Cambridge South East Transport Phase 2

Environmental Statement

Appendix 8.3 Water Framework Directive Assessment

31st July 2023

Appendix 8.3 Water Framework Directive assessment

Introduction

8.3.1 This document presents the Water Environment Regulations (WER) assessment, (previously known and referred to throughout this document as a Water Framework Directive, or WFD, assessment) for the Proposed Development. The aims of this particular assessment are to provide:

- Background information on the WER / WFD legislation, and the Proposed Development;
- A baseline understanding of the water bodies that would be affected by the Proposed Development, within the context of the WER / WFD;
- An assessment of the potential for the Proposed Development to cause deterioration in the WER / WFD status of any water body directly or indirectly; and
- An assessment of the potential impacts of the Proposed Development on water body improvement measures and therefore the ability to meet WER / WFD objectives.

8.3.2 The results of the assessment presented in this document may be updated and refined, if necessary, post planning consent, when the Proposed Development is at detailed design phase, and the associated applications for permits are made. The assessment in this document is based on the design that has been produced to support the Transport and Works Act Order application; as such, the design parameters are not likely to change in a way that would materially affect the conclusions presented.

8.3.3 The WFD[1] came into force in 2000, was transposed into UK law in 2003 and most recently updated in 2017[2]. It has since been renamed as the WER but is referred to in this assessment by its former name (WFD). It's principal aims are to protect and improve the water environment and promote the sustainable use of water. The headline environmental objectives of the WFD and its daughter directives are to:

- Prevent the deterioration of aquatic ecosystems; and
- Protect, enhance and restore water bodies to Good Status; which is based on ecology (with its supporting hydromorphological and physico-chemical factors) and chemical factors for surface water, and water quantity and chemical status for groundwater bodies.

8.3.4 The WFD sets a default objective for all rivers, lakes, estuaries, groundwater and coastal water bodies to achieve Good Status by 2027. For natural surface water bodies, Good Status is a function of both Good Chemical Status (GCS) and Good Ecological Status (GES). The River Basin Management Plans (RBMP)3 outline the actions required to enable natural water bodies to achieve these objectives. Artificial and Heavily Modified Water Bodies (A / HMWB) are considered unable to attain GES due to the modifications that are necessary to maintain their function for society or their 'human use'. They are, however, required to achieve Good Ecological Potential (GEP), primarily through the implementation of a series of Mitigation Measures outlined in the RBMP. A / HMWBs still need to attain GCS which, along with GEP, will collectively result in Good Status in these water bodies.

8.3.5 New activities and schemes that affect the water environment may adversely impact biological, hydromorphological, physico-chemical and / or chemical quality elements (Table A8.3.1) that could lead to a deterioration in water body status relative to the baseline conditions published in the RBMP. Such activities may also preclude the implementation or effectiveness of the proposed improvement measures published in the RBMPs, leading to the water body failing to meet its WFD objectives for GES / GEP. Under the WFD, activities and schemes must not cause deterioration in water body status or prevent a water body from meeting GES / GEP by rendering such improvement measures ineffective. The overall ecological status of a water body is primarily based on consideration of its biological quality elements and is determined by the lowest scoring of these elements. These biological elements are 'supported' by the physico-chemical (water quality) and hydromorphological (flow and form (i.e. habitat)) quality elements.

8.3.6 In order to achieve GCS, a water body must pass a separate chemical status assessment, relating to pass / fail checks on the concentrations of various identified priority / dangerous substances.

Table A8.3.1 WFD classification elements for rivers

Water body type	Biological	Physico-chemical and chemical	Hydromorphological
Rivers	Macrophytes, Phytobenthos, Benthic invertebrates, Fish	Thermal conditions Dissolved oxygen Acidification Nutrients Salinity Organic pollutants Pollution by substances being discharged (e.g. phosphate or ammonia) Chemicals (e.g. metals, pesticides)	Hydrological regime - quantity and dynamics of water flow; connection to groundwater bodies River continuity Morphological conditions - river depth and width variation; structure and substrate of the river bed; structure of the riparian zone

[1] https: / / eur-lex.europa.eu / resource.html?uri=cellar:5c835afb-2ec6-4577-bdf8-756d3d694eeb.0004.02 / DOC_1&format=PDF

[2] https: / / www.legislation.gov.uk / uksi / 2017 / 407 / contents / made

[3] There are several regional RBMPs in England. In the context of the proposed Scheme the relevant RBMP is the Anglian RBMP available at: https: / / www.gov.uk / government / publications / anglian-river-basin-district-river-basin-management-plan

8.3.7 For groundwater bodies, Good Status has a quantitative and a chemical component (Table A8.3.2). Both are measured on a scale of Good, Moderate or Poor, and a confidence rating is assigned to the status assessment of High or Low. Together, these provide a single final classification of either Good or Poor Status. There is also a trend objective set for groundwater water bodies where environmentally significant and sustained rising trends in pollutant concentrations need to be identified along with a definition of the starting point (percentage of level or concentration) for trend reversal. Furthermore, the daughter directive of the WFD specifically concerning groundwater (The Groundwater Directive, 2006) also requires the prevention of any input of Priority Substances and limiting (or control) of the input of all other substances to groundwater to prevent the deterioration of status.

Table A8.3.2 WFD classification elements for groundwater bodies

Water body type	Chemical	Quantitative
Groundwater	Saline intrusion Intrusion of other pollutants Ecological or chemical quality of associated surface water body Ecological or chemical quality of associated groundwater dependent ecosystems Drinking water quality standards and other water quality measures Human use of groundwater body	Saline intrusion Intrusion of other pollutants Flow impact on surface water body Water availability within associated groundwater-dependent ecosystems Abstracted amount of water and its impact on average rate of overall recharge

Key terms

WFD classification

8.3.8 The WFD classification for a defined water body is produced by the assessment of a wide variety of different 'elements' which includes:

- 'biological elements' such as fish, invertebrates and phytobenthos (which includes plants, macro-algae, phytoplankton);
- 'supporting elements' that include chemical measurements such as ammonia, dissolved oxygen, pH, phosphate, copper, zinc and temperature; and
- 'supporting conditions' (sometimes referred to as hydromorphology) that assess the physical attributes of the water body such as 'quantity and dynamics of flow' and 'morphology'.

8.3.9 The assessment given for each element is also accompanied by a measure of certainty in the result. The status classification is published in the RBMP and provides a baseline condition against which compliance and future improvements can be measured.

WFD compliance

8.3.10 There are two key objectives against which the impacts of proposed works on a water body need to be assessed to determine compliance with the overarching objectives of the WFD:

- Test 1: The Proposed Development will not cause a deterioration in any element of water body classification.
- Test 2: The Proposed Development will not prevent the WFD status objectives from being reached within the water body or other downstream water bodies.

8.3.11 In addition to the two tests, the Proposed Development should also look to contribute to the delivery of the relevant WFD objectives in the RBMPs, although this is not something that is required to comply with the objectives of the WFD.

8.3.12 If it is considered that the Proposed Development is likely to cause deterioration in water body status or prevent a water body from meeting its objectives, then an assessment would be made against the conditions listed in Article 4.7 of the WFD (or, domestically, Regulation 19 of the WER). Such a derogation can be invoked if; 'new modifications' are of overriding public interest and / or the environmental and social benefits of achieving the WFD objectives are outweighed by the benefits of the new modifications to human health, safety and sustainable development; there are no significantly better environmental options that are technically feasible or not disproportionately costly; and, all practicable steps for mitigation have been taken.

A / HMWB

8.3.13 Some water bodies cannot achieve GES due to substantial modification of their physical characteristics such that they can provide a 'human use' e.g. for flood risk management, navigation etc. These water bodies are referred to as either Artificial Water Bodies (AWB; where the water body is manmade), or Heavily Modified Water Bodies (HMWB; where a natural water body has been substantially modified as a result of human intervention) (collectively referred to as A / HMWB). These water bodies are required to reach GEP, which is considered to be the best ecology that can be achieved without compromising the human use. The attainment of GEP in such water bodies is partly based on the implementation of a set of Mitigation Measures, that are designed to improve the water body ecological elements that are sensitive to the human use for which is has been designated. Such Mitigation Measures are specific to each A / HMWB and are published in the RBMPs. 'Moderate or worse' is used if some Mitigation Measures are yet to be implemented. HMWBs may therefore have an element rated 'poor' but not be considered 'poor' in overall status. A / HMWBs are still required to attain chemical standards consistent with GCS and also attain ecological quality that is consistent with GES for all ecological elements that are not sensitive to the human use for which the A / HMWB has been designated.

Hydromorphology

8.3.14 Hydromorphology is a term used in the WFD to describe the processes operating within, and the physical form of, a water body. The term encompasses both hydrological and geomorphological characteristics that, in combination, provide the physical habitat required to support healthy aquatic ecology.

WFD water body

8.3.15 The water body (e.g. river, transitional, coastal, groundwater or lake), that is reported on for WFD and is shown on the catchment data explorer mapping[4]. For river waterbodies this is the WFD Principal Watercourse and its tributaries within the WFD catchment.

WFD principal watercourse

8.3.16 This is normally the largest river in a catchment and is the “blue line” on the maps provided in the Environment Agency Catchment Data Explorer. This does not refer to the other surface water features that fall within the catchment of the water body. The WFD Principal Watercourse is the part of the river network where the Environment Agency generally undertakes monitoring in respect of WFD classification.

Main river

8.3.17 A river water feature where the Environment Agency is the regulator in respect of the management of flood risk. These are usually the larger rivers and / or rivers that are prone to the risk of flooding people, properties or infrastructure. Consent for work on Main Rivers requires a Flood Risk Activities Permit (FRAP), and part of granting this consent is a requirement for compliance with WFD.

Ordinary watercourse

8.3.18 All other channels (rivers and ditches) that are not regulated by the Environment Agency. These are regulated by the Lead Local Flood Authority (LLFA; a relevant local authority) or an Internal Drainage Board (IDB).

Surface water feature

8.3.19 An element of the surface water environment displayed on OS master map data. Examples include ditches, rivers, canals and ponds.

Assessment approach

8.3.20 The overall aim of this WFD compliance assessment is to demonstrate that the potential impacts of the Proposed Development on the water environment are compliant with the requirements of the WFD as transposed into UK law.

8.3.21 Accordingly, the methodology used for this WFD compliance assessment follows these stages:

- Define the baseline;
- Screening of activities and water bodies;
- Scoping of potential impacts and, therefore, risk of being non-complaint with WFD objectives; and, if necessary
- Impact assessment.

8.3.22 If this process identifies a risk of overall non-compliance, then additional stages are required in order to identify and evaluate mitigation measures and / or an undertake an assessment in line with the requirements of Article 4.7 of the WFD (and therefore Regulation 19 of the WER).

Proposed Development background

8.3.23 The Proposed Development comprises:

- A new optically guided busway, which buses will run between the Cambridge Biomedical Campus and the A11 and A1307 junction
- Bus stops at Great Shelford, Stapleford and Sawston
- An Emergency Maintenance and Access Track
- A new Travel Hub close to the A11, with car, cycle and coach parking, bus stops, and a facilities building.

8.3.24 The Proposed Development lies to the south east of Cambridge, running for approximately 8.5 km between the A1307 / A11 / A505 junction and Cambridge Biomedical Campus (CBC) skirting the eastern edges of Sawston, Stapleford and Great Shelford. In addition, it is proposed that connections will be provided from the Travel Hub to Babraham, Babraham Research Campus and Granta Park. At the CBC, the new route is proposed to run on dedicated public transport lanes on Francis Crick Avenue, connecting to the existing Guided Busway, enabling services to continue to the stations and Cambridge City Centre via the Busway.

8.3.25 The majority of the Proposed Development runs on a new off-road alignment for the segregated carriageway. This alignment is proposed to be on land currently used for agricultural purposes (largely arable) and some land that is occupied by grassland, woodland or scrub. The Proposed Development will cross the River Granta (a Main River) in two locations.

Method

Baseline assessment

8.3.26 The red line boundary of the proposed route is taken as the study area for this assessment and is displayed in Figure A8.1.

8.3.27 A desk study was undertaken to identify the WFD water bodies and other surface water features within the study area. OS master map data was used to identify all surface water features. Features not shown on the OS mapping (e.g. some field drains) are not considered further in this assessment on account of the fact that they are unlikely to be of importance in determining WFD compliance.

8.3.28 The Environment Agency Catchment Data Explorer was used to identify WFD water bodies that overlap with the study area (surface and groundwater). The latest information (2019) from the 2016 Anglian RBMP and Cycle 3 WFD data was used to inform the baseline .

8.3.29 A desk-based baseline assessment has been undertaken for the surface water features using aerial imagery, OS mapping and site photographs to give a brief description of the baseline conditions. This information was supplemented with site survey and River Condition Assessment (RCA) surveys as part of the wider Biodiversity Net Gain (BNG) assessment. This baseline information provides an indication of the naturalness and sensitivity of channels to the Proposed Development.

[4] https: / / environment.data.gov.uk / catchment-planning /

8.3.30 As well as identifying the WFD groundwater bodies that underlay the Proposed Development, the study area has been reviewed for the presence of Groundwater Dependant Terrestrial Ecosystems (GWDTE), as defined by the Environment Agency. Additional habitats that are dependent on groundwater in sites designated for nature conservation have also been identified and all have been given an importance based on guidance in DMRB LA 113, Appendix B.

Screening assessment

8.3.31 A Water Framework Directive (WFD) Screening Assessment has been undertaken for the Proposed Development based on the Environment Agency's Technical Guidance 488_10_SD06. Proposed Development activities are checked for compliance against the "low risk activity register". This aims to determine if the Proposed Development has any potential impact pathways to any WFD water bodies.

8.3.32 For surface water bodies this assessment follows the guidance from the Environment Agency. The process is summarised in Figure A8.3.2, with the low-risk activity register for rivers outlined in Table A8.3.3 and the screening thresholds outlined in Table A8.4. Where there is a high confidence of works associated with the Proposed Development having no long-term impact on the water features, the works and water features have been screened out from subsequent investigation. Where they are screened in, a scoping assessment has been undertaken.

8.3.33 For groundwater bodies the screening assessment has comprised a review of available information pertaining to the geology and hydrogeology of the study area, within the context of the identified WFD groundwater bodies, GWDTE and sites designated for ecology that have habitats which are dependent on groundwater. This information has been utilised to determine the potential for impact upon WFD groundwater bodies as a result of the Proposed Development. This has identified possible pathways for impact from construction and operation of the Proposed Development, with respect to both the quality and quantity of groundwater within the identified WFD groundwater body.

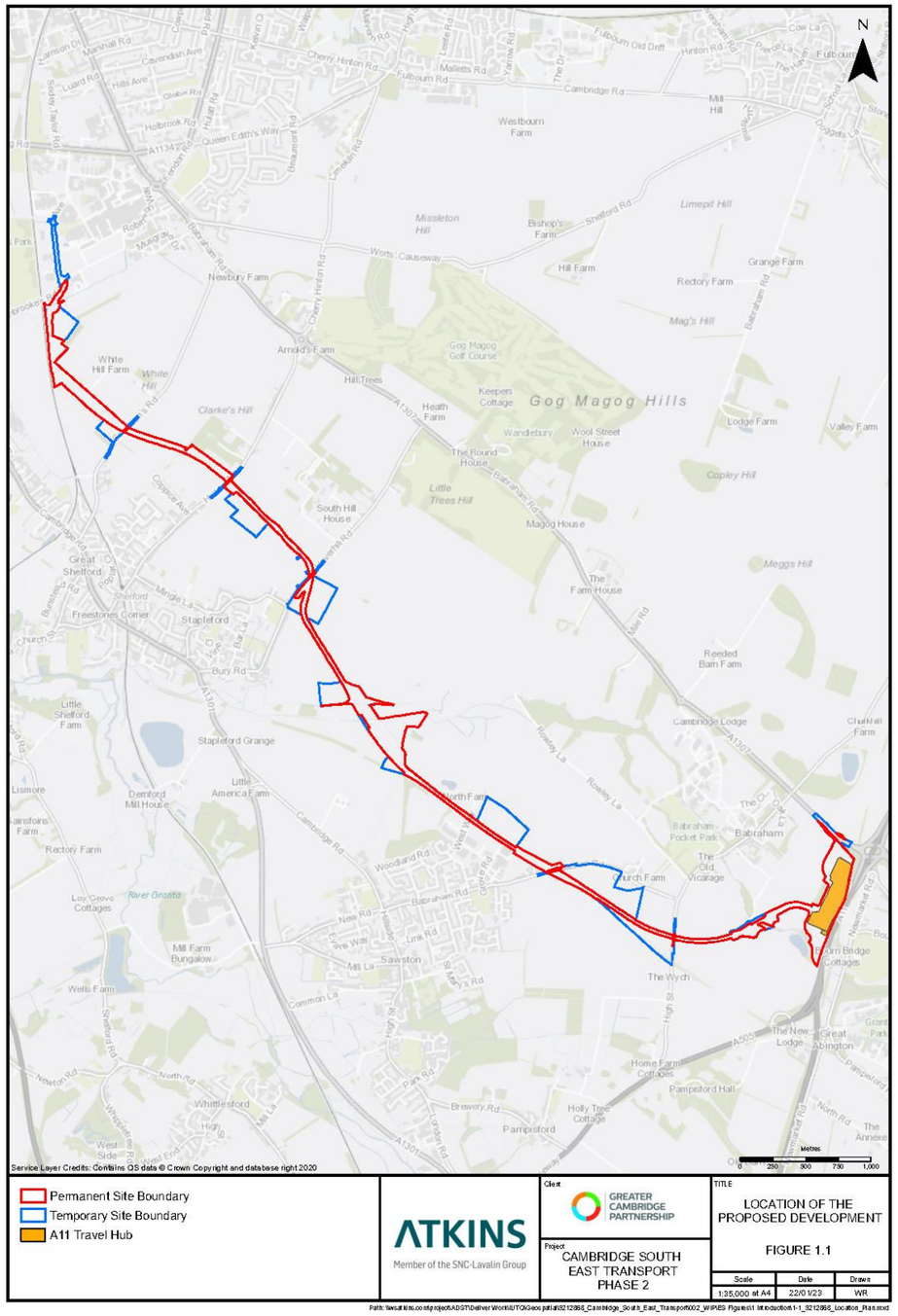


Figure A8.3.1: Red line boundary of the proposed route

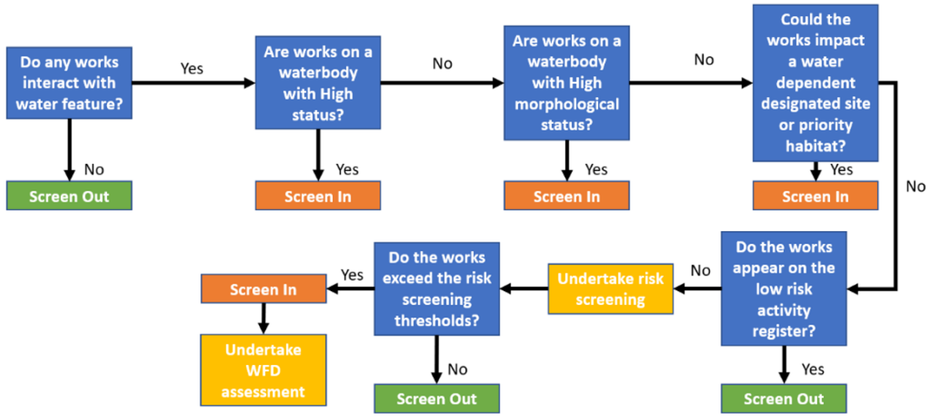


Figure A8.3.2 WFD surface water screening framework

Table A8.3.3 Low risk activity register for rivers (edited to show relevant activities) from Environment Agency (2016)

Activity	Activity definition
Temporary flood defences	To prevent / reduce the inflow of river water to an area of low-lying land in flooding situations. Such defences are only employed in times of flood.
Temporary coffer dam (if eel / fish passage not impeded)	Temporary structures to dam off a part of the channel to allow maintenance or building works to take place. The whole structure is removed once the works are complete.
Temporary flow diversion (if fish / eel passage not impeded)	Such as flumes and porta dams, cutting new temporary channels, overspill side weirs, over-pumping, etc.
Temporary abstraction	Temporary abstraction of water
Clear Span Bridges	Temporary clear span bridge where no part of the structure disturbs the bed or banks of the river (e.g. no in-stream piers) Abutments must be set-back into the floodplain far enough so as to not interfere with relatively frequent overbank flood flows.

Table A8.3.4 WFD risk screening threshold for rivers

Risk Category	Type of activity	Risk screening threshold for rivers	Risk comment
5	Culvert	Any length	Risk to WFD objective
5	Abstraction / Flow regulation Below the Environmental Flow Indicator (EFI)	Any length	Risk to WFD objective
5	Channel widening, deepening, straightening or realigning	Any length	Risk to WFD objective
5	Impounding structure	All impoundments (unless covered by Low Risk impoundments regulatory position statement)	Risk to WFD objective
		Where covered by Low Risk impoundments regulatory position statement	Risk to WFD objective
4	Bed reinforcement	Where >100 metres	Risk to WFD objective
		Where < 100 metres	Opportunity for delivery of water body improvements and improvements to Proposed Development design. Risk of local and cumulative impacts
4	Sediment management	Where >100 metres	Risk to WFD objective
		Where < 100 metres	Opportunity for delivery of water body improvements and improvements to Proposed Development design. Risk of local and cumulative impacts
4	Bank reinforcement	Where >100 metres	Risk to WFD objective
		Where < 100 metres	Opportunity for delivery of water body improvements and improvements to Proposed Development design. Risk of local and cumulative impacts
		Where soft engineering repair to short lengths of banks	Low risk to WFD objectives. No further WFD assessment required
3	Embankment	Where >100 metres	Risk to WFD objective
		Where >10 metres but < 100 metres	Opportunity for delivery of water body improvements and improvements to Proposed Development design. Risk of local and cumulative impacts
		Where <10 metres	Low risk to WFD objectives. No further WFD assessment required
3	Bank reprofiling	Where >100 metres	Risk to WFD objective
		Where >10 metres but < 100 metres	Opportunity for delivery of water body improvements and improvements to Proposed Development design. Risk of local and cumulative impacts
		Where <10 metres	Low risk to WFD objectives. No further WFD assessment required
2	Riparian vegetation management	Where undertaken over >200 metre length of river	Risk to WFD objective

Risk Category	Type of activity	Risk screening threshold for rivers	Risk comment
		Where undertaken over >20 metre but < 200 metre length of river	Opportunity for delivery of water body improvements and improvements to Proposed Development design. Risk of local and cumulative impacts
		Where undertaken over <20 metre length of river	Low risk to WFD objectives. No further WFD assessment required
2	In stream vegetation management	Where undertaken over >200 metre length of river	Risk to WFD objective
		Where undertaken over >20 metre but < 200 metre length of river	Opportunity for delivery of water body improvements and improvements to Proposed Development design. Risk of local and cumulative impacts
		Where undertaken over <20 metre length of river	Low risk to WFD objectives. No further WFD assessment required
1	Outfall	All outfalls unless covered by flood defence consenting low risk checklist for small outfalls	Opportunity for delivery of water body improvements and improvements to Proposed Development design. Risk of local and cumulative impacts
1	Bridge and crossings	Where meets criteria of flood defence consenting low risk checklist for small outfalls	Low risk to WFD objectives. No further WFD assessment required
		All bridges and crossings unless covered by flood defence consenting low risk checklist	Opportunity for delivery of water body improvements and improvements to Proposed Development design. Risk of local and cumulative impacts
		Where meets criteria of flood defence consenting low risk checklist for service crossings	Low risk to WFD objectives. No further WFD assessment required

8.3.34 For groundwater bodies the screening assessment has comprised a review of available information pertaining to the geology and hydrogeology of the study area, within the context of the identified WFD groundwater bodies, GWDTE and sites designated for ecology that have habitats which are dependent on groundwater. This information has been utilised to determine the potential for impact upon WFD groundwater bodies as a result of the Proposed Development. This has identified possible pathways for impact from construction and operation of the Proposed Development, with respect to both the quality and quantity of groundwater within the identified WFD groundwater body.

Scoping assessment

8.3.35 The scoping stage examines more closely whether there is a potential risk to any of the water bodies identified at screening and is undertaken separately for each WFD Water Body and each activity (or group of activities). This enables regulators and operators to determine the scope of the assessment required and to establish whether an activity will have a non-temporary effect on WFD Classification at the WFD Water Body level. Scoping therefore defines which WFD parameters could be affected by a project and agrees an appropriate level of assessment to meet WFD requirements.

Impact assessment

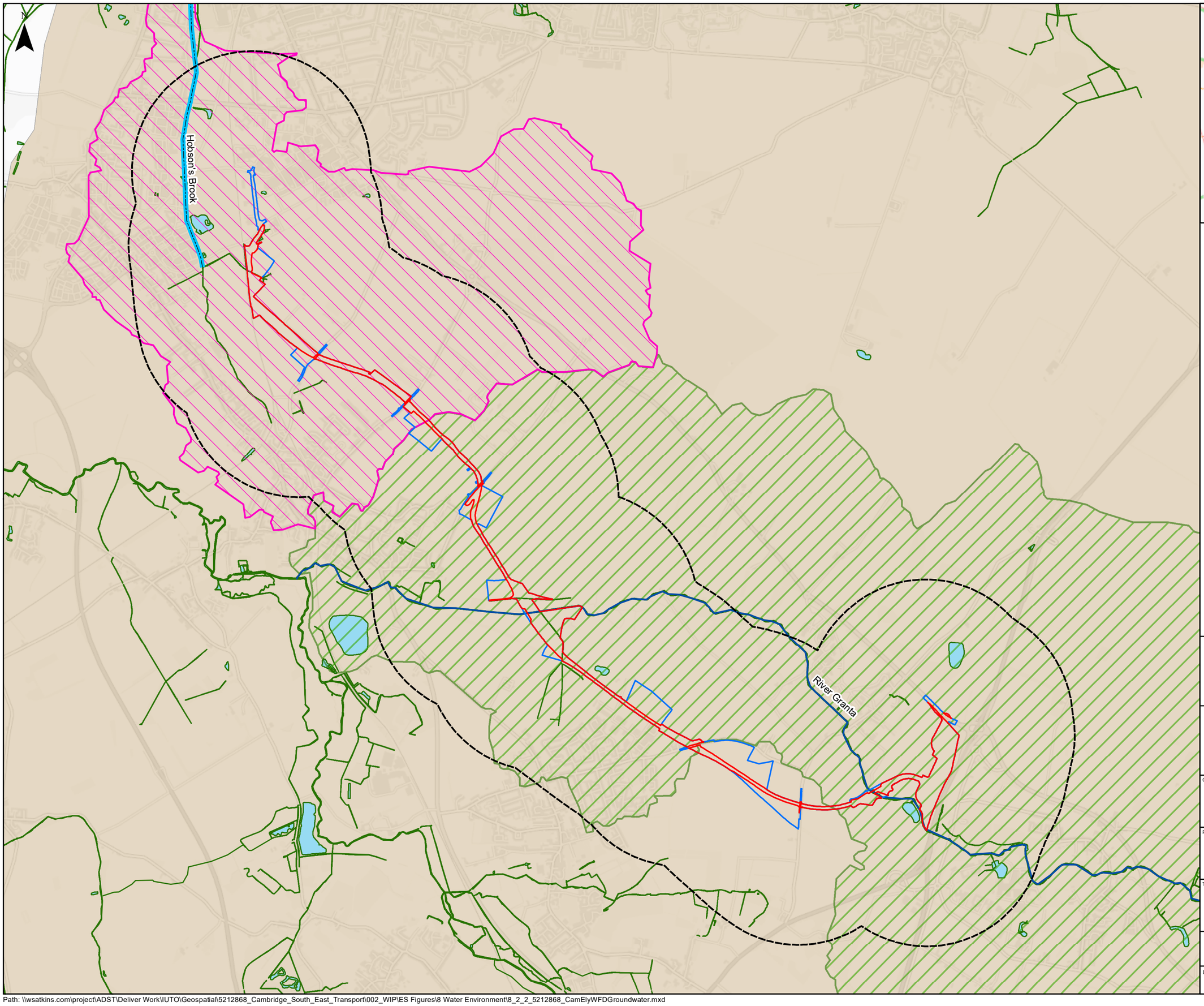
8.3.36 The impact assessment aims to determine whether the project or activity will have a permanent impact on the status of one or more WFD quality elements at the water body scale. It will determine whether the activity is likely to affect a WFD quality element sufficiently to result in deterioration of its current status. For Priority Substances, the process requires the assessment to consider whether the activity is likely to cause the parameter to fail or achieve GCS.

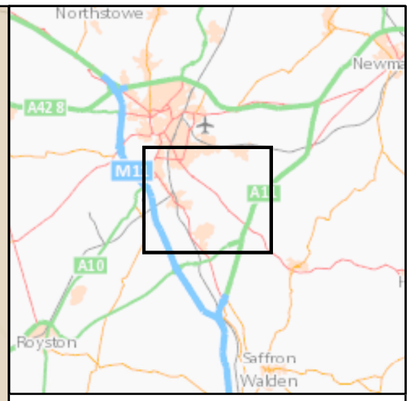
Screening assessment

Surface water baseline

8.3.37 The Proposed Development study area crosses two WFD surface water body catchments, displayed in Figure A8.3.3. The majority of the Proposed Development is located within the Granta (GB105033037810) catchment, the remainder of the Proposed Development to the north located within the Hobson's Brook (GB105033037620) catchment. A summary of the WFD status for these surface water bodies can be found in Table A8.3.5.

8.3.38 There are a total of nine channels within the red line boundary for the study area, that will form these WFD water bodies. Besides the River Granta and Hobson's Brook Principal Watercourses (and Main River), the majority of channels are agricultural ditches classified as ordinary watercourses. These have low gradients and heavily managed water levels. These ditches tend to be deep with steep banks and have little bank or riparian vegetation and have low sensitivity to change.





- Permanent Site Boundary
- Temporary Site Boundary
- Redline Buffer 1km
- Hobson's Brook WFD River Waterbodies
- Granta WFD River Waterbodies
- Ordinary Watercourses
- Surface Water Features
- Granta WFD River Waterbody
- Hobson's Brook WFD River Waterbody
- Cam and Ely WFD Ground Waterbody

Metres

0 500 1,000

Atkins, Member of the SNC-Lavalin Group
Nova North
11 Bressenden Place
London
SW1E 5BY

ATKINS
Member of the SNC-Lavalin Group

Client

GREATER CAMBRIDGE PARTNERSHIP

Project

CAMBRIDGE SOUTH EAST TRANSPORT
PHASE 2

Title

CAM & ELY WFD
GROUNDWATER MAP

Sheet Size	Original Scale	Designed / Drawn	Checked	Authorised
A3	1:30,000	LG Date 13/03/23	WR Date 13/03/23	LM Date 13/03/23

Drawing Number: FIGURE A8.3.3

Rev: 00

Path: \\wsatkins.com\project\ADST\Deliver Work\IUTO\Geospatial\5212868_Cambridge_South_East_Transport\002_WIP\ES Figures\8 Water Environment\8_2_2_5212868_CamElyWFDGroundwater.mxd

Table A8.3.5 WFD Status and Objectives for river water body catchments within the study area from Cycle 3

Water body ID	Water body name	Hydro-morphological designation	Overall water body	Ecological	Supporting elements (surface water)	Biological quality elements	Hydro-morphological supporting elements	Physico-chemical quality elements	Specific pollutants	Chemical	Other pollutants	Priority substances	Priority hazardous substances
GB105033037810	Granta	Not designated artificial or heavily modified	Moderate	Moderate	N / A	Moderate	Supports good	Moderate	N / A	Fail	Does not require further assessment	Good	Fail
GB105033037620	Hobsons Brook	Heavily modified	Moderate	Moderate	Moderate	Good	Supports Good	Good	N / A	Fail	Does not require further assessment	Good	Fail

8.3.39 More detailed baseline information on each of the surface water features that make up these water bodies is provided within the ditched assessment Biodiversity Net Gain (BNG) assessment in ES Volume 3, Appendix 10.12. A desk-based assessment and MoRPh surveys of the River Granta only were undertaken to feed into the River Condition Assessment as art of the BNG Metric 3.1 biodiversity net gain calculations. Ditch assessments were undertaken for the remaining water courses within the study area. The evidence collected as part of this BNG exercise has been used to provide detail of the character of the rivers and streams assessed as part of the WFD assessment.

8.3.40 It should be noted that the Granta water body achieved good chemical status between 2013 and 2016. Reasons for not achieving good status are related to pollution by sewage discharge (treated effluent) and impacts to flow as a result of groundwater abstractions (industry, water industry, government and agriculture related).

8.3.41 Hobson's Brook water body achieved good chemical status between 2013 and 2016. Reasons for not achieving good status are related to physical modification as part of urbanisation and impacts to flow as a result of groundwater abstractions (industry, water industry and agriculture related).

Groundwater baseline

8.3.42 There is one groundwater body within 1 km of the red line boundary, the Cam and Ely Chalk. A summary of the WFD baseline for this groundwater body catchments within the study area of the Proposed Development can be found in Table A8.3.6.

Table A8.3.6 WFD Status and Objectives for groundwater body within the study area from Cycle 3

Water body ID	Water body name	Overall status	Quantitative	Chemical
GB40501G400500	Cam and Ely Chalk	Poor	Poor	Poor

8.3.43 The Cam and Ely Ouse Chalk groundwater body status objectives remain as poor due to the unfavourable balance of costs and benefits as well as disproportionate burdens. The reasons for not achieving good are numerous but include issues relating to point source sewage discharge pollution, diffuse pollution from agriculture and industry, and impacts to quantitative status as a result of groundwater abstractions (industry, water industry and agriculture related).

Designated sites

8.3.44 The following protected areas listed in Table A8.3.7 are situated within the footprint of the Site boundary within the Cam and Ely Chalk groundwater body and have potential to have connections to the groundwater body.

8.3.45 The Nine Wells Local Nature Reserve (LNR) is adjacent to the Site boundary.

8.3.46 The Cambridge Geological Society website[5] indicates the Nine Wells Local Geological Site (LGS) is situated on the boundary of the site and study area in the north. Nine Wells Local Nature Reserve was designated a LGS in February 2017 as a result of its geological value for scientific, educational, historical and / or aesthetic reasons.

8.3.47 The spring at Nine Wells Local Geological Site is the main source of water for Hobsons Conduit, based on information from the Cambridge Geological Society website the spring is geologically controlled with water discharge at the base of the Zig Zag Chalk at the boundary with the less permeable Tottenhoe Stone as shown in Figure A8.3.4.

Table A8.3.7 List of Protected Areas identified within the Site boundary in the Cam and Ely Chalk water body from Cycle 3

Protected Area Name	ID	Directive
Babrahams	GWSGZ0001	Safeguard Zone
Cam and Ely Ouse Chalk	UKGB40501G400500	Drinking Water Protected Area

[5] Nine Wells | Cambridgeshire Geological Society (cambsgeology.org)

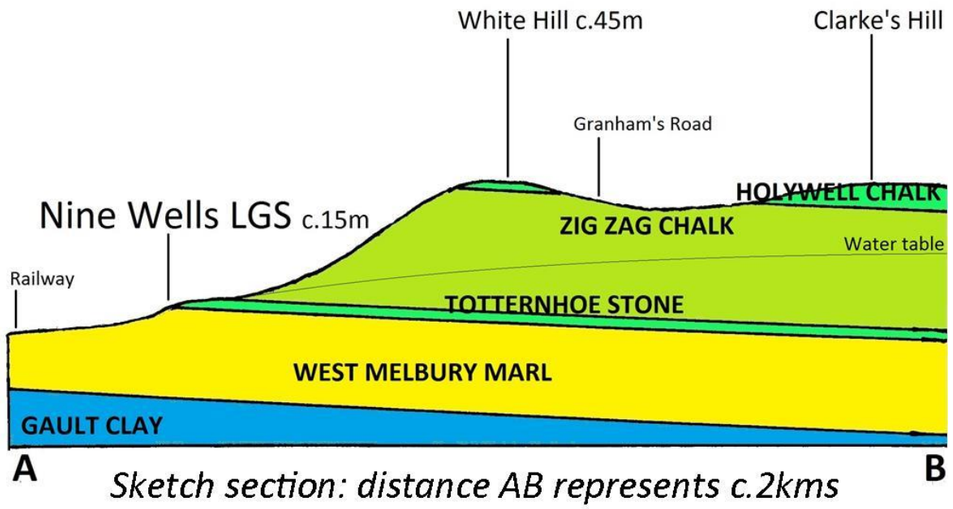


Figure A8.3.4 Nine Wells geological character

8.3.48 The River Granta County Wildlife Site (CWS), a non-statutory site, is crossed by the Proposed Development in two locations, Stapleford and Babraham.

8.3.49 The Environmental Scoping Report[6] indicated potential for several notable and protected species:

- Water vole: There are records of water voles using the River Granta and the ditch to the south of the Cambridge Biomedical Campus (CBC) was identified having the suitability to support water vole
- Kingfisher: these have been sighted at the River Granta CWS and downstream of Hobson's Brook. These waterbodies were noted as highly likely to support kingfishers.
- Otters: these are considered to be located within the River Granta and spraints were recorded downstream of Hobson's Brook
- White Clawed Crayfish: records indicate these are present within the River Granta CWS

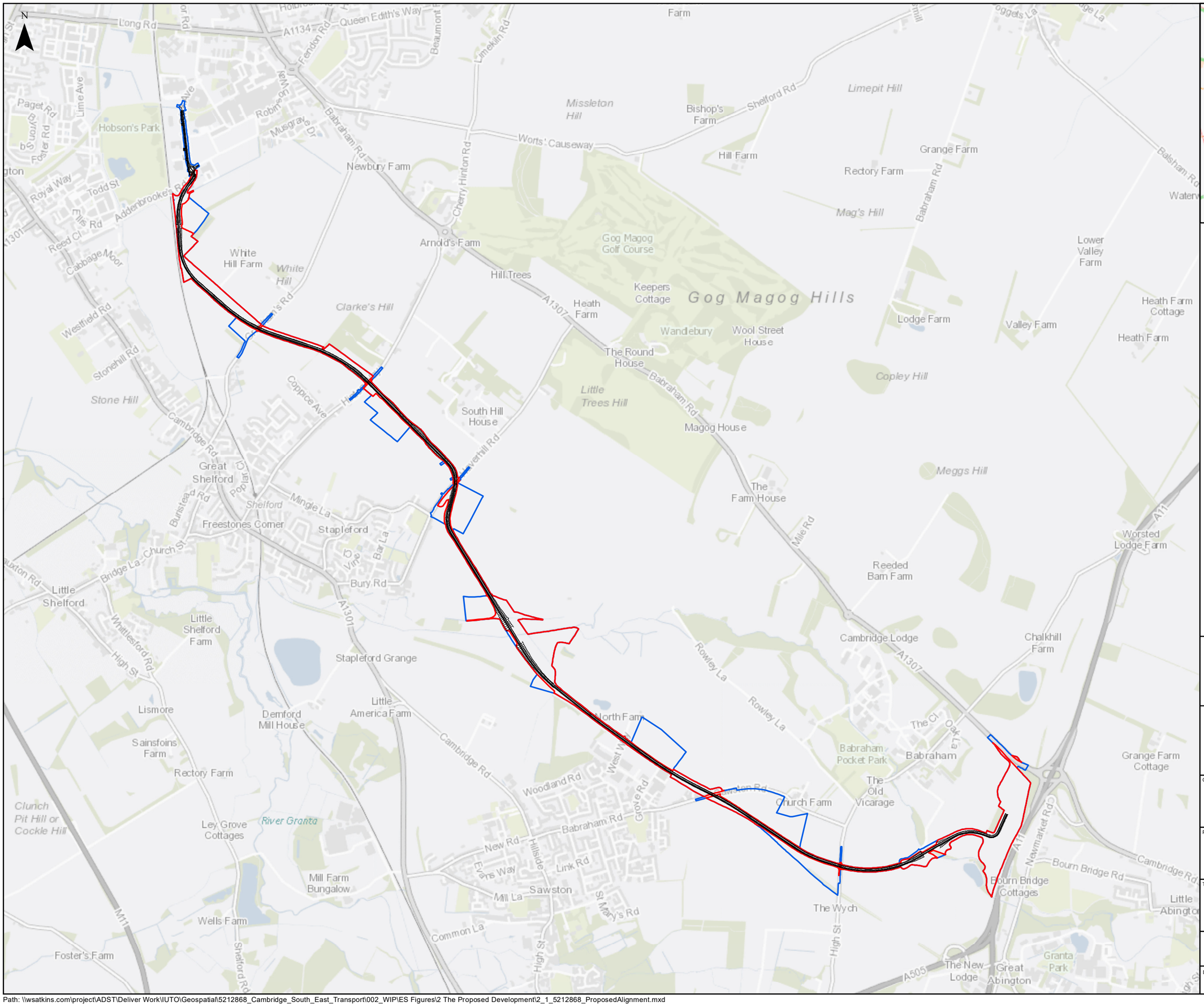
8.3.50 The impact assessment on these species has been carried out and reported in Chapter 10 of the Environmental Statement.

Proposed Development works

8.3.51 The Proposed Development will involve the permanent physical modification on a total of five of the channels in the study area; two WFD Principal Watercourse and three ordinary watercourses. The channels effected are identified are detailed in Table A8.3.8, along with the proposed structures to be introduced. Figure A8.3.5 and A8.3.6 detail the proposed route alignment and proposed construction locations respectively. As part of the Proposed Development design, permanent embedded mitigation has already been considered and incorporated. See ES Volume 2, Chapter 2 for full details of embedded mitigation.

8.3.52 As well as these permanent physical modifications, there will also be temporary impacts associated with construction outlined in Table A8.3.9. Provided the construction phase mitigation and best practice measures stipulated in Table A8.3.9 are adhered to, the construction phase works will not have an impact on groundwater receptors.

[6] Mott MacDonald (2020) Environmental Scoping Report, Cambridge South East Transport Phase 2.



Permanent Site Boundary
Temporary Site Boundary
Route Alignment

Metres
0 250 500

Atkins, Member of the SNC-Lavalin Group
Nova North
11 Bressenden Place
London
SW1E 5BY

ATKINS
Member of the SNC-Lavalin Group

Client
GREATER CAMBRIDGE PARTNERSHIP

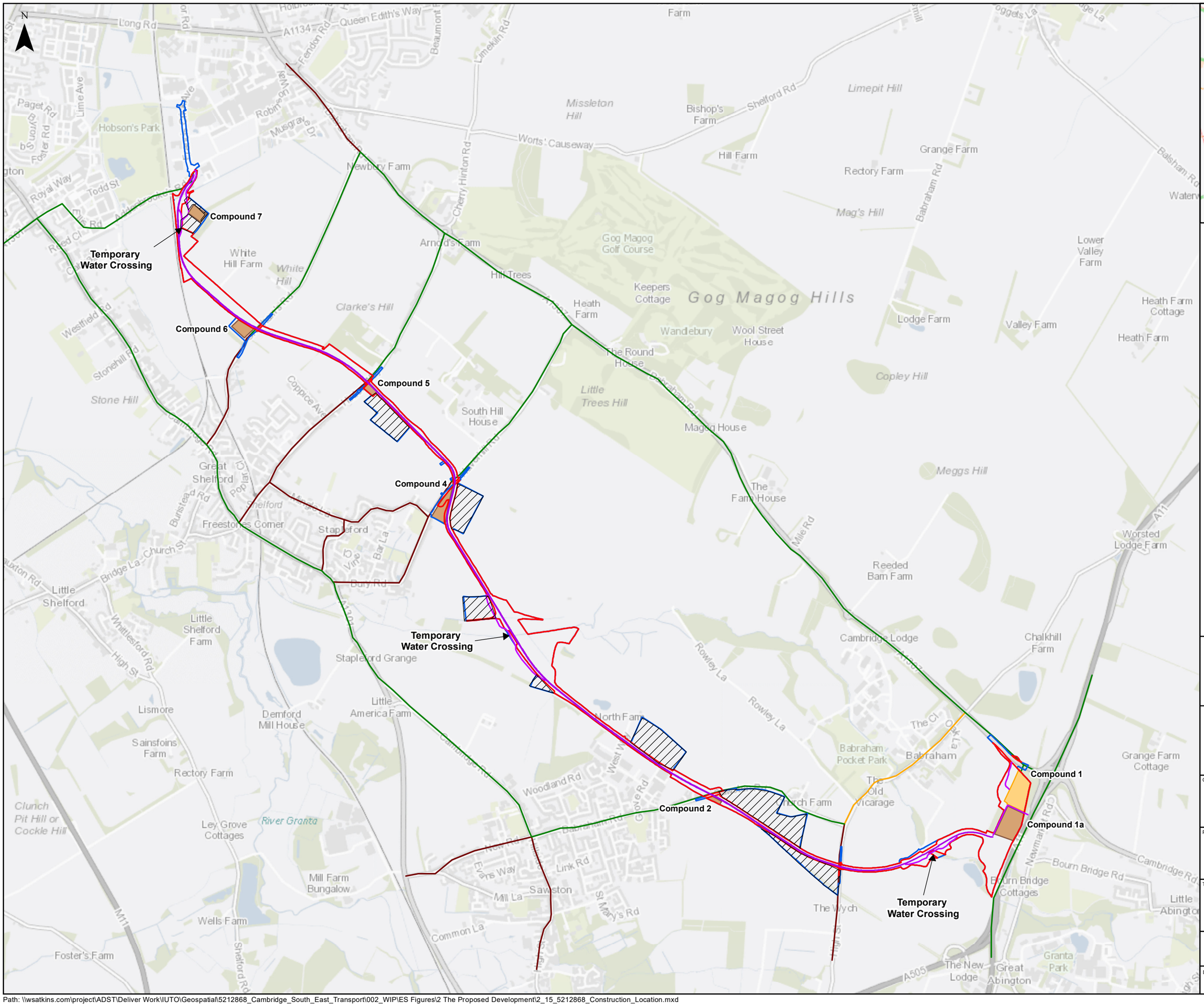
Project
CAMBRIDGE SOUTH EAST TRANSPORT
PHASE 2

Title
PROPOSED DEVELOPMENT
ROUTE ALIGNMENT

Sheet Size	Original Scale	Designed / Drawn	Checked	Authorised
A3	1:25,000	JM Date 22/01/23	WR Date 22/01/23	LM Date 22/01/23

Drawing Number: FIGURE A8.3.5
Rev: 00

Path: \\wsatkins.com\project\ADST\Deliver Work\IUTO\Geospatial\5212868_Cambridge_South_East_Transport\002_WIP\ES Figures\2 The Proposed Development\2_1_5212868_ProposedAlignment.mxd



Permanent Site Boundary
Temporary Site Boundary
Proposed Haul Road

Preferred Local Access Routes
All Site Traffic Permitted
No Access to Site Traffic
Site Traffic Excluding HGV's

Main Compound
Proposed Satellite Compound
Material Storage Areas

Metres
0 250 500

Atkins, Member of the SNC-Lavalin Group
Nova North
11 Bressenden Place
London
SW1E 5BY

ATKINS
Member of the SNC-Lavalin Group

Client
GREATER CAMBRIDGE PARTNERSHIP

Project
CAMBRIDGE SOUTH EAST TRANSPORT
PHASE 2

Title
LOCATION PLAN OF THE HAUL ROADS, COMPOUNDS, MATERIAL STORAGE AREAS AND TEMPORARY BRIDGES

Sheet Size	Original Scale	Designed / Drawn	Checked	Authorised
A3	1:25,000	JM Date 24/01/23	WR Date 24/01/23	LM Date 24/01/23

Drawing Number
FIGURE A8.3.6

Rev
00

Path: \\wsatkins.com\project\ADST\Deliver Work\IUTO\Geospatial\5212868_Cambridge_South_East_Transport\002_WIP\ES Figures\2 The Proposed Development\2_15_5212868_Construction_Location.mxd

Table A8.3.8 Description of Proposed Development and watercourse interactions

Watercourse	Structure No.	Structure Type	[7]Description of Proposed Development
Unnamed Watercourse 11	1, 2, 3	Culvert (one single culvert)	Culvert structure to enable the busway to cross the ordinary watercourse located on the south side of Addenbrookes Road Culvert structure over the ordinary watercourse on the south side of Addenbrookes Road, immediately to the east of Structure No. 1, to enable the Pemberton Access run from Addenbrookes Road to the Nine Wells Nature Reserve, as well as access to Network Rail Land. The structure also incorporates the Emergency, Maintenance and Access Track (EMAT)crossing. EMAT culvert structure over the ordinary watercourse on the south side of Addenbrookes Road, immediately to the west of Structure No. 1, to enable the DNA Cycle Path to tie into the existing cycle lane that passes beneath the bridge carrying Addenbrookes Road over the railway line.
Hobson's Brook	Attenuation Pond 1	Attenuation pond with discharge channel	Attenuation pond associated with Structures 1, 2 and 3 with a total volume capacity of 899.92m^3. A drainage channel is to convey attenuated flow from the pond into the Hobson's Brook. A culvert outfall and headwall will be installed on the left bank of the Hobson's Brook.
Hobson's Brook	4	Hobson's Brook Bridge	Hobson's Brook Bridge, crossing of Hobson's Brook WFD Principal Watercourse, running parallel to the railway line, the structure is to be used by both the HQPTR and ATP's.
Unnamed Watercourse 21	5	Culvert	Culvert structure over the ordinary watercourse to the north of the River Granta (Stapleford) Crossing, constructed within the northern approach embankment to the bridge to be used by both the busway and EMAT.
River Granta	Pond 2	Attenuation pond with discharge channel	Attenuation pond associated with Structure 5, with a total volume capacity of 1134.41m^3. A drainage channel is to convey attenuated flow from the pond into the River Granta. A culvert outfall and headwall will be installed on the left bank of the River Granta.
River Granta	6	HQPTR Bridge	River Granta (Stapleford) Crossing over the River Granta Principal Water Body. Bridge to be used by both the HQPTR and ATP's.
Unnamed tributary of the River Granta 4	Pond 3	Attenuation pond with discharge channel	Attenuation pond associated with Structure 7, with a total volume capacity of 313.7m^3. A drainage channel is to convey attenuated flow from the pond into the Unnamed Trib of River Granta 4. A culvert outfall and headwall will be installed on the right bank of the Unnamed Trib of River Granta 4.
Unnamed tributary of the River Granta 4	7	Culvert	Culvert structure over the ordinary watercourse to the south east of the River Granta (Stapleford) Crossing, constructed within the southern approach to the bridge to be used by both the HQPTR and ATP's.
River Granta	8	HQPTR Bridge	River Granta (Babraham) Crossing over the River Granta Principal Water Body. Bridge to be used by both the HQPTR and ATP's.

Screening assessment

8.3.54 The potential temporary and permanent impacts associated with the surface water environment during the construction phase of the works and the operational lifespan of the structures are presented, with proposed mitigation in Table A8.10 and Table A8.12. Potential temporary and permanent impacts associated with the groundwater environment are presented in Table A8.10. Justification has been provided for screening in or out each of the works elements and water features in the study area based on the methodology presented. Where water features are screened in, a scoping assessment has been undertaken.

8.3.55 The mitigation stated in the following screening assessment tables relates to mitigation specified in the ES Main Report (Volume 2). Each mitigation measure has a unique identifying code comprising letters and numbers. The letter refer to the assessment that they were identified in (BD = biodiversity (Chapter 10), WE = water environment (Chapter 8) etc.) See the relevant ES chapters for a full description of the proposed mitigation measures.

7

Table A8.3.9 Works elements, potential impacts and mitigation on surface water features during construction

Works Element	Impact	WFD Element Impacted	Construction phase mitigation	Screened in or out the assessment?	Justification for screening decision
Hardstanding	Temporary increase in the total hardstanding along the Proposed Development, associated with the temporary installation of features such as construction compounds and access tracks has potential to increase sediment laden runoff.	Biological Physico-chemical	WE2: Implementation of best practice measures outlined in the draft CoCP[8] and draft CEMP[9]. WE4: Adherence to Pollution prevention guidance. WE7: Temporary drainage and surface water management. GEN1: Production of CEMP and Code of Construction Practice.	Screened out	Provided that best practice is followed and mitigation identified as part of the Water Environment impact assessment is implemented, impacts to WFD elements arising from a temporary increase to the total hardstanding on site will not lead to a deterioration in the WFD status of screened in water bodies.
Site / vegetation clearance	Site clearance works can lead to a loss of riparian vegetation and vegetation across the wider floodplain. This can lead to a degradation in the existing habitat quality and the rate of surface water runoff into the fluvial system.	Biological Physico-chemical Hydromorphological	BD45: Watercourse buffer zone BD4: Implement measures to protect trees set out in BS 2998:2010.	Screened out	Provided that best practice is followed and mitigation is implemented, impacts to WFD elements arising from site and vegetation clearance will not lead to a deterioration in the WFD status of screened in water bodies.
Sediment management	Site work can lead to a temporary increase in the generation, disturbance and mobilisation of sediments, pollutants and contaminants. There is the potential for this material to be entrained by surface water runoff and discharged into the fluvial environment.	Biological Physico-chemical Hydromorphological	WE2: Implementation of best practice measures outlined I the draft CoCP and draft CEMP. WE4: Adherence to Pollution prevention guidance. WE7: Temporary drainage and surface water management. GEN1: Production of CEMP and Code of Construction Practice	Screened out	Provided that best practice is followed and mitigation identified in the EIA tool is implemented, impacts to WFD elements arising from a temporary increase in the generation, disturbance and mobilisation of sediments, pollutants and contaminants will not lead to a deterioration in the WFD status of screened in water bodies.
Accidental pollutant run-off to the surface water environment	Accidental leaks and spillages from vehicles accessing Site, vehicle and plant refuelling, oil and fuel storage tanks and from construction materials and chemicals storage areas could	Biological Physico-chemical	WE2: Implementation of best practice measures outlined I the draft CoCP and draft CEMP WE4: Adherence to Pollution prevention guidance	Screened out	Provided that best practice is followed and mitigation identified in the EIA tool is implemented, impacts to WFD elements arising from accidental pollutant run-off to the surface water environment will not lead to a deterioration in the WFD status of screened in water bodies.

[8] Environmental Statement. Volume 3. Appendix 2.3.
[9] Environmental Statement. Volume 3, Appendix 2.4.

Works Element	Impact	WFD Element Impacted	Construction phase mitigation	Screened in or out the assessment?	Justification for screening decision
	result in polluted run-off migrating to surface water.		WE5: Safe storage of fuel and oil on site, and measures to minimise leaks and drips WE6: Concrete washout procedure WE7: Temporary drainage and surface water management WE9: Safe storage of chemicals and hazardous substances GEN1: Production of CEMP and Code of Construction Practice		
Material Storage	Potential for stored material to be entrained and mobilised by surface water flows into the fluvial environment.	Biological Physico-chemical Hydromorphological	WE2: Implementation of best practice measures outlined in the draft CoCP and draft CEMP WE4: Adherence to pollution prevention guidance WE7: Temporary drainage and surface water management GEN1: Production of CEMP and Code of Construction Practice	Screened out	Provided that best practice is followed and mitigation identified in the EIA tool is implemented, impacts to WFD elements arising from a temporary increase in the generation, disturbance and mobilisation of sediments, pollutants and contaminants will not lead to a deterioration in the WFD status of screened in water bodies.
Dewatering	Channel dewatering will likely be required to facilitate the installation of each of the box culverts. This could lead to a reduction or disruption in flow conveyance to downstream reaches. This could lead to an alteration in the sediment transport regime, resulting in fine sediment accumulation.	Biological Physico-chemical Hydromorphological	None required	Screened out	The ditches which will be culverted are ephemeral, but is assumed will convey water after rain events. Should any water be present in the ditches during the installation of the culverts, this will be over-pumped to maintain downstream flows and minimise sediment disturbance. Impacts to WFD elements arising from a temporary increase in the generation, disturbance and mobilisation of sediments, pollutants and contaminants will not lead to a deterioration in the WFD status of screened in water bodies. impacts to WFD elements arising from temporary dewatering on site will not lead to a deterioration in the WFD status of screened in water bodies.

Works Element	Impact	WFD Element Impacted	Construction phase mitigation	Screened in or out the assessment?	Justification for screening decision
Temporary clear span bridge during construction	There will be a need for a haul road along the route to cross the two River Granta crossings and Hobson's Brook using some form of temporary crossing. Installation of a temporary bridge to facilitate the movement of plant machinery across the site could disrupt fluvial and overland flow dynamics, and impact the existing condition of the riparian zone and riverbanks.	Biological Hydromorphology	WE1: Temporary Bridge Design	Screened out	Provided that best practice is followed and mitigation identified in the ES is implemented, impacts to WFD elements arising from the installation of a temporary clear span bridge will not result in a deterioration in the status of screened in WFD water bodies.

Table A8.3.10 Works elements, potential impacts and mitigation on groundwater features during construction

Works Element	Impact	WFD Element Impacted	Construction phase mitigation	Screened in or out the assessment?	Justification for screening decision
Excavation	Deep excavations and piling could disrupt flows to ground water. There is also the risk of groundwater contamination from pollutants and fine sediment mobilised during the construction phase.	Biological Physico-chemical Chemical (GW)	WE4: Adherence to pollution prevention guidance	Screened out	The deepest cuttings required are between Haverhill Road and Hinton Way (Chainage 3170.00 to 3410.00) with approximately 3m of cutting required (from 39 to 36m AOD). Preliminary ground investigations did not encounter groundwater despite drilling to depths of 10.95m bgl , therefore no impact on the chalk groundwater table (a high value receptor) is likely from the Proposed Development. Deep foundations that affect groundwater flows are limited to the piles for the two River Granta bridges and the Hobson's Brook bridge. These will all be bored piles that will allow for any groundwater to flow past them. None of the foundations will form a continuous barrier that could constrain or divert groundwater flows. Provided that best practice is followed and mitigation identified in the ES is implemented, impacts to WFD elements arising from temporary excavation works will not result in a deterioration in the status of screened in WFD water bodies.

Table A8.3.11 Works elements, potential impacts and mitigation on surface water features during operation

Works Element	Impact	WFD Element Impacted	Mitigation	Screened in or out the assessment?	Justification for screening decision
Culvert	Installation of a culvert in an existing stretch of open channel will restrict and disrupt the flow conveyance to downstream reaches due to variation in culvert capacity compared to the channel. As such, flow dynamics in the channel would be modified, leading to further potential risks such as bank erosion, bed scour downstream and siltation upstream. The culvert may result in the permanent loss of water vole habitat. The addition of the culvert to the ditch has the potential to cause isolation of the high water vole population and habitat fragmentation.	Biological Hydromorphological	BD38: Appropriate design of culverts and outfalls to protect aquatic habitats / species BD23: Box culvert with mammal ledge	Screened in	The introduction of a culvert across any length of watercourse is categorised as a risk to WFD objectives as per the risk screening threshold for rivers. As such there is a risk that the introduction of culverts to screened in water bodies will result in a deterioration in the status of these water bodies. Therefore, this permanent activity will be screened into further assessment.
Attenuation ponds and associated outfall structures	Precast outfall structures will be installed to facilitate the conveyance of surface water runoff from the 7 proposed attenuation ponds into the Hobson's Brook, Unnamed Tributary of the Granta 4 and the River Granta. These structures have the potential to disturb bankside habitat permanently and change the quantity and dynamics of flow. There is also the potential for pollutants associated with the vehicles using the busway to enter the watercourse through new outfalls which could decrease water quality and cause degradation of habitat quality.	Biological Physico-chemical Hydromorphological	None proposed	Screened out	The introduction of an outfall is categorised as a low risk or localised risk, depending on if the outfall is covered by the flood defence consenting low risk checklist, as per the risk screening threshold for rivers. As such, impacts arising from the introduction of outfalls will not result in a deterioration in the status of screened in WFD water bodies. The installation of the attenuation ponds and the associated conveyance channels is part of a SuDS drainage network designed to ensure: • Surface Water drainage is managed as close to the source as possible and to maintain ground conditions • Provide at source pollution control • Limit discharge rates to greenfield run-off rates to protect downstream watercourses • Attenuate run-off up to the critical rainfall event and to minimise flooding for the exceedance rainfall event. The drainage design includes the use of filter drains, conveyance swales and attenuation ponds which will help to remove any pollution before the water enters the river. The busway is expected to take only light usage compared to a traditional road so there is a relatively low risk of pollution from runoff. The runoff through these drainage systems is expected to be small and so is unlikely to cause and changes to flow volume and quantity within the River Granta. As such, the installation of the attenuation ponds and associated outfall structures will provide a number of wider environmental, pollution and flood risk benefits for the Proposed Development. Please refer to Chapter 2 of the ES Main Report (Volume 2) for more information.

Works Element	Impact	WFD Element Impacted	Mitigation	Screened in or out the assessment?	Justification for screening decision
Earth embankment	The introduction of an earth embankments to support the new bridge has the potential to disrupt existing overland flow routes on the floodplain during out of bank flow events. This may also result in a deterioration in the existing riparian habitat, and accelerate flow velocities through proposed watercourse crossing locations, increasing the risk of bed and bank erosion.	Biological Hydromorphological	None required	Screened out	The earth embankments associated with the segregated bridges are all set back from the riparian corridor so disturbance to the riparian zone will be minimal. All structures to be introduced on watercourses have been oversized, and as such the conveyance route of surface water flows will not be impacted by the new structures. The existing quantity and dynamics of flow will not be interrupted.
Bridge pier	The introduction of eight bridge piers associated with Structure 6 has the potential to disturb existing riparian habitat permanently change the quantity and dynamics of flow	Biological Hydromorphological	None required	Screened out	The piers will be located on the floodplain and away from the tops of the riverbank. Disturbance to the riparian zone will be minimal. The bridge opening of Structure 6 has been oversized, and as such the conveyance route of surface water flows will not be impacted by the new structure. The existing quantity and dynamics of flow will not be interrupted. The introduction of a bridge and its associated structures is categorised as a low risk or localised risk, depending on if the outfall is covered by the flood defence consenting low risk checklist, as per the risk screening threshold for rivers. Impacts arising from the introduction of outfalls will not result in a deterioration in the status of screened in WFD water bodies.

Table A8.3.12 Summary of WFD water body screening assessment

Water body Name	Water body ID	Justification
Hobson's Brook	GB105033037620	The Proposed Development is located within and upstream of the Hobson's Brook water body. There are proposals for culverts for the minor field ditch drains, and a bridge structure over Hobson's Brook. The introduction of four new structures on the watercourses within this WFD water body have the potential to have a detrimental cumulative impact on hydromorphological quality elements in the Hobson' Brook. Whilst it is acknowledged that the structures associated with the field ditches (structures 1 to 2) are not directly on the Hobson's Brook, there is the potential for impacts associated with the installation of the culverts to propagate downstream and impact Hobson's Brook. The cumulation of negative impacts on the quality elements of this water body have the potential to prevent the water body from achieving Good ecological status in the future. As detailed in the EA low risk register, the introduction of culverts in a water body could pose a risk to the delivery of WFD objectives (designated red). Bridges or crossings introduces a risk of local and cumulative impacts to the condition of the WFD quality elements (designated amber). As there are four structures to be introduced within this water body, there is the risk of the cumulative impacts to stack, yielding a more significant combined impact. Therefore, the potential risk associated with the installation of the four crossings will need to be considered and appropriately mitigated where necessary to avoid a deterioration of the status of the WFD water body. The scope of impacts that could arise from both the temporary and permanent works associated with these four structures will need to be considered at the scoping stage of this assessment. Therefore, the culverts on Unnamed Watercourse 11 and 21, in the Hobson's Brook water body, will be screened in for further assessment.

Water body Name	Water body ID	Justification
Cam and Ely Ouse Chalk	GB40501G400500	The Proposed Development is located across the Cam and Ely Ouse Chalk groundwater body. Proposals for piling and excavation associated with the installation of structures across the extent of the Proposed Development have the potential to directly and indirectly impact the quantitative and chemical status of this groundwater body. The presence of a number of protected areas associated with this groundwater body, negative impacts on the quantitative and chemical status of this groundwater body have the potential to prevent the water body from achieving Good overall status in the future. Based on the geology and hydrogeology of Nine Wells and the Site boundary not extending into the LGS nor onto the Zig Zag Chalk or Tottenhoe Stone in the vicinity of the LGS, no impact is expected as a consequence of construction or operation of the Proposed Development. As a conservative measure and due to the proximity of the temporary compound adjacent to the Nine Wells LGS, potential impacts have been assessed during construction only. Temporary and permanent activities listed in the EA low risk register do not pose a direct risk to the status of the Cam and Ely Ouse Chalk groundwater body. Potential impacts associated with excavation and piling activities have sufficient mitigation associated with them to reduce the risk of impacts to the quantitative and chemical status of this groundwater body. Potential indirect risks associated with pollution and sediment release into the groundwater environment have been sufficiently mitigated against with measures detailed in Table A8.11. Activities that have the potential to impact the groundwater body quality elements are small scale relative to the size of the groundwater body within the study area, and activities will take place over a short duration of the potential impacts. Therefore, provided the mitigation outlined in the ES are adhered to, the potential risk associated with the Proposed Development has been sufficiently mitigated against and as such the Cam and Ely Ouse Chalk is scoped out of further assessment.
Granta	GB105033037810	The Proposed Development is located within Granta water body. There are proposals for the installation of two bridges / viaducts over the River Granta, and two culverts on field drains that discharges into the River Granta. The introduction of four new structures on watercourses within this WFD water body have the potential to have a detrimental cumulative impact on hydromorphological quality elements in the Granta Water Body. The introduction of a new structures on the watercourses within this WFD water body have the potential to have a detrimental cumulative impact on hydromorphological quality elements in the River Granta. Whilst it is acknowledged that the structure associated with the field ditch is not directly on the River Granta, there is the potential for impacts associated with the installation of the culvert to propagate downstream and impact the River Granta. The confluence of this field drain and the River Granta is situated approximately 400 m downstream of the proposed position of the culvert, and as such is in close proximity. The cumulation of negative impacts on the quality elements of this water body have the potential to prevent the water body from achieving Good ecological status in the future. As detailed in the EA low risk register, the introduction of culverts in a water body could pose a risk to the delivery of WFD objectives (designated red). Bridges or crossings introduces a risk of local and cumulative impacts to the condition of the WFD quality elements (designated amber). As there are two structures to be introduced within this water body, there is the risk of the cumulative impacts to stack, yielding a more significant combined impact. Therefore, the potential risk associated with the Proposed Development will need to be considered and appropriately mitigated where necessary to avoid a deterioration of the status of the WFD water body. The scope of impacts that could arise from both the temporary and permanent works associated with this culvert will need to be considered at the scoping stage of this assessment. Therefore, the culvert on Unnamed trib of River Granta 4 in the Granta water body will be screened in for further assessment .

Scoping assessment

8.3.56 Waterbodies where culverts are proposed are screened into further assessment to identify the potential effects in respect of WFD compliance. A scoping assessment has been undertaken to determine the WFD elements at risk (and therefore those that will be assessed) and the relevant waterbodies that could be impacted. The findings are presented in Table A8.13.

8.3.57 The physio-chemical, specific pollutants and all chemical elements will be scoped out of this assessment as any impacts on these elements will be over the short term and will be reversible (maximum of a number of days) during construction and are not expected to impact on a water body scale.

8.3.58 The biological elements (fish, invertebrates and macrophytes and phytobenthos), hydromorphological supporting elements and hydrological regime are scoped in unless the water body is not assessed for a given element or conditions in the water feature are not suitable to support that element.

8.3.59 Elements that will be assessed are documented in Table A8.13 along with the current (2019) status of each of these elements on these waterbodies.

Table A8.3.13 Scoping outcome and current element status

WFD Water body	Watercourse ID	Structure Type	Structure ID	Baseline Character	WFD Fish classification	WFD Invertebrate Classification	WFD Macrophyte Classification	WFD Hydrological Regime	WFD Hydromorphological Supporting Elements
Hobson's Brook (GB105033037620)	Unnamed Watercourse 11	Culvert	Structure 1, Structure 2, Structure 3 (all part of the same culvert structure)	Characterised as a wet ditch. Classified as in Poor Condition as per the ditch assessment detailed in the BNG assessment. No photographs of the channel were provided as part of this assessment.	N / A	Good	Good	Does not support good	Supports good
	Unnamed Watercourse 21	Culvert	Structure 5	Characterised as dry, however it was noted that the channel was recorded with water in the past. The assessment suggested that drought conditions may have influenced the condition. Classified as in Poor Condition as per the ditch assessment detailed in the BNG assessment. No photographs of the channel were provided as part of this assessment.					
Granta (GB105033037810)	Unnamed trib of River Granta 4	Culvert	Structure 7	Characterised as choked by common reed within the range of 50-100% of the channel. Classified as in Poor Condition as per the ditch assessment detailed in the BNG assessment. No photographs of the channel were provided as part of this assessment.	Good	High	Moderate	Does not support good	Supports good

Impact assessment

8.3.60 The Granta (GB10503307810) and Hobson's Brook (GB105033037620) surface water bodies have the potential to be impacted by the Proposed Development. An impact assessment has been undertaken on each of these water bodies for the culverts and the findings are in Table A8.14

8.3.61 The Proposed Development has the potential to impact Biology and Hydromorphology quality elements through impacts on local water vole populations, loss of riparian vegetation, disruption to existing flow dynamics and impacts to riverbed substrate. However the Proposed Development design already contains mitigation measure for these culverts and as a result assuming this mitigation is put in place and the implementation of good practice is undertake, no deterioration in Ecological status is anticipated in any of these surface water bodies. They will also not prevent the WFD status objectives from being reached within the water body or other downstream water bodies.

Table A8.3.14 Impact assessment

Water body name	Watercourse ID	Assessment
Hobson's Brook	Unnamed Watercourse 11	The proposed works involve the installation of three structures on the Unnamed Watercourse 11. Structure 1 and Structure 2 cover the same pre-cast concrete culvert with a total length of 45 m, representing the western and eastern openings of the culvert respectively and Structure 3 is a separate culvert with a total length of 45 m. A combination of mitigation measures embedded within the culvert design and the characteristics of Unnamed Watercourse 11, will ensure that WFD quality elements within the Hobson's Brook WFD water body are not degraded as part of the proposed works on this watercourse. The capacity of the proposed culvert, will ensure that the conveyance of flow within the channel remains unchanged when compared to existing conditions. As such, the conveyance of flow to downstream reaches will be maintained, minimising impacts to the quantity and dynamics of flow in downstream reaches and impacts on longitudinal river continuity. It is proposed that the abutments associated with the culvert are vegetated as part of the design. This will offset any localised deterioration in the condition of the riparian zone, by promoting replacement habitat. It is proposed that the culvert invert is embedded into the riverbed, to allow for the accumulation of natural riverbed substrate within the culvert and reduce the potential for significant habitat severance and effects on fish. When considering the characteristics of the watercourse, the total length of the culvert installation is 45m for Structures 1 and 2, and 45 m for Structure 3. When compared with the overall length of the watercourse, this length is insignificant. As such, impacts will be confined to a localised area of this watercourse and are unlikely to impact the wider Hobson's Brook WFD water body that it is situated in.
River Granta	Unnamed Watercourse 21	The proposed works involve the installation of a pre-cast box culvert (Structure 5) within Unnamed Watercourse 21. Structure 5 covers a total length of 32 m. A combination of mitigation measures embedded within the culvert design and the characteristics of Unnamed Watercourse 21, will ensure that WFD quality elements within the River Granta are not degraded as part of the proposed works on this watercourse. The capacity of the proposed culvert, 4.5 m x 3 m, will ensure that the conveyance of flow within the channel remains unchanged when compared to existing conditions. As such, the conveyance of flow to downstream reaches will be maintained, minimising impacts to the quantity and dynamics of flow in downstream reaches and impacts on longitudinal river continuity. It is proposed that the abutments associated with the culvert are vegetated as part of the design. This will offset any localised deterioration in the condition of the riparian zone, by promoting replacement habitat. To protect local populations of water voles on unnamed watercourse 21, the culvert has been designed with a mammal ledge and oversized to enable water voles to travel through the structure. It is proposed that the culvert invert is embedded into the riverbed, to allow for the accumulation of natural riverbed substrate within the culvert and reduce the potential for significant habitat severance and effects on fish. When considering the characteristics of the watercourse, the total length of the culvert installation is 32m. When compared with the overall length of the watercourse, this length is insignificant. As such, impacts will be confined to a localised area of this watercourse and are unlikely to impact the wider Granta WFD water body that it is situated in.
	Unnamed trib of River Granta 4	The proposed works involve the installation of a pre-cast box culvert within the Unnamed Trib of River Granta 4. Structure 7 covers a total length of 45 m. A combination of mitigation measures embedded within the culvert design and the characteristics of the Unnamed Trib of River Granta 4, will ensure that WFD quality elements within the River Granta are not degraded as part of the proposed works on this watercourse. The capacity of the proposed culvert, 4.5 m x 3 m, will ensure that the conveyance of flow within the channel remains unchanged when compared to existing conditions. As such, the conveyance of flow to downstream reaches will be maintained, minimising impacts to the quantity and dynamics of flow in downstream reaches and impacts on longitudinal river continuity. It is proposed that the abutments associated with the culvert are vegetated as part of the design. This will offset any localised deterioration in the condition of the riparian zone, by promoting replacement habitat. To protect local populations of water voles on the Unnamed Trib of River Granta 4, the culvert has been designed with a mammal ledge and oversized to enable water voles to travel through the structure. It is proposed that the culvert invert is embedded into the riverbed, to allow for the accumulation of natural riverbed substrate within the culvert and reduce the potential for significant habitat severance and effects on fish. When considering the characteristics of the watercourse, the total length of the culvert installation is 32m. When compared with the overall length of the watercourse, this length is insignificant. As such, impacts will be confined to a localised area of this watercourse and are unlikely to impact the wider Granta WFD water body that it is situated in.

Conclusion

8.3.62 An assessment has been undertaken to consider the potential impacts of the Proposed Development on WFD Compliance. Most of the proposed types of works have been assessed as having a low risk of resulting in non-compliance with WFD legislation, and these have been screened out of the requirement for any further assessment. Culverts associated with the Proposed Development has been fully assessed.

8.3.63 Embedded mitigation in the culvert design, and best practice will ensure that hydromorhpological, phsyico-chemical and biological quality elements will not be impacted as part of the Proposed Development. The installation of culverts is to take place on small water features within the Hobson's Brook and River Granta WFD Water Bodies, and the lengths of culvert themselves are small in terms of the overall length of watercourse. As such there will not be a deterioration of the status of the surface water bodies considered as part of the scoping assessment, and the permanent works will not prevent the water bodies from achieving good status in the future.

8.3.64 Groundwater bodies have been screened out of the need for any further assessment, due to the small-scale (relative to the size of the water bodies within the study area), short duration of the potential impacts and associated mitigation measures.

8.3.65 The Proposed Development poses a very low risk to the delivery of WFD objectives and therefore the three WFD Water Bodies in the study area have been screened out of further assessment.