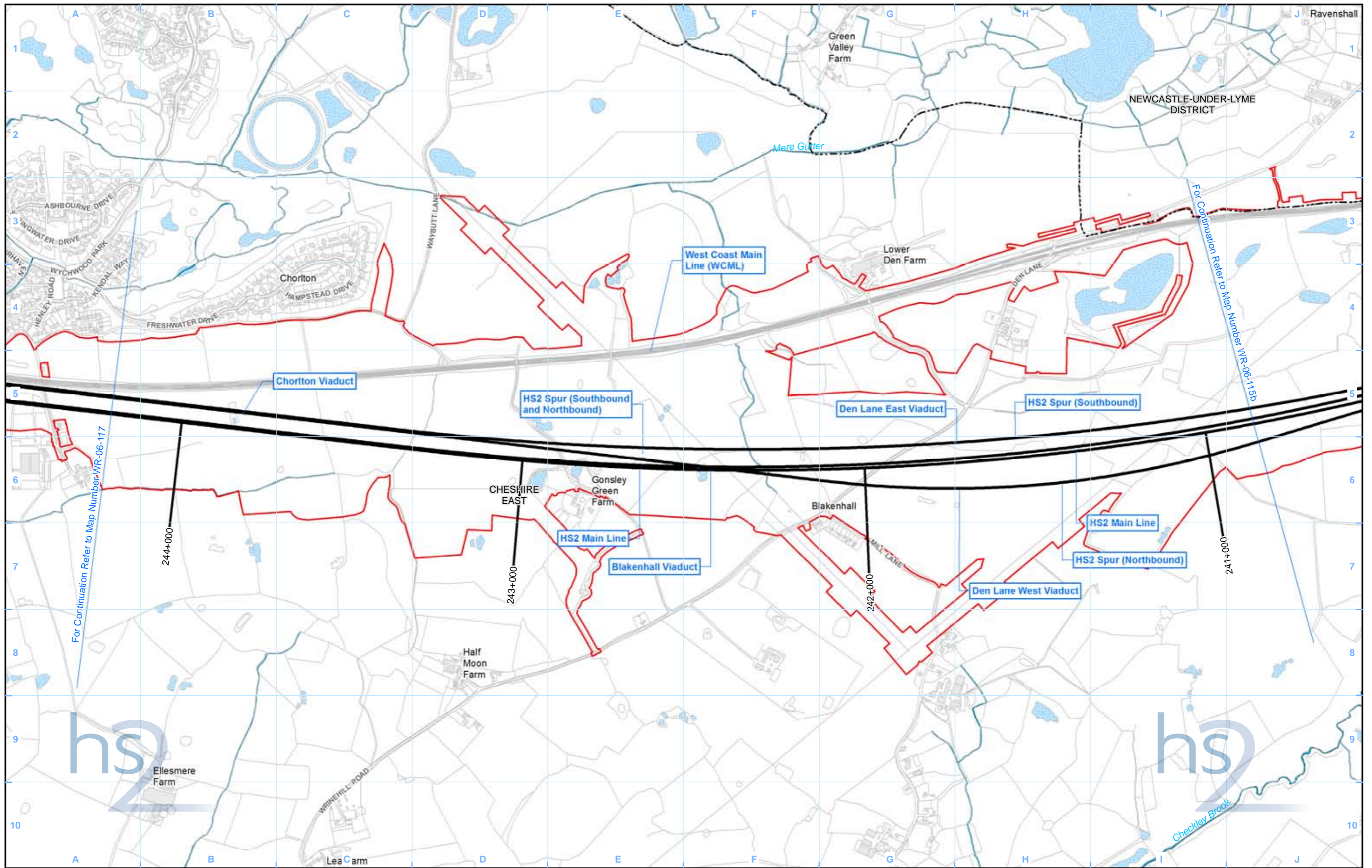
Route in tunnel	District/Borough boundary	Modelled Baseline Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding
Route on surface	Watercourse	Modelled Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding
Depot, station, headhouse or portal building	Culverted watercourse	
Land potentially required during construction	Canal	
Community area boundary	Canal tunnel	
County boundary	Open water	
	Registered Park and Garden	

Map Number	WR-05-116
Map Name	Modelled Baseline and Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding
Community Area	Community Area 5: South Cheshire

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- Legend**
- Route in tunnel
 - Route on surface
 - Depot, station, headhouse or portal building
 - Land potentially required during construction
 - Community area boundary
 - County boundary
 - District/Borough boundary
 - Watercourse
 - Culverted watercourse
 - Canal
 - Canal tunnel
 - Open water
 - Registered Park and Garden
 - Modelled Baseline Flood Extent 1 in 20 (5%) Annual Probability of River Flooding
 - Modelled Post Development Flood Extent 1 in 20 (5%) Annual Probability of River Flooding

Map Number
WR-06-116

Map Name
Modelled Baseline and Post Development Flood Extent 1 in 20 (5%) Annual Probability of River Flooding

Community Area 5:
South Cheshire

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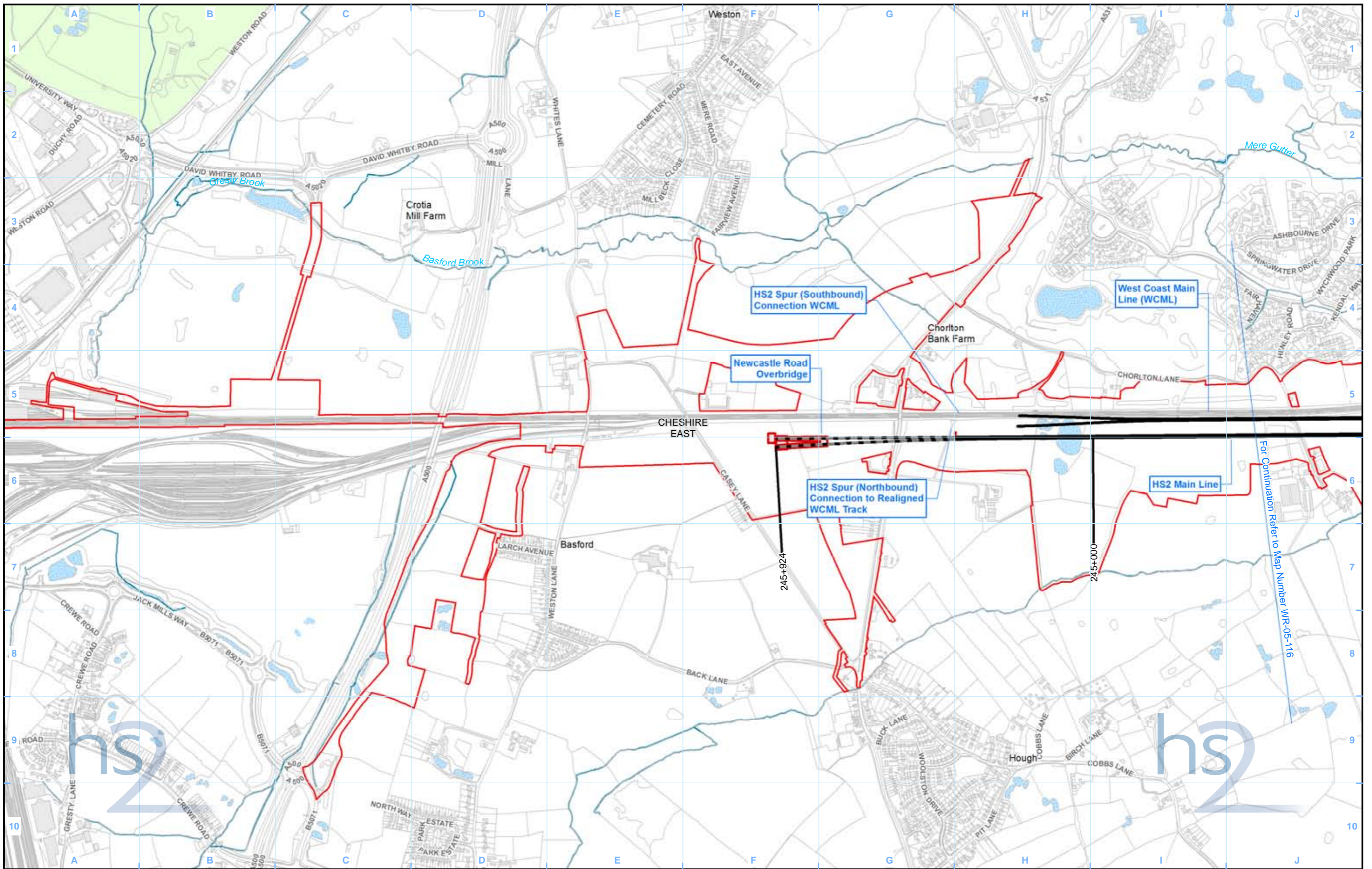
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- Legend**
- Route in tunnel
 - Route on surface
 - Depot, station, headhouse or portal building
 - Land potentially required during construction
 - Community area boundary
 - County boundary
 - District/Borough boundary
 - Watercourse
 - Culverted watercourse
 - Canal
 - Canal tunnel
 - Open water
 - Registered Park and Garden
 - Modelled Baseline Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding
 - Modelled Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding

Modelled Baseline Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding

Modelled Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding

Map Number: **WR-05-117**

Map Name: **Modelled Baseline and Post Development Flood Extent 1 in 100 (1%+CC) including Climate Change Annual Probability of River Flooding**

Community Area 5: **South Cheshire**

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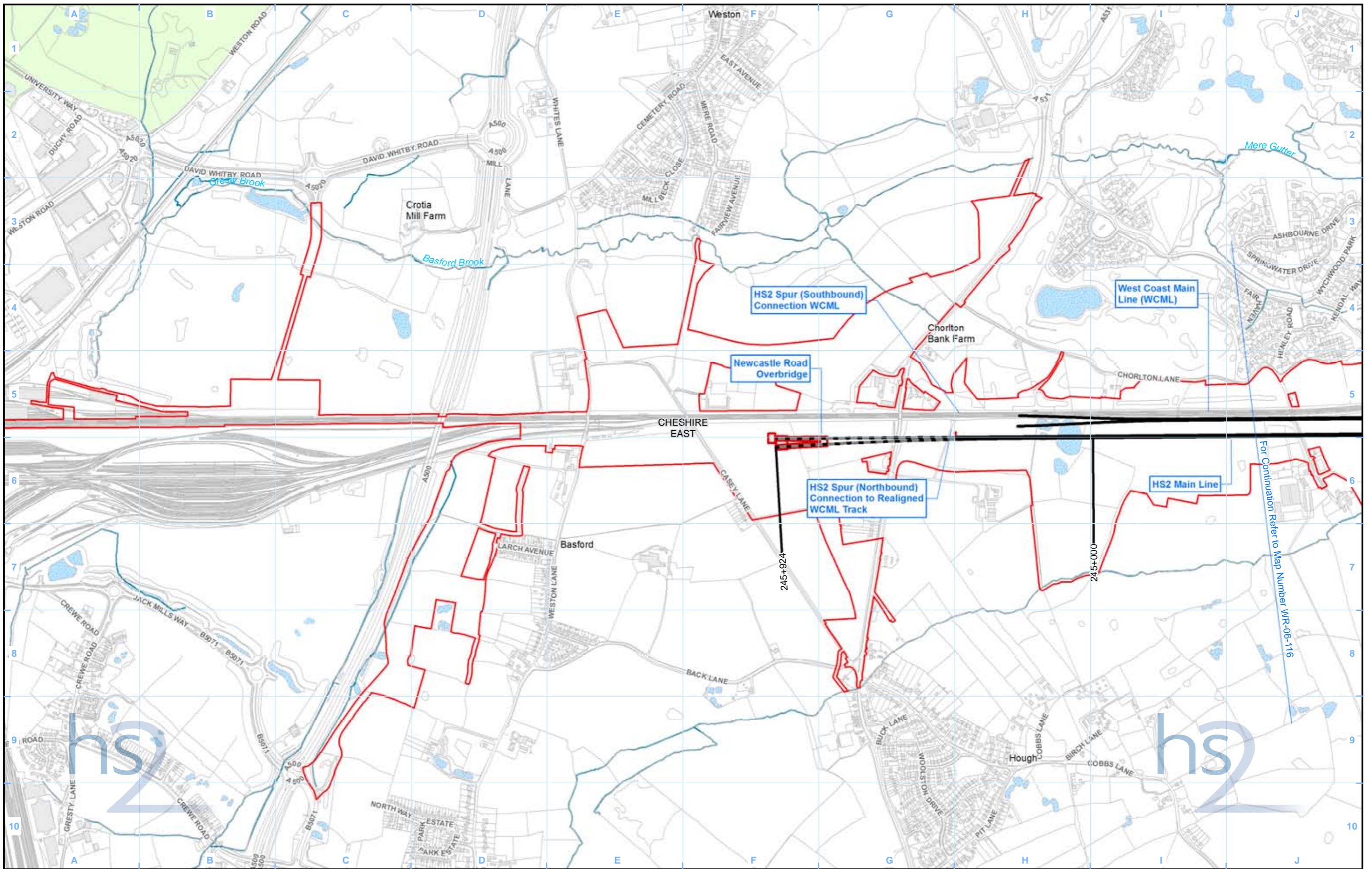
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- Legend**
- Route in tunnel
 - Route on surface
 - Depot, station, headhouse or portal building
 - Land potentially required during construction
 - Community area boundary
 - County boundary
 - District/Borough boundary
 - Watercourse
 - Culverted watercourse
 - Canal
 - Canal tunnel
 - Open water
 - Registered Park and Garden
 - Modelled Baseline Flood Extent 1 in 20 (5%) Annual Probability of River Flooding
 - Modelled Post Development Flood Extent 1 in 20 (5%) Annual Probability of River Flooding

Map Number
WR-06-117

Map Name
Modelled Baseline and Post Development Flood Extent 1 in 20 (5%) Annual Probability of River Flooding

Community Area 5:
South Cheshire

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