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Nottingham Trent Left Bank Flood Alleviation Scheme Environmental Statement

VOLUME 1

OCTOBER 2008

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NOTTINGHAM TRENT LEFT BANK FLOOD ALLEVIATION SCHEME
ENVIRONMENTAL STATEMENT

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Nottingham Trent Left Bank Flood Alleviation Scheme

Environmental Statement

Non Technical Summary

October 2008

This Non Technical Summary relates to the Environmental Statement which was compiled as part of the Environmental Impact Assessment process for the Nottingham Trent Left Bank Flood Alleviation Scheme.

Glossary

Abbreviation	Definition
CIRIA	Construction Industry Research and Information Association
cSINC	Candidate Site of Importance for Nature Conservation
Critical Infrastructure	Basic facilities and installations whose loss or compromise of would have a major impact on the well being of society. E.g. sewage works, water treatment works, electricity sub-stations.
Ha	Hectare (area of land)
LWS	Local Wildlife Site (called a SINC in Nottinghamshire)
Penstock	A valve mechanism for controlling water flows
SSSI	Site of Special Scientific Interest
SINC	Site of Importance for Nature Conservation (called a Local Wildlife Site in Derbyshire)
Steel sheet piles	A series of steel plates that are driven into the ground to provide support for a structure or restrict groundwater flows.
1% annual probability of flooding	A flood event that has a 1 in 100 chance of occurring in any given year
2% annual probability of flooding	A flood event with a 1 in 50 chance of occurring in any given year



The River Trent, Nottingham

Managing Flood Risk in Nottingham

Introduction

The Environment Agency has an important role in reducing the risk of flooding from rivers and the sea. Flooding is a natural process that can have a major effect on lives, communities, the economy and the environment. Continued development on floodplains has increased the number of people and properties at risk from flooding. We cannot prevent floods. There will always be a risk of flooding even in locations that have flood defences. However, we can prepare for them.

Our work can reduce the chance of properties flooding by managing land and river systems. This is known as 'flood risk management'. Flood risk is influenced by land use management (built environment and agricultural), river processes and climate change. We manage the risk by providing flood warning systems, restricting future development in areas at risk of flooding and maintaining and constructing flood defences.

The Nottingham Trent Left Bank Flood Alleviation Scheme (FAS) is a proposed construction scheme that will reduce the risk of flooding for 16,000 properties in Nottingham. It is a large and complex scheme covering a length of 27km alongside the River Trent. We are undertaking the work as one project to ensure a consistent approach to flood risk management. If the defences were to fail in one location then potentially the whole left bank area, to the north of the river, could be flooded. Therefore, it is essential that we treat the whole left bank as one scheme.

Due to the scale of the proposals we have split the work into four scheme areas:

- Sawley and Trent Meadows
- Attenborough, Erewash and Rylands
- Meadows and Colwick Country Park
- Colwick

This Non-Technical Summary is a summary of a more detailed report called an Environmental Statement which we have prepared and published on the Nottingham Trent Left Bank FAS. The Environmental Statement provides a technical assessment of the impacts of the scheme and is part of the planning application that will be submitting to Broxtowe Borough Council. Details of where you can obtain the full report can be found in the 'Way Forward' section, below.

The structure of the Non-Technical Summary is:-

- 1) Introduction and background to the scheme
- 2) Legislative framework
- 3) Consultation
- 4) Our proposals and general impacts
- 5) Description of the scheme including an assessment of the impact on the environment, how the impacts will be mitigated and how we will create a better place
- 6) Risks and uncertainties associated with the proposals
- 7) The way forward
- 8) Conclusion



Attenborough village – November 2000

There is a formal consultation period until 5 December 2008. However, if you comment after this date we will try to consider your comments if we can. Further information on how to make a comment to us and our contact details are given in the 'Way Forward' section, below.

Background to the Scheme

Nottingham has a well documented history of flooding, which dates back to 1795. The most serious flooding in recent times occurred in March 1947 when 28 miles of roads, 3000 properties and 86 factories in the city centre were flooded. In response to this event, flood defences were constructed in the 1950's. Following more recent flooding in the Midlands in 1998 and 2000, the Environment Agency embarked on a study of the flood risk from the River Trent. This study was finished in 2005 with the publication of the Fluvial Trent Flood Risk Management Strategy, (referred to as the Fluvial Trent Strategy).



Nottingham – March 1947



Nottingham Station – March 1947

We looked at each of the options taken forward to identify which one provided the optimum balance between economic cost, environmental impact and technical matters. Using this method, the option to raise existing defences and construct new ones where required, was identified as the preferred option. Subsequent and more detailed studies have confirmed this choice.

The Fluvial Trent Strategy identified that the defences through Nottingham were below the standard of protection currently recommended by the Department of Environment, Food and Rural Affairs and some were also in poor condition.

In the Strategy we considered eighteen general options for managing the flood risk. The options were assessed to identify which ones were technically possible, economically viable and environmentally acceptable. These included hard defences, removing obstructions and managing the effects of flooding.

A number of options were not taken forward including retreating from the river and allowing land to flood, dredging and flood storage options.



Attenborough Station – August 2000

Nottingham Trent Left Bank Flood Alleviation Scheme

The aim of the Nottingham Trent Left Bank FAS is to reduce the risk of flooding to 16,000 homes and businesses in Nottingham. We propose to do this by building new defences and raising existing defences. In Attenborough there is currently a 4% annual probability of flooding (1 in 25 chance) whilst the study area generally has a 2% annual probability of flooding (1 in 50 chance). When the works have been completed the risk of flooding will have been reduced so that there will only be a 1% annual probability of flooding (1 in 100 chance).^{1,2}

As part of the scheme, we also intend to enhance the area near the river by:

- Creating a greater variety of plant and animal habitat;
- Improving the quality of the local environment for the people who live there; and
- Increasing recreational opportunities.



Existing lake at Colwick Country Park

In April 2007 we published proposals for the Nottingham Trent Left Bank FAS and made two applications for planning permission, one to Broxtowe Borough Council and the other to Erewash Borough Council. In June 2007 we received planning permission from Erewash Borough Council. In November 2007 new information became available through the Nottingham Strategic Flood Risk Assessment. This information has improved the accuracy of our flood predictions and this has resulted in some changes to the scheme. The main differences between our current proposals compared with the proposals published in 2007 are:

- The level of the existing high ground around the end of River View at Sawley is not sufficient to provide protection against a flood with 1% annual probability of occurrence. We propose building a 0.8 metre high flood wall around the perimeter of the garden.
- Works are no longer required around Grounds Farm, Sawley.
- A flood wall will be constructed around the western side of the Siemens site in Attenborough.
- The existing flood embankment and wall along the Nottingham and Beeston Canal will be raised.
- The alignment along the Meadows has been altered to include an embankment across Wilford Grove Recreation Ground. This change has been agreed and developed with Nottingham City Council to assist with their future plans for the area.
- Works are no longer required along the Racecourse and Daleside Road near Colwick Country Park.
- The existing flood embankment south of Candle Meadow in Colwick does not need to be raised.
- The height of the walls and embankments along several sections of the scheme has altered. However, their alignment remains unchanged.

¹ Floods are characterised by their size and the frequency with which they are likely to occur. A 1% annual probability of flooding may also be expressed as a flood that has a 1 in 100 chance of occurring in any given year. If a flood occurs in one year the chance of it occurring the following year is still the same, 1 in 100.

² This standard is likely to reduce as a result of climate change.

Legislative Framework

The Environment Agency has permitted development rights for some of its works under the Town & Country Planning (General Permitted Development) Order 1995. This means we are exempt from planning permission for some types of works. If the proposed work does not fall within these powers, we have to apply for planning permission from the relevant Local Planning Authority (LPA).

The proposed Nottingham Trent Left Bank FAS includes construction work in four different Local Authority areas, see below.

Local Planning Authority	Scheme Area	Authority for Work
Erewash Borough Council	Sawley and Trent Meadows	Planning Permission (obtained July 2007) & Permitted Development
Broxtowe Borough Council	Attenborough, Erewash and Rylands	Planning Permission & Permitted Development
Nottingham City Council	Meadows and Colwick Country Park	Permitted Development
Gedling Borough Council	Colwick	Permitted Development

We have contacted all four LPAs about our proposals and we will be applying for planning permission for some of the work in Broxtowe Borough Council. Erewash Borough Council has confirmed that the planning permission obtained in 2007 is still valid for our revised proposals and no further planning application is required. The LPAs have determined that we are permitted to undertake all of the rest of the proposed work under our permitted development rights.

An Environmental Impact Assessment (EIA) is required for projects that may have a significant effect on the environment. This is an assessment of the impact of the works on the existing environment. It also identifies what action we will take to reduce the predicted impacts. This is documented in a report called an Environmental Statement (ES). The ES also provides details of the environmental enhancements to be done as part of the scheme.

At the same time as we made our planning applications to Erewash and Broxtowe Borough Councils in April 2007 we also published an ES. We have revised the document from April 2007 to produce a further ES for our current proposals. This is similar to the original document the following amendments have been made:

- Identification and assessment of the changes to our proposals;
- Identification of critical infrastructure following the recommendations of the review of the national flooding in the summer of 2007;
- Clarification of the language used to describe the assessment of the impacts.

Copies of the current ES are available from the Environment Agency from the address in the 'Way Forward' section.

Consultation to date

We have undertaken consultation at different stages of the project. The responses we have received have helped to influence our choice of option, alignment, design and appearance.

The main consultation stages were the Scoping Report and the Scheme Alignment Leaflet.

In November 2005 we published the Scoping Report. In excess of 1000 copies of the report were issued and we received over 150 responses. The majority of these expressed support for the scheme.

We followed this up in August 2006 with the Scheme Alignment Leaflet, which summarised the approach to the selection of the preferred alignment. Over 2000 copies of the leaflet were issued with over 100 responses received, mostly commenting on the alignment through Attenborough.

Given the concerns raised regarding the choice of alignment through Attenborough we undertook a review of the options for this section of the scheme and a 'Frequently Asked Questions' document was published in December 2006.

Throughout the consultation process we have held meetings with residents, interested stakeholders and Local Councils including:

- residents of The Strand, Newbery Avenue, Nottingham Road and Fraser Road;
- British Waterways;
- Cemex;
- Broxtowe Borough Council;
- Nottingham City Council;
- Natural England, Derbyshire Wildlife Trust and Nottinghamshire Wildlife Trust.

There are still a number of statutory consultation steps that we have to undertake before the works can proceed. For the work being undertaken under our permitted development powers we have to give notice of the publication of the Environmental Statement and allow all interested parties 28 days to comment on the proposals. This notice will be published at the same time that this Non-Technical Summary is issued. Further, our application for planning permission from Broxtowe Borough Council will be advertised by the Council as part of the application process. Therefore, members of the public still have an opportunity to comment on the scheme, for further information see the 'Way Forward' section below.

Description of the scheme

The scheme comprises improvements to the existing defences and constructing new defences between the M1 at Sawley and Radcliffe on Trent railway viaduct, which is a distance of some 27km. The locations of the four scheme areas are shown in Figure 1. Our works will include:

- raising existing flood defence walls and embankments;
- building new flood defence walls and embankments;
- raising a number of roads and footpaths;
- refurbishing or replacing some floodgates associated with the canals;
- installing a number of new pumping stations;
- installing steel sheet piles below ground to reduce the amount of water flowing under the ground during a flood; and
- improving the local surface water drainage systems.

More information on the consultation process is provided on our website

www.nottinghamflooddefence.co.uk



The proposed start date for construction is May 2009. However, this is subject to planning approval and other consents. An indicative construction programme is detailed in the 'Way Forward' section. The anticipated duration and order of the works may change as a result of restrictions on access or the working methods, or to use materials more efficiently.

The scheme will have a significant beneficial impact on the population of Nottingham by reducing the annual risk of flooding. However, there will be some adverse impacts during construction including disturbance to humans and wildlife. We will mitigate these impacts during the works and reinstate affected areas. In Attenborough we intend to start creating new habitats in and around the Attenborough SSSI in early 2009. This work has recently been granted planning permission from Broxtowe Borough Council.

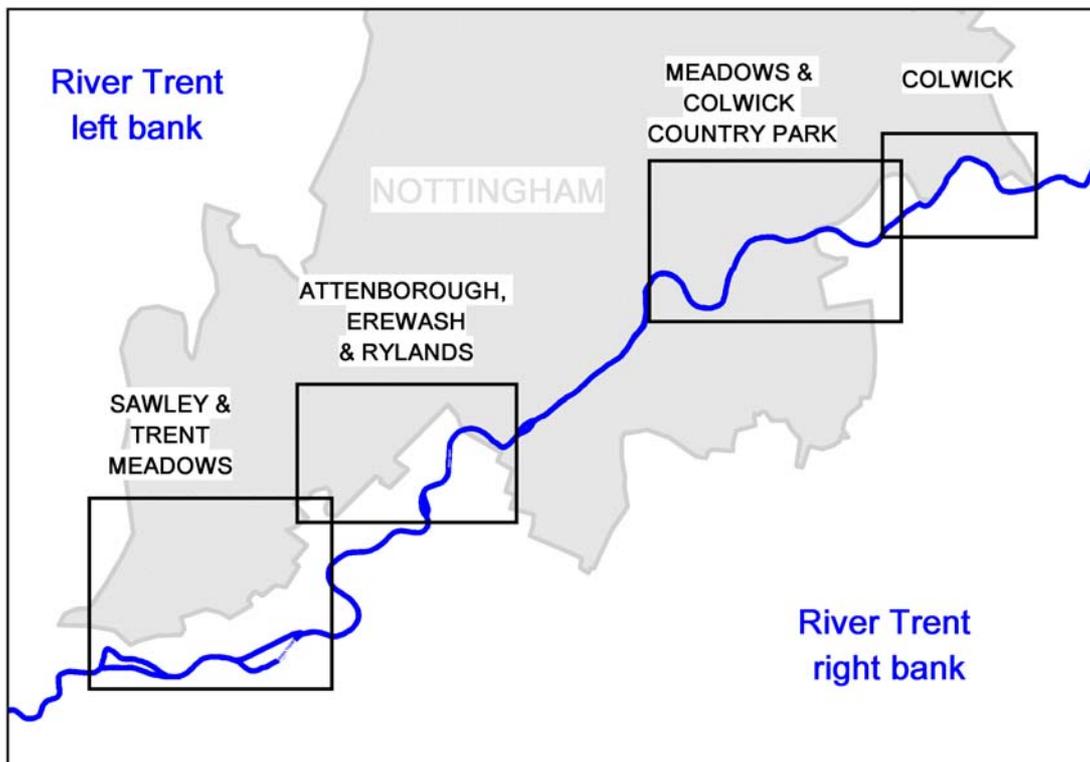


The existing wall at Victoria Embankment, Meadows, is to be replaced



The existing embankment at Trent Meadows is to be raised

Figure 1: Location plan of Nottingham Trent Left Bank FAS



General impacts and proposed mitigation

There will be general impacts that arise from construction work including:

	Likely Impact	Proposed Mitigation
Human Beings	Major beneficial outcome for the people of Nottingham through a reduction in flood risk.	Not applicable.
	Increased flood risk to some village communities outside the scheme area during flood events where the annual probability of flooding is greater than 2%.	We have made best use of the natural floodplain where possible to minimise the impact. Separate schemes are on-going to mitigate the increased risk of flooding to local villages.
	Temporary disturbance during construction to local communities and businesses, agricultural land, from combination of noise, visual intrusion, on site activity and restrictions such as closure of roads, pedestrian accesses and impacts on sensitive sites e.g schools and local festivals.	A Public Liaison Officer will be appointed during construction and works will be timed to avoid important local events. Footpath and road closures will be sign-posted and diversions set up.
	Disturbance to residents where we are working on the edge of or within the property boundary in particular, Nottingham Road, Newbery Avenue, The Strand and Fraser Road.	Working areas within private properties will be minimised. Liaison carried out with affected properties before and during construction. Gardens will be fully reinstated.
Flora & Fauna	Site clearance will result in loss of habitat for bats and birds.	All habitats in temporary working areas will be reinstated. Bird and bat boxes will be erected. We will clear vegetation outside of the bird nesting season.
	Loss of hedgerows, vegetation and trees. It is predicted that approximately 196 trees will be lost and a further 116 groups of trees will be partially lost due to their proximity to the works.	Tree removal will be minimised through protective barriers and planning of access and working areas. Replacement planting will be undertaken. Monitoring of tree health following completion of works, notably along Victoria Embankment will be carried out.
Visual Effects	New flood defence walls will change the way the area looks.	Walls will be clad in materials that are typical for the local area. Landscaping and planting will reduce the height and screen the walls.
	New or raised embankments will change the way the area looks.	Embankments will be landscaped and the slopes re-seeded.
Noise	There will be a localised increase in noise as a result of construction activities. The 519 properties/businesses within 50m of the works will be the most significantly affected. 476 of these are residential.	Regular liaison with affected communities and good site management practices will reduce the impact of increased noise.
	Steel sheet piling activities during construction will have associated noise and vibration impacts.	Piling techniques with reduced vibration will be employed in sensitive areas and vibration levels will be monitored throughout the works.
Soils	Compaction of soil due to construction activities.	Affected areas will be restored following completion of the works.
	Sheet piling works to prevent flooding from ground water may adversely affect ground water flows under normal conditions.	Sheet piling is designed to reduce water flowing through the ground, not completely prevent it. Monitoring will be undertaken for 5 years.
Traffic & Transport	Access routes will experience increased traffic as a result of site vehicle movements.	A detailed traffic management plan will be developed during detailed design and agreed with the County Councils. Road closures will be advertised and diversions set up.
	Road and lane closures will increase journey times.	
Air	Construction activities may generate dust.	CIRIA Guidelines for good environmental practice on site will be adhered to.

	Likely Impact	Proposed Mitigation
Cultural Heritage and Archaeology	Potential for construction work to disturb archaeological remains.	A mitigation plan will be agreed with the local authority archaeological officers and English Heritage. Working areas adjacent to sensitive locations will be restricted and excavations monitored, where necessary.
Water	Possible pollution of watercourses and water bodies due to pollution from construction activities.	Environment Agency Guidelines for good environmental practice on site will be adhered to.
Land Use	The defence crosses gardens, allotments, businesses, recreation areas and agricultural land. Working areas will restrict land use in short term.	We will work closely with landowners to minimise disruption to current land use. All temporary works areas will be re-instated.

Environmental Action Plan

The Environmental Statement that we have prepared for the scheme includes an Environmental Action Plan. This contains details of all the predicted impacts of the work and the actions that will be undertaken to reduce the impacts. This allows the Environment Agency to communicate the proposed mitigation, identify who is responsible for it and monitor its implementation.

The following sections detail the proposals in each of the four scheme areas, the likely impacts of the works and our proposed mitigation measures.



Aerial view of Victoria Embankment

Sawley and Trent Meadows

The existing environment of the scheme area

The Sawley and Trent Meadows section runs from the M1 at Sawley to the point where the River Erewash meets with the River Trent, see Figure 2. There are existing flood defences in the area but 7323 properties are still at risk of flooding in an event with a 1% probability of occurring in any given year.

The main urban communities in this area are Sawley and Long Eaton. There are 640 properties within 200m of the proposed works, including two churches (Sawley Baptist Church and Sawley All Saints Church). Important local recreational interests include walking, angling, boating and golf. Land use at Sawley is mainly agricultural yet downstream at Trent Meadows there is a mixture of agricultural, recreational, residential and former industrial areas. The open fields to the south of the existing flood defences and main railway line are designated as Green Belt in Erewash Borough Council's Local Plan. There is a Scheduled Monument in the open area between Sawley and Trent Meadows, and the area is surrounded by a number of features of archaeological interest. Old Sawley village is designated as a Conservation Area and contains a number of listed buildings. There are twenty nine Local Wildlife Sites within 2km of the scheme. However, only seven have the potential to be affected by our works.

The proposals

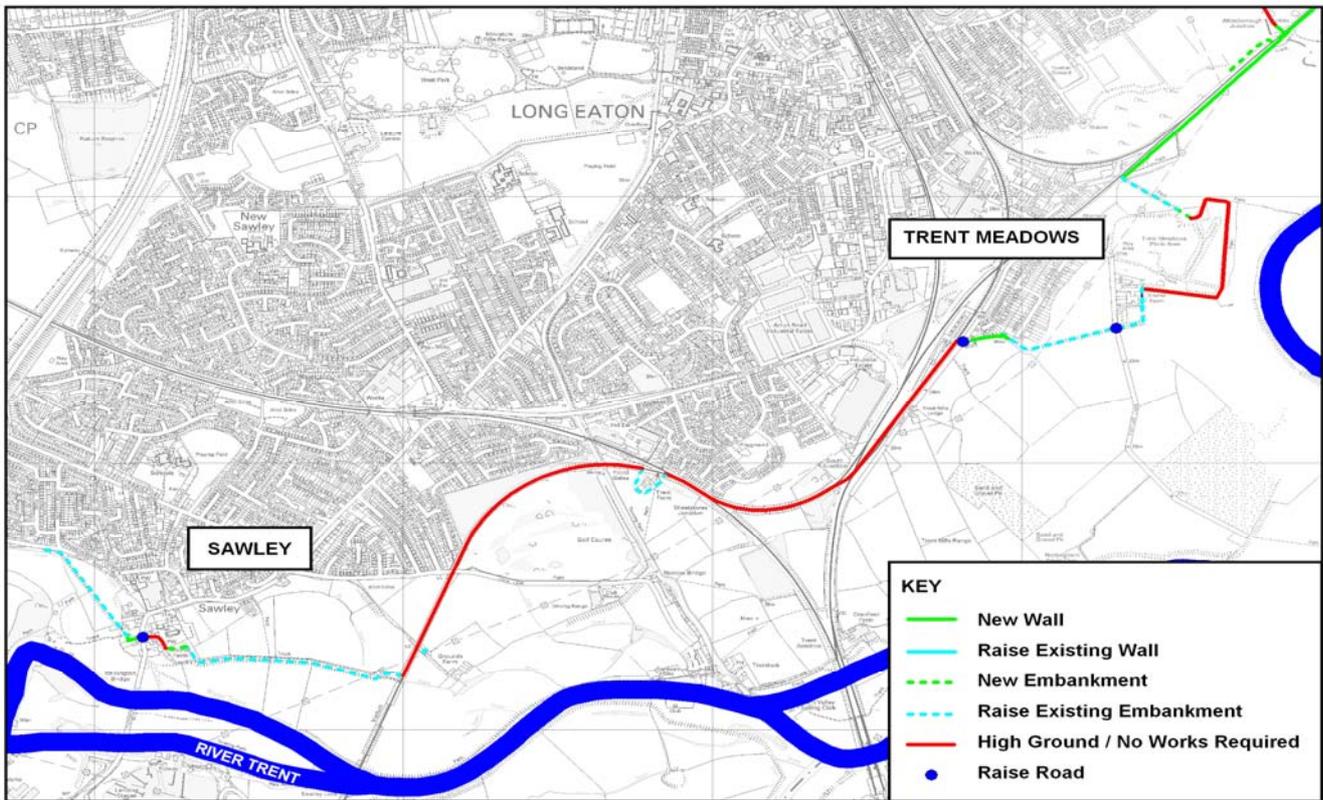
The proposed works for the Sawley and Trent Meadows include:

- raising 2300 metres of existing embankment, mainly through open fields;
- constructing 975 metres of new walls through Sawley village, Newbery Avenue, and parallel to the railway near the Trent Meadows potential LWS; constructing 650 metres of new embankments;
- raising Tamworth Road, Trent Lane and Pasture Lane; and
- replacing Sheetstores floodgates on the Erewash Canal.



Aerial View of Sawley

Figure 2: Sawley and Trent Meadows Scheme Area



Impacts

There will be a moderate adverse impact on local properties and businesses as a result of construction activities. There are 44 properties within 50 metres of the works which will be affected by noise and vehicle movements. This includes properties on Newbery Avenue, Tamworth Road and a single property on River View which will be directly affected by the scheme. This impact will be mitigated by sensitive design and the gardens will be fully reinstated when the works are completed. There will also be minor impacts on local farming and sensitive sites, such as the churches and Meadow Lane allotments. The Erewash canal moorings and users will be affected as the canal will be closed during the winter and access will be restricted to a number of Public Rights of Way.

Tamworth Road (B6540), Trent Lane and Pasture Lane will be affected as a result of road raising and construction operations. Tamworth Road will need to be completely closed for a short period and this will have a major adverse impact on road users. It will also affect local businesses. A diversion will be put in place for the duration of the road closure. Other roads will experience increased traffic as a result of site vehicle movements. However, because the impacts are linked to the construction phase these impacts will all be short term.

The defences pass through mainly agricultural land with little variety of plants and wildlife. However, there are LWSs likely to be affected by the scheme. Lock Lane, Trent Meadows, Attenborough Junction Tip and Erewash Canal LWSs will all experience minor adverse impacts and site clearance will cause some loss of habitat for bats and birds. More significantly at Barton Pool LWS there will be a permanent loss of woodland habitat. However, through replanting and active management we will restore the site and reduce the significance of the long term impact.

At Newbery Avenue there will be a significant change to the character of the private gardens where the existing flood embankment is to be replaced with a flood wall. New flood defence walls and embankments will also have a visual impact, for instance at Old Sawley village and Trent Meadows potential LWS.

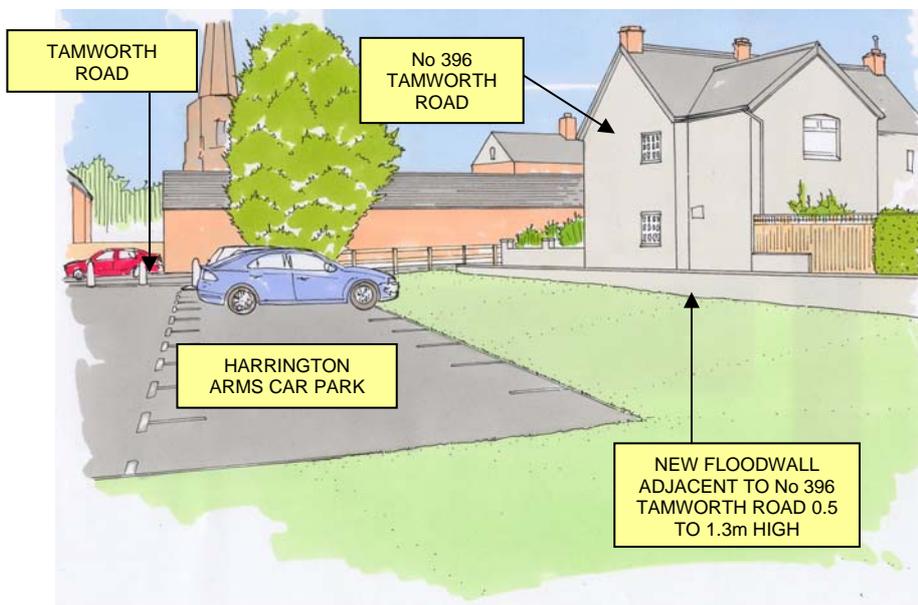
Proposed mitigation

Human Beings	<p>Liaise with residents at Newbery Avenue, Owen Avenue, Tamworth Road, River View, local businesses including the Harrington Arms Public House and churches.</p> <p>Notification of restricted parking at Harrington Arms Public House.</p> <p>Minimise working areas in private properties.</p> <p>Full reinstatement of gardens.</p> <p>Provide alternative canal moorings and widely publicise the canal closure.</p> <p>Clearly sign temporary diversions of Public Rights of Way.</p>
Flora & Fauna	<p>Agree method statement with Derbyshire Wildlife Trust and landowners to reduce impacts. This will include re-instatement measures and compensatory habitat creation/restoration and management activities including tree management and de-silting of pond at Barton Pool.</p> <p>Areas of cleared vegetation will be replaced and supplementary planting will provide additional habitat in the medium to long term.</p>
Cultural	<p>A detailed mitigation strategy is to be agreed with English Heritage and County archaeological officer.</p>
Noise	<p>Machines to be positioned as far away from residential properties as possible and screened to reduce noise.</p> <p>Vibration will be minimised by using the smallest machinery practical adjacent to residential properties.</p>
Traffic and Transport	<p>Avoid using Tenter Close access to Trent Farm during school holidays.</p> <p>Install additional signage along Meadow Lane near to Trent Meadows picnic area car park to ensure access for wide/heavy loads.</p> <p>Timing of closure of Tamworth Road to be restricted to school holidays and weekends if possible.</p>
Land Use	<p>Regular liaison with landowners and tenants. Full re-instatement of agricultural land.</p>

Enhancements

There are a number of opportunities to improve the area including:

- upgrading existing footpaths and creating new footpaths along the flood embankment;
- local habitat enhancement including removing Japanese Knotweed at Lock Lane Nature Reserve;
- provision of additional seating in Trent Meadows Picnic Area;
- enhancements to Sawley Carr LWS; and
- installation of information boards at areas of nature or archaeological interest.



Visualisation of the new flood by the Harrington Arms Public House

Attenborough, Erewash and Rylands

The existing environment of the scheme area

The Attenborough, Erewash and Rylands scheme goes from where the River Erewash joins the River Trent to the Boots complex in Beeston, see Figure 3. There are only isolated sections of defence along the left bank of the River Erewash and currently no defences in Attenborough. As a consequence 3191 properties and businesses are at risk of flooding in an event with a 1% probability of occurring in any given year.

This section includes the village of Attenborough, the Long Lane residential area of Beeston, Attenborough Gravel Pits Nature Reserve and Site of Special Scientific Interest (Attenborough SSSI) and the Cemex site.

The Attenborough SSSI extends for some 220 hectares and comprises a number of lakes that were created as a result of gravel extraction. It provides a valuable habitat for over-wintering waterfowl and sustains an important breeding bird community. The main Derby to Nottingham railway line runs along the western side of the area. The proposed work is along the boundary of the Attenborough SSSI, the railway line and Attenborough village.

The centre of Attenborough village is designated as a Conservation Area. It derives its character from the older cottages, narrow lanes, and the maturity, density and variety of the vegetation. On its eastern side, the local village green provides an important local recreation and social resource. Alongside the village green runs The Strand which is the access road to the properties overlooking the green. A valuable hedgerow is located between The Strand and the village green.

Rylands is downstream of Attenborough and includes a residential area, a large industrial complex, allotments, a mobile home complex, the Nottingham and Beeston Canal and a large recreation ground adjacent to the river.

The proposals

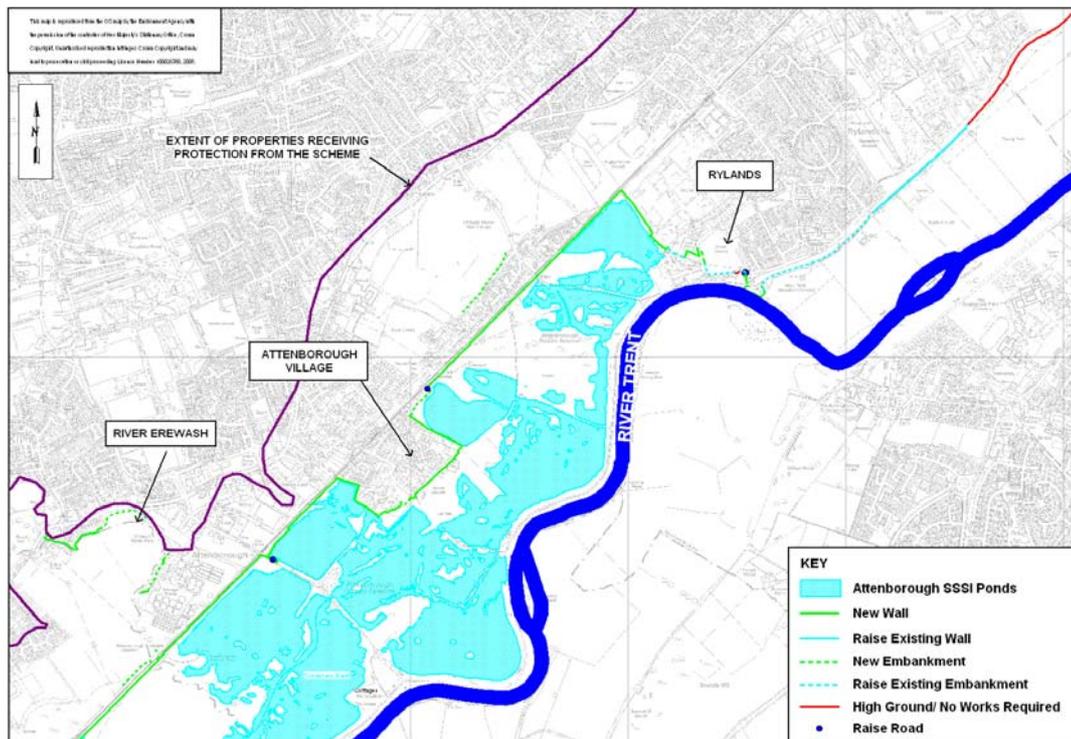
The proposed works for Attenborough, Erewash and Rylands include:

- constructing 4780 metres of new walls through Attenborough SSSI, Attenborough village and the gardens of properties on Nottingham Road;
- raising 650 metres of existing flood wall;
- constructing 1100 metres of new embankment along the River Erewash and within Attenborough village;
- raising 935 metres of existing flood embankment;
- 2750 metres of underground piling through Attenborough SSSI and Attenborough village.
- local road raising to Barton Lane, The Strand and Riverside Road;
- drainage improvements and a new pumping station along The Strand; and
- replacing Beeston Lock gates.



Aerial photo of Attenborough

Figure 3: Attenborough, Rylands & Erewash Scheme Area



Impacts

During the works there will be a moderate impact on local people including noise, reduced pedestrian and vehicle access and loss of recreational areas as a result of the construction activities.

There will be further general impacts on the 288 properties within 50 metres of the work including those on:

- The Strand, Church Lane, Adenburgh Drive, St Mary's Close, Long Lane and Meadow Lane in Attenborough Village;
- Riverside Road, Canal Side, Cornwall Avenue and the Beeston Marina and Mobile Home Complex in Rylands; and
- Nottingham Road facing the River Erewash.

All properties that are directly affected by the works will have their gardens fully reinstated.

At The Strand the existing hedgerow is to be replaced with a wall and this will adversely affect the landscape character of the area. However, this impact will be reduced by cladding the wall in material in keeping with the local area and replanting the hedgerow. The planting will help to reduce the visual impact of the wall and to mitigate this impact further we are proposing to raise the level of the road. In order to undertake this work there will be restricted use of the village green for approximately ten months.

Several Public Rights of Way will be temporarily diverted including two bridleways. The Nottingham and Beeston Canal will also have to be closed during the works. A full road closure will be required along Riverside Road and Barton Lane will need a single lane closure. There will also be a temporary road closure along The Strand. Diversions will be put in place and access to properties maintained during the closures.

At Attenborough SSSI we have selected the option that we believe will minimise the damage to the SSSI and maximise the amount of floodplain storage. However, the improvements will result in a permanent loss of 1.68ha of land including the loss of wet woodland in this area. There will also be a temporary impact on another 5ha of the site including some loss of trees, woodland and hedgerows. We intend to reduce these impacts through carefully planned mitigation including habitat creation and re-planting.

The clearance work will also have a short-term minor effect on local wildlife habitats including for example, bird and bat habitat. In addition, there will be general construction impacts during this phase of the scheme. However, there will be no long-term impact once the replacement planting has completely re-established.

Proposed mitigation

Human Beings	<p>Carry out works to Beeston Lock gates during low season (October to January). Minimise working areas within private properties. Screen works from residential properties where possible. Reinstate all gardens affected by the work. Agree suitable access arrangements with Attenborough Preparatory School. Minimise construction activity during annual village fete, biennial flower festival and Christmas Bazaar. Liaise with Rylands allotment holders.</p>
Flora & Fauna	<p>We have undertaken extensive consultation with Natural England and Nottinghamshire Wildlife Trust to consider the options available and develop a package of mitigation and compensation measures for the impact at Attenborough SSSI. This will include:</p> <ul style="list-style-type: none"> • landscaping works to some of the lakes within the working area and in-filling other parts to create valuable marginal habitat; • landscaping to existing small islands to improve diversity; • structures to control water levels in the lakes; • vegetation clearance outside of bird breeding season; • reinstatement of vegetation in the working areas; • restoration work on The Brook, adjacent to Attenborough village green; • the appointment of an Ecological Clerk of Works during construction. <p>A detailed mitigation method statement is to be agreed with Natural England, Nottingham Wildlife Trust and Cemex. We are committed to creating a minimum 9.8ha of habitat to mitigate the impact on the SSSI.</p>
Noise and Vibration	<p>Surveys of all properties within 200m of sheet piling that are considered at risk will be carried out. Continuous vibration monitoring during steel sheet piling. Locate machinery as far away from properties as possible and screen to reduce noise impact.</p>
Landscape and Visual	<p>Appropriate landscape enhancement will be agreed with the local community and the Conservation Officers to further minimise the impact. Minimise impact on mature trees through protective fencing. Locate compound areas and storage sites away from sensitive residential receptors. Raising the road along The Strand.</p>



Visual representation of the new wall along The Strand, with the newly planted hedge re-established.



Visual representation of the new wall, viewed from the cricket pitch.

Enhancements

A number of enhancements opportunities have been identified in the Attenborough, Erewash and Rylands scheme area including:

- introduce new and upgrade existing footpaths along the defence for multi-users;
- improve amenities in Attenborough village;
- installation of bird and bat boxes in Attenborough SSSI.

As well as the above enhancements planned within the scheme area, there are proposals for additional biodiversity improvements off-site within the River Trent floodplain with the creation of habitat at Holme Pitt SSSI.



Attenborough SSSI with the adjacent railway

Meadows and Colwick Country Park

The existing environment of the scheme area

The Meadows through to Colwick Country Park scheme area runs from Wilford Toll Bridge to Candle Meadow housing estate in Colwick, see Figure 4. This section is close to the centre of Nottingham and comprises residential, industrial, commercial and recreational land uses. There are existing flood defences through the area, which are principally walls that link into areas of high ground but 4524 properties are still at risk of flooding in an event with a 1% probability of occurring in any given year.

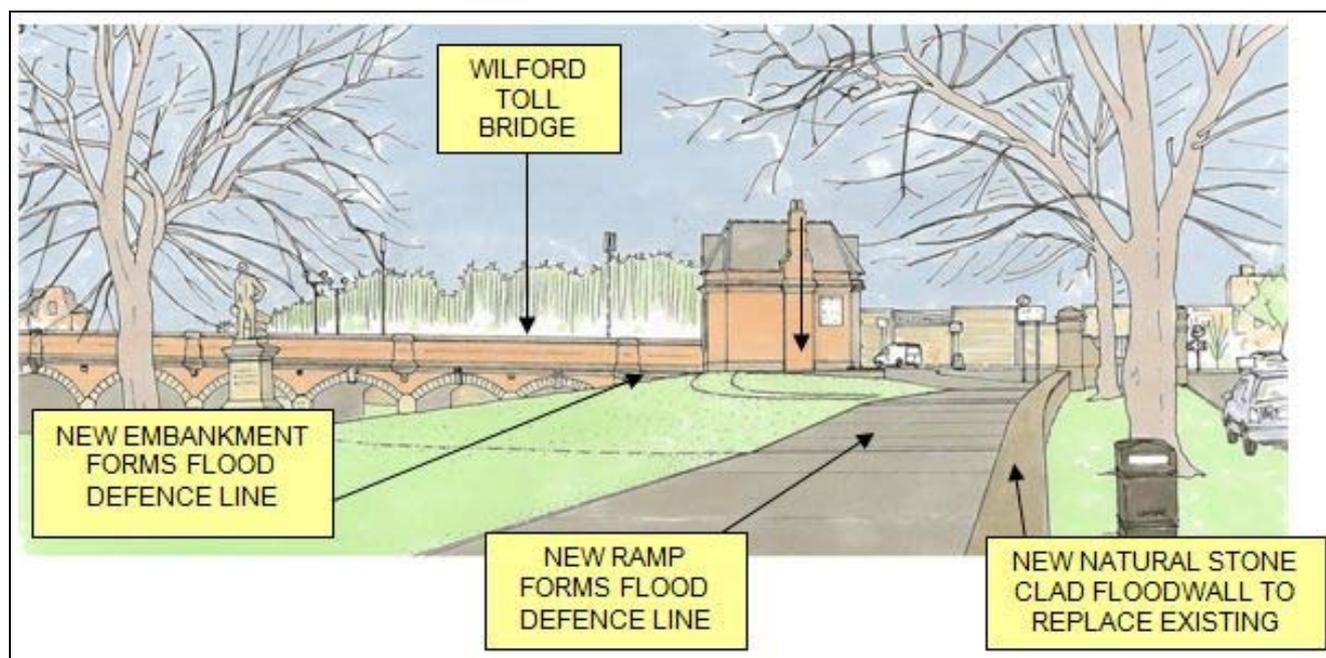
Much of the proposed works are concentrated around Victoria Embankment, which is a privately owned road that runs between the River Trent and the Wilford Grove recreation ground. This is popular with local people and is used for the annual Riverside Festival in August each year. Large mature London Plane trees line the embankment, making the area visually attractive.

Colwick Country Park is designated as a Site of Importance for Nature Conservation (SINC). This 87ha site includes landscaped areas of former sand and gravel workings, and an old course of the River Trent. The park supports a variety of habitats, including open grassland, planted woodland, swamp areas and lakes.

The proposals

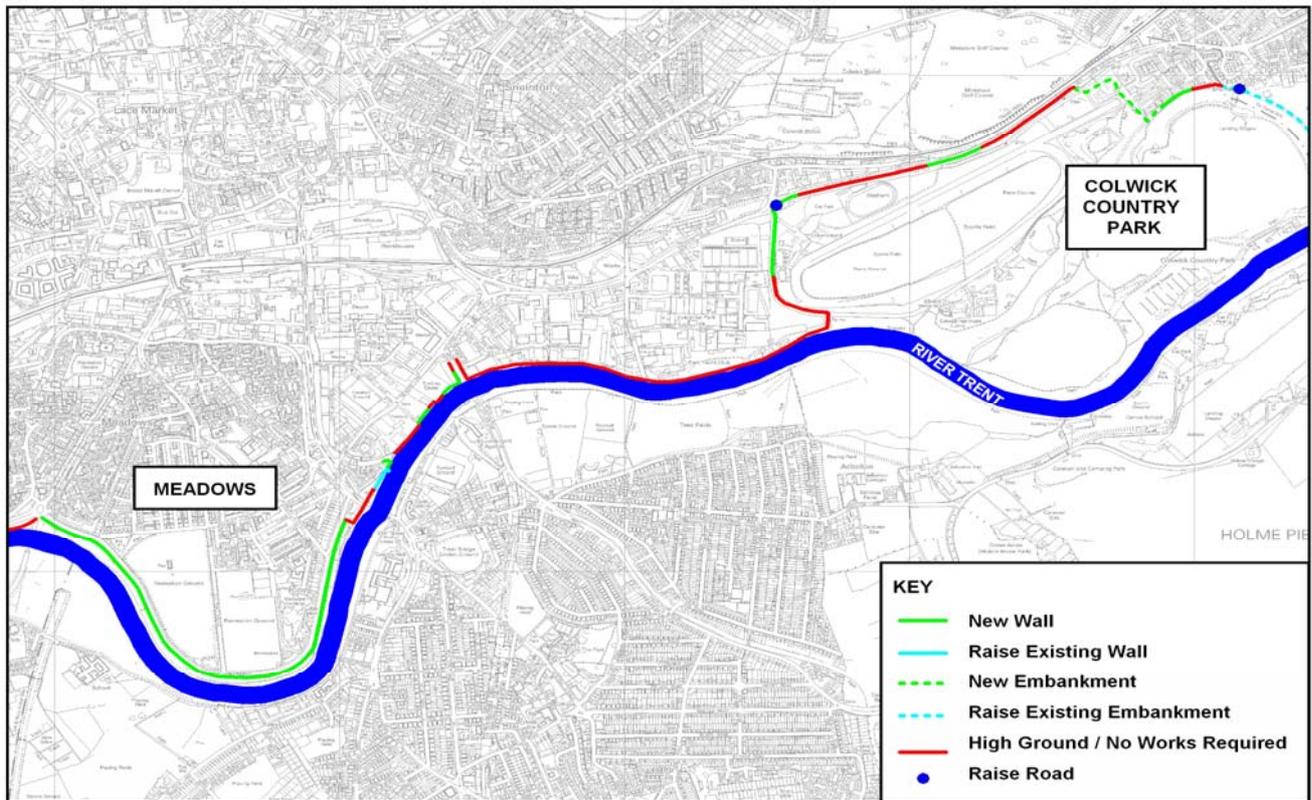
The proposed works at the Meadows through to Colwick Country Park include:

- replacing 700 metres of existing flood wall along Victoria Embankment downstream of the Toll Bridge;
- constructing 400 metres of new embankment across Wilford Grove recreation ground to accommodate future regeneration plans of Nottingham City Council;
- constructing a 245 metres of floodwall around the Memorial Gardens;
- raising the level of Victoria Embankment in front of the war memorial;
- constructing 365 metres of wall along the rear boundary of properties on Fraser Road;
- raising walls around Meadow Lane Lock;
- constructing a new pumping station on the Tinkers Leen outfall;
- constructing new walls at the Arla Depot and Personal Storage on Meadow Lane;
- constructing a 275 metres embankment through Colwick Country Park car park.



Visual representation of the new flood wall and footpath adjacent to Wilford Toll Bridge, Victoria Embankment

Figure 4: Meadows and Colwick Country Park Scheme Area



Impacts

The adverse impacts of the scheme at Meadows are related almost entirely to the construction phase of the works. There will be moderate disturbance to local people and businesses from general construction activities, including dust and noise. This will directly affect 24 properties on Fraser Road (including a block of flats) where we are working within the boundaries of the properties.

There will be further general impacts on properties within 50 metres of the work including properties in:

- Carol Gardens,
- Green Street,
- Meadow Close and Quayside Close,
- Fraser Road; and
- Crossland Meadow housing estate.

A lane closure will be required along Victoria Embankment for approximately 6 months. For a short period a full road closure will be required for the road raising works. This will impact upon road users and parking.

There will be minimal impact on nature conservation. We have designed the works along Victoria Embankment to minimise the impact on the avenue of trees and a tree specialist will be monitoring the works to ensure the trees are protected. The new embankment through Colwick Country Park car park will not impact on the sensitive features of the SINC.

A moderate adverse impact will be caused on the landscape due to the new floodwalls and embankments. The affected sites will include Victoria Embankment and Colwick Country Park car park. In particular, the new embankment through Wilford Grove recreation ground will have a significant visual impact and to reduce this we are proposing landscape planting and a central terrace at Wilford Grove. The setting of the War Memorial will also be affected by the proposals to raise the road. However, this will be mitigated by improving the landscape design for pedestrians.

Proposed mitigation

Human Beings	<p>Minimise working areas in private properties along Fraser Road and Arla Depot and Personal Storage.</p> <p>Ensure works do not affect the Riverside Festival.</p> <p>Maintain access at all times along tow path at the bottom of Victoria Embankment.</p> <p>Notify football and cricket clubs that on-street parking will be reduced.</p> <p>Maintain essential access along River Road to Colwick Country Park.</p> <p>Provide a footpath on top of the embankment at Colwick Country Park car park to link to the footpath network.</p>
Flora & Fauna	<p>Minimise loss of trees.</p> <p>Replacement and supplementary planting.</p> <p>Tree specialist to monitor the works at Victoria Embankment as they take place.</p>
Noise	<p>Concrete piles to be bored rather than driven into the ground in sensitive locations to reduce noise levels and protect trees.</p>
Visual	<p>Where possible store and reuse natural stone from demolished walls such as the existing Victoria Embankment Floodwall. This will maintain the visual character of the location.</p> <p>Retain the existing avenue of mature trees at Victoria Embankment.</p> <p>Landscaped embankment slopes across the Wilford Grove recreation ground. Introduce raised terrace at Wilford Grove. Views from embankment to Suspension Bridge created.</p> <p>Reduced road width in front of the War Memorial to reduce vehicle speed and prevent parking.</p>
Land use	<p>Full reinstatement of car parking except in front of the War Memorial.</p>
Traffic and Transport	<p>Road closures on Victoria Embankment will be signed and a diversion route clearly marked.</p>

Enhancements

A number of enhancement opportunities have been identified for Meadows and Colwick Country Park scheme area including:

- improvements along Victoria Embankment to footpaths, cycleway links, and lighting; and
- the installation of fishing pegs, the creation of shallows and reedbeds, and habitat improvement for fisheries and amphibians within Colwick Country Park.



Visual representation of the War Memorial, Victoria Embankment

Colwick

The existing environment of the scheme area

The Colwick section runs from River Road by Candle Meadow housing estate to the Radcliffe on Trent railway viaduct, see Figure 5. It includes Crosslands Meadow residential area and Colwick Industrial Estate. It is also covers Colwick Country Park SINC which is 87ha of landscaped area around the old course of the River Trent. The SINC supports a variety of habitats including open grassland, planted woodland, swamp areas and lakes. It is also an important local recreational site. There are existing flood defence embankments and walls through the area but 1344 properties still have a greater than 1% annual probability of flooding.

The proposals

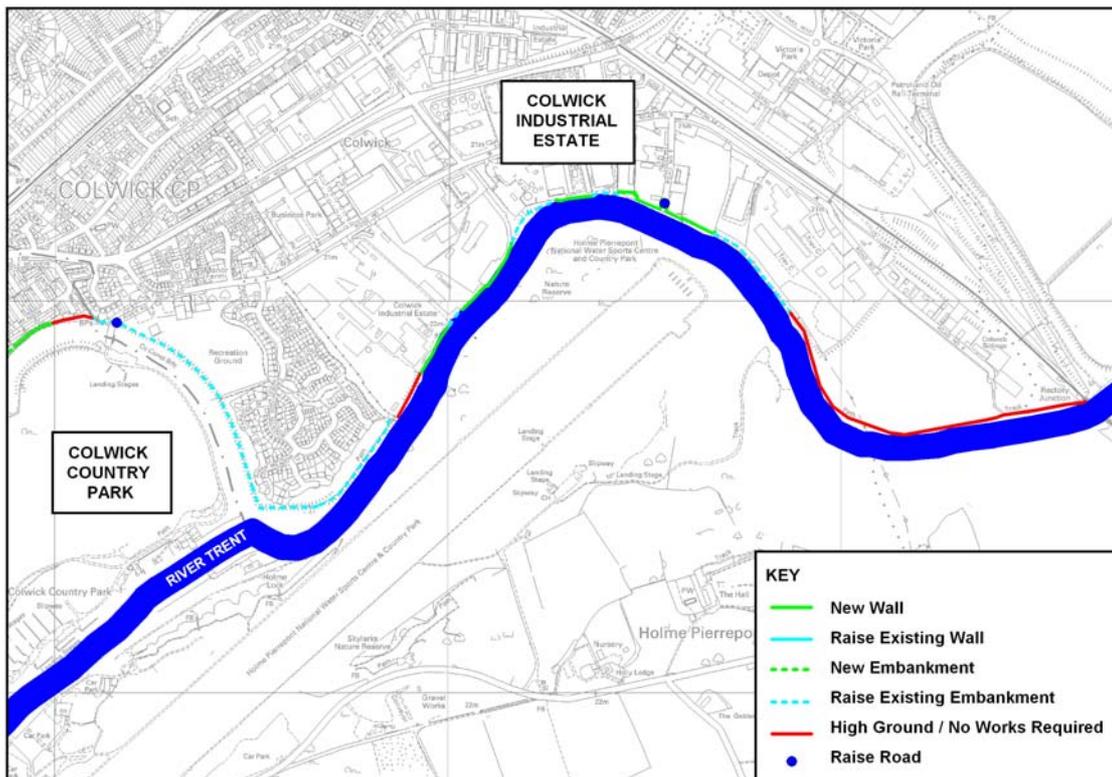
The proposed works at Colwick involve:

- raising 1485 metres of existing embankment;
- replacing 165 metres of embankment with a floodwall;
- constructing 280 metres of new embankment around Crosslands Meadow housing estate;
- replacing 455 metres of wall through Colwick Industrial Estate; and
- building a new pumping station at Holme's Dyke.



Existing flood embankment adjacent to the Crosslands Meadow Recreation Ground

Figure 5: Colwick Scheme Area



Impacts

As with the other sections there will be a moderate short-term adverse impact on local people and properties from the general construction activities. There will be noise, dust and vibration impacts. In addition access will be restricted to River Road. A number of Public Rights of Way will also be affected. This will impact on recreational use and disturb local people and businesses. There are 10 businesses that will be directly impacted by the works and this disturbance is likely to last for up to twelve months. There will also be indirect disturbance to residential properties through construction noise as a result of raising the embankments.

Impacts upon nature conservation will be minimal. The main nature conservation area is Colwick Country Park SINC. We will be constructing a short section of new embankment along its boundary but this will have no significant impact on the SINC.

There will be minor visual impacts from raising the defences, both embankments and floodwalls, but these will not be significant.

Proposed mitigation

Human Beings	<p>Minimise working areas within private properties. Reinstate all working areas affected. Maintain access to Colwick Country Park. Liaison with owners of properties in close proximity to the works. Maintain unrestricted access for Greater Nottinghamshire Bike Ride.</p>
Flora & Fauna	<p>Measures to reduce the effect and working methods to be agreed with Nottingham City Council including re-sowing and programming of works.</p>
Noise and vibration	<p>Regular monitoring of vibration frequencies. Liaison with owners of properties in close proximity to the works.</p>
Visual	<p>Retain the existing trees to the landward side of the embankment within Crosslands Meadow Recreation Ground.</p>

Enhancements

The improvements for Colwick include extending the Trent Valley Way through Colwick Industrial Estate. The walkway will be incorporated into the flood defence design and will allow pedestrians and cyclists to use the immediate riverside for recreational purposes, by providing a more attractive environment.



Colwick Country Park and Crosslands Meadow Housing Estate

Risks and uncertainties

The project has a number of risks and uncertainties that may impact on our proposals, programme and predicted impacts.

- Providing the proposed environmental enhancements and compensatory habitat is subject to consultation with landowners and interested parties. However, the Environment Agency has developed relationships with key stakeholders including Natural England, Nottingham City Council, Derbyshire Wildlife Trust and Nottinghamshire Wildlife Trust to ensure that these can be delivered.
- The disruption to gardens at Newbery Avenue, Nottingham Road, Fraser Road, Beeston Marina and Mobile Home Complex and Attenborough village is very significant to the residents affected. Therefore, further discussions with landowners will be needed to ensure that there is an opportunity for any further concerns to be raised before the works commence.
- Landowners within Colwick Industrial Estate have raised concerns about the location of site compounds and working areas. Discussions will continue to reach agreement on these issues.
- A number of trees are very close to the construction work and these will be fully protected. However, the full impact on the trees may not be seen for several seasons. Therefore, trees along Victoria Embankment will be monitored during construction and for several years afterwards.
- There is a risk of pollution from the works. We will manage this risk and precautions will be in place to minimise this risk.
- A number of consents, in particular planning permission, are needed before the works can proceed. This could affect scheme programme, sequence and final completion of the whole project.

Way forward

This document summarises the Environmental Statement. Full copies of the Environmental Statement can be viewed at the following locations:

Location	Hard copy	CD
Environment Agency Offices – West Bridgford, Nottingham	✓	✓
Broxtowe Borough Council Offices	✓	✓
Erewash Borough Council Offices	✓	✓
Gedling Borough Council Offices	✓	✓
Nottingham City Council Offices	✓	✓
Beeston Library		✓
Inham Nook Library		✓
Meadows Library		✓
Nottingham Central Library		✓
Radford/Lenton Library		✓
Sneinton Library		✓
Toton Library		✓
West Bridgford Library		✓

Broxtowe Borough Council will be advertising our planning application and we will be advertising the publication of the Environmental Statement. Therefore, there are two ways of commenting:-

Comments regarding the **Attenborough and Rylands** section will need to be addressed to:

Adele Bramall
Broxtowe Borough Council
Foster Avenue
Beeston Nottingham
NG9 1AB

If you wish to comment on this **Non-Technical Summary, the remaining sections or the scheme in general or require additional copies of the summary**, please contact:

John Hindle
Project Executive
Nottingham Trent Left Bank FAS
Olton Court
10 Warwick Rd
Olton
B92 7HX
email: Nottingham.FAS@environment-agency.gov.uk

Further information can be found at our website www.nottinghamflooddefence.co.uk

Our consultation period runs until the 5 December 2008. Following this date we expect to hear whether the planning application has been successful. If we receive planning permission we expect the detailed design for the Nottingham Scheme to start early in 2009. The comments received through the consultation period will influence the detailed design process.

Following detailed design, we would expect to start construction at Sawley in May 2009. An indicative programme of construction work is outlined below.

Scheme Area/ Location	Indicative Construction Period																	
	2009				2010				2011				2012					
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	
Sawley		■	■	■	■													
Trent Meadows		■	■	■	■	■	■											
Attenborough							■	■	■	■	■	■	■	■				
Erewash											■	■	■	■				
Rylands				■	■	■												
Meadows											■	■	■	■			■	
Colwick Country Park																	■	■
Colwick																	■	■

Q1:Jan/Feb/Mar Q2:Apr/May/June Q3:Jul/Aug/Sept Q4:Oct/Nov/Dec



St Mary's Church, Attenborough

Conclusions

The proposed scheme will reduce the risk of flooding to more than 16,000 homes and businesses on the left bank of the River Trent through Nottingham. The preferred option is a mixture of improving the existing walls and embankments and constructing new defences through the city. The permanent impacts of the scheme will be minimised by working closely with the local planning authorities, landowners and other affected organisations to agree suitable designs and finishes.

The scheme will reduce the flood risk in Nottingham to a 1% annual probability of occurrence. However the new defences will slightly increase surrounding flood levels and have a modest effect on some local villages. The maximum increase in flood levels for all of these properties will be 7 centimetres (2.5 inches) during a flood event with a 1% annual probability of occurrence. The effect of this is that additional 69 properties are at risk during a flood event of this size. The majority of these affected properties are located in Burton Joyce with the remainder split between Stoke Bardolph, Gunthorpe, Hoveringham and Bleasby. Flood levels at these properties will only be increased in a flood event that would overtop the existing defence levels.

We have undertaken separate studies in the locations affected by increased flood risk. Measures to protect some properties in Gunthorpe, Bleasby and Gibsmere have been undertaken in 2008. Works to protect the affected properties in Burton Joyce are expected to be completed in 2009. In addition we are proposing further work in Hoveringham, Gunthorpe and Radcliffe on Trent. In Stoke Bardolph work is on-going to determine whether individual property protection measures can be used. All of this work will reduce the impact of the Nottingham Trent Left Bank FAS on the villages affected.

The main environmental impacts from the scheme are associated with the construction period and include increased traffic and noise levels during construction. There will be a number of road and canal closures and restricted access to footpaths and recreational areas. 62 residential properties and 21 businesses will be directly affected by the work. All sites will be fully reinstated.

The scheme will impact on a number of nature conservation sites, with land being affected at six SINC/LWSs and Attenborough SSSI. The temporary impacts will be reduced by fencing off the working area and by carrying out reinstatement following the works. There will be a permanent loss of habitats and compensatory habitats have been agreed. These include habitat restoration within the Attenborough SSSI and other areas of the floodplain. Landscape design and use of materials appropriate to the character of the site will be used to mitigate visual impacts.

In addition the scheme should include the following enhancements:

- upgrading existing footpaths and creating new footpaths along the crest of the flood embankments;
- provision of additional seating in Trent Meadows Picnic Area;
- habitat creation at Sawley Carr and Holme Pitt SSSI;
- installation of information boards at areas of biodiversity or archaeological interest;
- improve amenities in Attenborough village;
- improvements at Victoria Embankment including cycleway links, lighting and public shelters;
- improvements at Colwick Country Park such as installing fishing pegs, creation of shallows and reedbeds, or habitat improvement for fisheries and amphibians;
- extending the Trent Valley Way through Colwick Industrial Estate.

The project will bring significant reduction to the flood risk in Nottingham. We have assessed the impacts of the project in the Environmental Statement. The mitigation and enhancements proposed will reduce the negative impacts associated with the scheme, which are mainly due to construction activities. We will be taking the opportunity as far as is possible within the framework of the scheme, to enhance the natural environment and the amenity for local people.

1 INTRODUCTION AND BACKGROUND

1.1 General

This Environmental Statement (ES) was prepared on behalf of the Environment Agency by Black & Veatch. It presents the findings of an Environmental Impact Assessment (EIA) of the proposed flood alleviation works on the left (north) bank of the River Trent through Nottingham. The works are normally referred to as the Nottingham Trent Left Bank Flood Alleviation Scheme (FAS).

We have revised the original ES from April 2007 to produce this further ES for our current proposals; refer to *Section 1.6*.

1.2 The Environmental Impact Assessment

The EIA is a procedure to be followed for certain types of project before they can be given 'development consent'. It requires a systematic assessment of the likely significant environmental effects of the development project. The basis for EIA in the UK is the EC Directive (85/337/EEC), as amended by Directive (97/11/EC), on 'the assessment of effects of certain public and private projects on the environment'. The EIA Directive is implemented in the UK through the following legislation:

- Environmental Impact Assessment (Land Drainage Improvement Works) Regulations 1999 (SI 1999/1783 as amended by SI 2005/1399).
- The Town and Country Planning (Environmental Impact Assessment) Regulations 1999 (SI 1999/293 as amended by SI 2000/2867 and SI 2006/3295).

In accordance with the Environment Act 1995, the EIA commenced at the start of this project. As part of this process, a screening and scoping exercise was carried out. This included internal and external consultation, and the publication of an Environmental Scoping Report in November 2005.

The proposed development is likely to have significant effects on the environment by virtue of its size, nature or location; refer to *Section 2* for more details. The development spans the boundaries of four Local Planning Authorities (LPAs); Erewash, Broxtowe, Nottingham City and Gedling. It was confirmed that some elements of the scheme under the jurisdiction of Erewash Borough Council and Broxtowe Borough Council would require planning permission. The other LPAs, namely Nottingham City Council and Gedling Borough Council, confirmed that the works in their authority can be undertaken without formal planning approval by virtue of the Environment Agency's 'permitted development' rights given under Parts 14 and 15 of the Town and Country Planning (General Permitted Development) Order 1995 (SI 1995/418). Therefore, the EIA culminated in the production of an ES under the following legislative instruments:

- Environmental Impact Assessment (Land Drainage Improvement Works) Regulations 1999 (SI 1999/1783 as amended by SI 2005/1399);

- The Town and Country Planning (Environmental Impact Assessment) Regulations 1999 (SI 1999/293 as amended by SI 2000/2867 and SI 2006/3295).

This EIA has followed the Environment Agency Management Systems (AMS), which provide guidance on the development of an EIA when it is undertaken under SI 99/1783.

1.3 Purpose and Structure of the Environmental Statement

The purpose of this ES is to give the public, statutory and non-statutory consultees, an opportunity to express an opinion before the relevant planning applications are determined, or works proceed under our permitted development rights.

This *Volume 1* of the ES is a ‘front end’ overarching summary document. It outlines the approach and scope of the EIA, and presents the key findings. *Volume 1* deals with background legislation and policy, the survey methods and generic mitigation. It also summarises the consultations, the proposed environmental enhancements and the Health Impact Assessment (HIA).

Findings of the EIA for the proposed works within each LPA are presented in four appendices, as shown in Table 1.1. The appendices should be read in conjunction with this *Volume 1*.

1.4 Background to the Project

1.4.1 Flood risk in Nottingham

The city of Nottingham, which straddles the River Trent, contains some 16,000 homes and businesses that are currently at risk of flooding during a flood event with a 1%¹ (1 in 100) annual probability of occurrence. Nottingham has a long history of flooding and when thousands of properties were flooded nationally in March 1947, Nottingham was one of the worst hit areas. Some 3,000 properties, 86 factories and 28 miles of roads in Nottingham were flooded.

In response to this event, a flood defence scheme was constructed during the 1950s to protect Nottingham. The defences prevented significant flooding during the most recent event of November 2000, but parts of the city were undefended and 60 properties flooded. This flood was classified as an event with a 3% (1 in 33) annual probability of occurrence.

1.4.2 The Approach to Flood Risk Assessment

As shown in Plate 1.1, the Environment Agency adopts a tiered approach to managing flood risk, as recommended by the Department for Environment, Food and Rural Affairs (Defra) in their Flood and Coastal Defence Project Appraisal Guidance. This tiered approach has led to the publication of the Fluvial Trent flood

¹ Floods are categorised by the likelihood they will occur in any given year. This is expressed as a ‘% annual probability’. Therefore a flood event that has a 1% annual probability will have a 1 in 100 chance of occurring in any given year. If a flood occurs in one year the chance of it occurring in the following year is still the same, 1 in 100

risk management Strategy, see below and the subsequent development of flood alleviation schemes for the right and left bank through Nottingham.

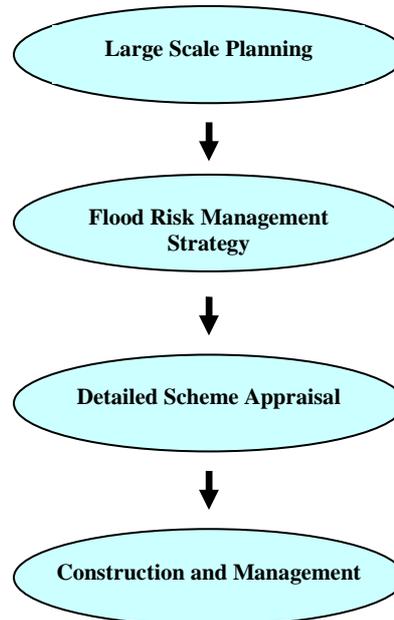


Plate 1.1 Hierarchy of Flood Defence Management

1.4.3 The Fluvial Trent Strategy

The Environment Agency embarked on studies to investigate flood risk in Nottingham in 2003, with the Fluvial River Trent Flood Risk Management Strategy. This is referred to as the Fluvial Trent Strategy or FTS. It was a high level study throughout a 200km length of the River Trent, between Stoke-on-Trent and Newark. It included a technical, environmental and economic appraisal of a number of options to reduce the flood risk along this reach of the River Trent. A final report on the study was issued in 2005.

The principal findings of the FTS were as follows:

- The defences through Nottingham provide a relatively low standard of protection and some are in poor condition.
- Raised or new defences, as appropriate, are the preferred option for reducing the risk of flooding in Nottingham.
- The most economically viable solution is to protect against a flood event with a 1% annual probability of occurrence.
- There is considerable opportunity for environmental enhancement and improvements to leisure and recreation facilities along the river frontage.
- Separate studies should be carried out for the left bank and right banks through Nottingham because they are effectively independent ‘flood cells’.

1.5 Nottingham Trent Left Bank Flood Alleviation Scheme Objectives

Works to improve the flood protection on the left bank of the River Trent through Nottingham are proposed as part of the Nottingham Trent Left Bank Flood Alleviation Scheme (FAS). The whole of the River Trent’s left bank through Nottingham is a single ‘flood cell’. By this we mean that a breach of the defences

at any location could potentially result in flooding to the whole cell. For this reason, the scheme will be progressed in its entirety.

The area under consideration follows the line of the River Trent from the M1 at Sawley (National Grid Reference: SK 466320) to the Radcliffe Railway Viaduct in Colwick (National Grid Reference: SK 636 397), which spans the boundaries of four LPAs. The current flood defences typically protect against a flood with a 2% annual probability of occurrence. This level of flood risk management is not considered sufficient for Nottingham.

Our solution is to raise existing defences and, where required, construct new defences to protect approximately 16,000 homes and businesses against a flood with a 1% annual probability of occurrence. The main objectives of the scheme are to:

- provide a project that reduces the risk of flooding to the residents of Nottingham;
- accommodate future plans for the city within our proposals;
- minimise the adverse effects on the environment;
- provide a sustainable solution that is best value for money;
- create a better place for people and wildlife through Nottingham through environmental improvements including:
 - a. providing a greater variety of plant and animal habitat;
 - b. improving the quality of the local environment for the people who live there;
 - c. increasing the recreational opportunities close to the river.

Due to its size, the scheme was split into the following ‘scheme areas’, which have been grouped together by LPA:

- Erewash Borough Council: Sawley and Trent Meadows;
- Broxtowe Borough Council: Attenborough, Erewash and Rylands;
- Nottingham City Council: Meadows and Colwick Country Park;
- Gedling Borough Council: Colwick.

The boundaries of the above areas are shown on Figure 1.1. Figures V4.1 to V4.12 in *Annex 4* show the areas in more detail.

1.6 Previous Environmental Statement

In April 2007, the Environment Agency published an ES for the Nottingham Trent Left Bank FAS and undertook statutory consultation and submitted planning applications where required (Erewash Borough Council and Broxtowe Borough Council). Planning permission from Erewash Borough Council was received in 2007 and is still current.

In October 2007 as part of the Nottingham Strategic Flood Risk Assessment a remodelling exercise was completed using a revised modelling technique. The new model has improved the accuracy of our flood predictions and led to changes in the outline design detailed in April 2007. Other changes have resulted from consultations during the development of the scheme to improve the landscape and

recreational value of the flood defence. The most significant changes are described below and in the and in the appendices:

Sawley and Trent Meadows

- A 0.8m wall is now required around the boundary 6 River View by All Saints Church as the high ground is not at a level to provide flood protection from a flood event with a 1% annual probability of occurrence.
- No works are required around Grounds Farm as the existing defences are sufficient.

Attenborough, Erewash and Rylands

- The existing flood embankment and wall along the Nottingham and Beeston Canal will be raised as it does not provide protection from a flood within a 1% annual probability of occurrence.
- A flood wall will be constructed around the western side of Siemens, Technology Drive, Beeston as the new model has shown that the ground levels are not sufficient to defend against a flood event with a 1% annual probability of occurrence.

Meadows and Colwick Country Park

- The alignment along the Meadows has been altered to include an embankment across Wilford Grove Recreation Ground, and a wall across the front of the Memorial Gardens and properties facing Victoria Embankment. These changes were discussed with and supported in principle by Nottingham City Council on the 18th June 2008 with representatives from planning, conservation, parks, drainage, highways and regeneration; refer to *Appendix C*.
- Road and kerb raising works are no longer required along Racecourse and Daleside Road.
- The existing section of flood embankment south of Candle Meadow is now above the required flood defence level.

Colwick

- The proposals through Colwick scheme area remain mostly unchanged from the results of the new model. Small changes to the footprint of the embankment and design of flood wall have been incorporated to minimise the impact on trees and industrial estate users.

Further to the identification and assessment of the changes to our proposals, this revised ES also has the following amendments:

- Identification of critical infrastructure following the recommendations of the review of the national flooding in the summer of 2007;
- Clarification of the language used to describe the assessment of the impacts.

Table 1.1 The Appendices of the Environmental Statement

Appendix	LPA	Scheme Area
A	Erewash Borough Council	Sawley and Trent Meadows
B	Broxtowe Borough Council	Attenborough, Erewash and Rylands
C	Nottingham City Council	Meadows and Colwick Country Park
D	Gedling Borough Council	Colwick

The Health Impact Assessment (HIA) is presented in *Volume 1* but it is also considered in *Section 3* of *Appendices A to D*.

Appendix E contains a summary of responses to the consultation process. *Appendix F* contains details of proposed mitigation and compensation measures.

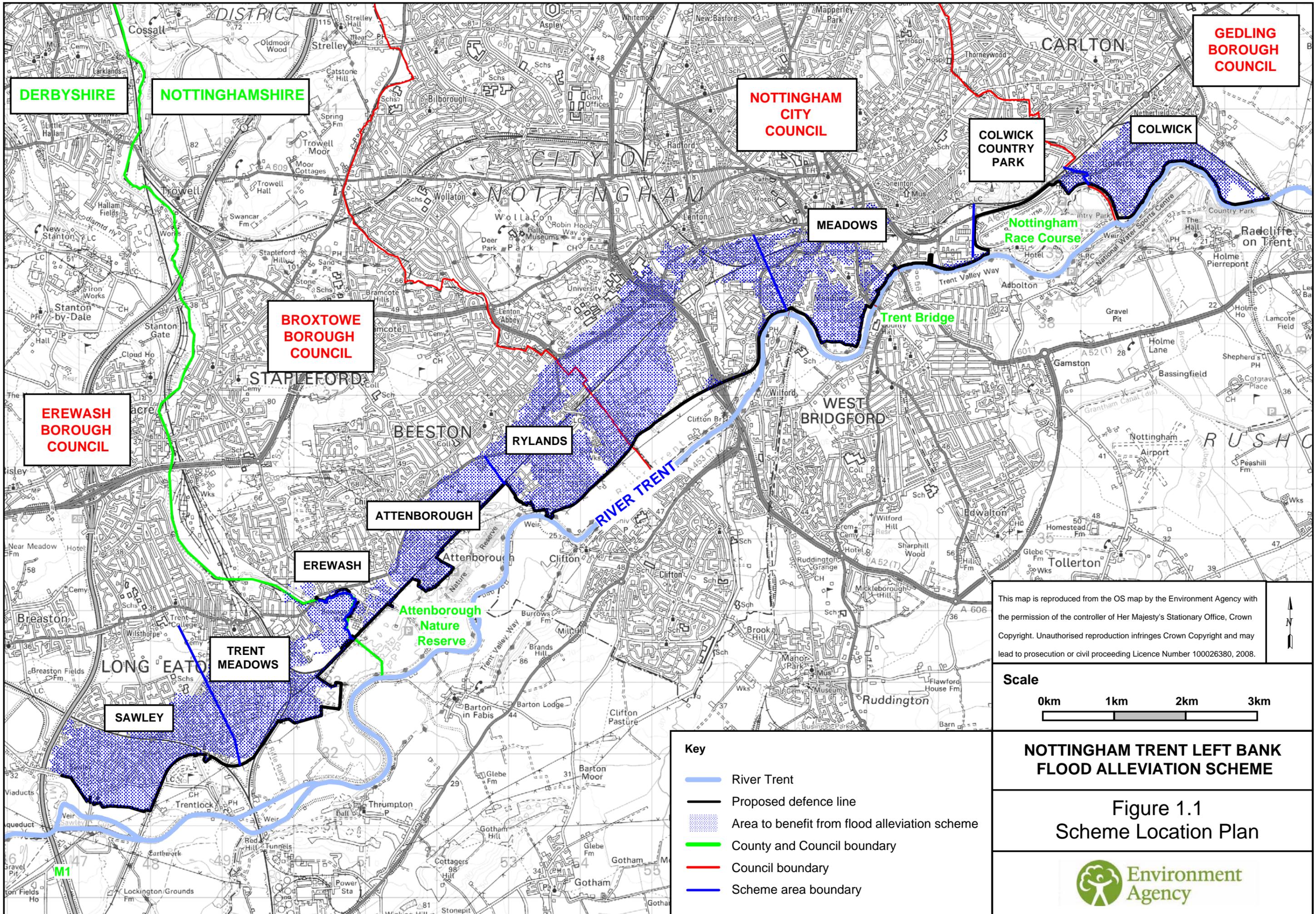
1.7 Further Information

Further information can be obtained from:

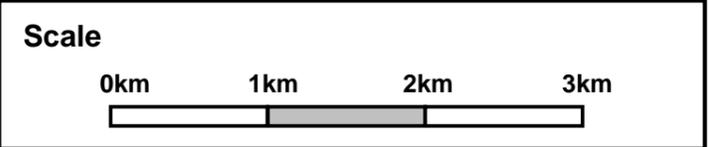
John Hindle
Project Executive
Environment Agency
Olton Court
10 Warwick Road
Olton
Solihull
B92 7HX

Or by email at:

Nottingham.FAS@environment-agency.gov.uk



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- Key**
- River Trent
 - Proposed defence line
 - Area to benefit from flood alleviation scheme
 - County and Council boundary
 - Council boundary
 - Scheme area boundary

NOTTINGHAM TRENT LEFT BANK FLOOD ALLEVIATION SCHEME

Figure 1.1
Scheme Location Plan



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2 ALTERNATIVE OPTIONS CONSIDERED

2.1 Introduction

The EIA regulations require the main alternatives to be outlined and an indication given of the principal reasons for selecting the preferred option.

Defra have an overall responsibility for flood defence and coastal protection in England. They fund capital works and their “Flood and Coastal Defence Project Appraisal Guidance” sets down best practice for the appraisal of projects. The guidance states that the project objectives are to:

- reduce the risks to people and the environment from flooding and coastal erosion;
- provide a solution that is technically sound and fit for purpose;
- provide a solution that is environmentally acceptable and sustainable;
- ensure best value for money.

The FTS followed the above guidance and this chapter summarises the options which were appraised as part of that study. This chapter also deals with the EIA Scoping Stage and selection of the preferred option.

2.2 Alternative Options

2.2.1 Generic Options for Nottingham

Table 2.1 presents the 18 generic flood risk management options for Nottingham which were appraised as part of the FTS, using the following criteria:

- technical: ‘Will it reduce the flood risk?’
- economic: ‘Do the benefits of doing the project outweigh the costs?’
- environmental: ‘Are the effects on the environment acceptable?’

Strategic Environmental Assessment was undertaken on these options at that time and incorporated into the findings of the FTS.

With reference to Table 2.1, only those options that met all the above criteria were taken forward for consideration as part of the EIA Scoping Stage.

Table 2.1 Generic Options for Nottingham

Name	Description	Suitability ²			Recommended
		Technically	Economically	Environmentally	
Do-nothing	Undertake no further maintenance or construction work on the River Trent	✓	✓	✓	✓
Do-minimum	Continue to undertake the current maintenance and flood warning tasks	✓	✓	✓	✓
Off-line and Floodplain Storage	Increase the amount, or better manage use of the available floodplain storage	x	-	✓	x
On-Line Storage	Water retaining structure(s) to create a flood storage area(s) on the line of the river	x	-	✓	x
Managed Retreat	Abandon the flood defences and defended property, and revert back to a natural floodplain	x	-	x	x
Development Control	Prevent development within areas that are at risk of flooding	✓	-	✓	✓ ¹
Sustainable Drainage Systems	Drainage systems that mimic natural processes and allow water to soak into the ground	✓	-	✓	✓ ¹
Managing the Effects of Floods	Raise awareness of flooding issues, including the use of local flood protection measures	✓	-	✓	✓ ¹
Land Management Options	Change the land use to reduce the amount and rate of runoff to the watercourses	✓	-	✓	✓ ¹
Weirs and Sluices	Manage water levels in the river using existing or new control structures	x	-	✓	x
Groundwater Recharge	Divert flood waters into natural underground aquifers	x	-	x	x
Underground Tanks	Divert flood waters into underground tanks	x	-	x	x
Dredging	Mechanically remove sediment from the river bed to increase the capacity of the channel	✓	✓	x	x
Remove Floodplain Obstructions	Remove or modify structures that have an impact on water levels in the floodplain	✓	-	✓	✓
River Reprofilng	Rebuild the river channel to improve the hydraulics	x	-	✓	x
Flow Diversion	Create artificial channels to convey flood waters	✓	x	✓	x
Tributary Storage	Store water in the catchments of the tributaries to reduce peak flows in the Trent	x	-	✓	x
Flood Defences	Raise existing or construct new defences	✓	✓	✓	✓

¹ These strategic options are recommended as best practice but not considered further as stand alone options for Nottingham. They will be considered part of an overall flood risk management solution.

² x denotes that an option is not technically/economically/environmentally acceptable

✓ denotes that an option is technically/economically/environmentally acceptable

- denotes that the option was not assessed for its economic acceptability as it was not technically/environmentally acceptable.

2.2.2 Options not carried forward

This section summarises the strategic conclusions and identifies those options that were not considered suitable; refer also to Table 2.1.

Off-line and Floodplain Storage

The River Trent has an extensive floodplain at present but flooding in and around Nottingham is still an issue. High flows and water levels in the Trent are experienced for long periods. This large volume of water already floods the current natural valley to such a depth that creating off-line storage within the natural floodplain is ineffective. However, there is also insufficient suitable land outside the natural floodplain to store the required volume of water.

Floodplain storage would reduce peak levels in the Trent for smaller events because there is some spare capacity in the storage volume. However, Nottingham only starts to experience significant flooding during larger events (an event with an approximate 2% annual probability of occurrence) and such storage would be ineffective.

Off-line and floodplain storage is therefore not technically suitable for Nottingham.

On-line Storage

An on-line storage option upstream of Nottingham was considered, which would reduce the pass forward flow during a flood event with a 1% annual probability of occurrence, by 50%. Although economically viable, it was not recommended for the following reasons:

- The villages of Barrow and Swarkestone upstream of Nottingham would need to be relocated to accommodate the storage area. This is environmentally unacceptable due to the impacts on the communities.
- The proposed storage site is upstream of the Rivers Derwent and Soar. There would, therefore, still need to be refurbishment of the existing defences through Nottingham to protect against flood events from these rivers.

On-line storage is therefore not suitable for Nottingham.

Managed Retreat

Managed retreat as assessed in the FTS considered the abandonment of the current defences and reverting back to the natural floodplain. This would place significant properties at risk and is not environmentally acceptable for Nottingham.

Weirs and Sluices

The complete or partial removal of Beeston Weir and Colwick Sluices was considered. However, the removal of either would only significantly reduce upstream water levels during the lesser flood events. The hydraulic impact of the structures reduces as the flow in the River Trent increases and their removal would only lower peak water levels during an event with a 1% annual probability of occurrence by up to 0.2m over a length of 1km. The current scheme considers a length of 27km through Nottingham. In addition, a control structure would be required at each location to maintain navigation along the river.

Weirs and sluices are therefore not technically suitable for Nottingham.

Groundwater Recharge

This option is not technically feasible at any location in the Trent Valley.

Underground Tanks

This option is not technically feasible at any location in the Trent Valley.

Dredging

Dredging is both technically and economically suitable as a flood risk management option for Nottingham. However, there are significant environmental impacts which make it unsuitable, including:

- It is unsustainable and would need to be repeated at regular intervals.
- There would be direct impacts on river habitats and their associated flora and fauna.
- It would release silt into the river, which would adversely affect fisheries, spawning areas and riparian flora, by way of reduced water quality.
- It would have a adverse impact on visual amenity through either the dredged material being placed on the river banks or disturbance to adjacent land and habitat by removal of the dredged material.
- The lower water levels could destabilise any bankside structures, some of which may be of historic importance.

River Reprofiling

This option is not technically feasible at any location in the Trent Valley.

Flow Diversion

A flow diversion channel around the southern edge of Nottingham was considered. Because of the topography, a 20km tunnel at depths of up to 15m is the only feasible option. This is not economically viable.

Tributary Storage

The storage of flood waters in the catchments of the Derwent and Soar would slightly reduce peak levels in Nottingham. For example, reducing the peak flow in the Derwent by 20% would lower peak water levels through Nottingham by 0.08m. This is not enough to alleviate flooding during an event with a 1% annual probability of occurrence.

Tributary storage is therefore not technically suitable for Nottingham.

2.2.3 Options Considered Further

The remaining options, described below, were appraised in detail during the Scoping Stage of the EIA.

Option 1: Do-nothing

In accordance with Defra's guidance, consideration of the 'do-nothing' option is mandatory and forms the benchmark for the economic appraisal and all options are compared to it.

For this option, all flood risk management operations would cease through Nottingham, including maintenance of the existing defences, clearance of debris and flood warning. This would result in the gradual deterioration of the river channel and the existing defences, some of which are already in poor condition and at risk of failure in the next 10 years. The risk of flooding would increase with time as a result of this and the impacts of climate change.

Option 2: Do-minimum

For this option, the consideration of which is mandatory under Defra guidance, the defences would continue to be adequately maintained to the current level. This would leave the protection of the left bank below an acceptable standard and it would reduce with time as a result of climate change.

Option 3: Flood Defences

Where necessary, the existing defences would be raised or new ones constructed to increase the standard of protection. There are environmental impacts associated with this and these need to be considered as part of the development of the scheme. There are issues regarding the sustainability of flood defences, for instance, that it is not possible to continually raise them to counteract the effects of climate change. However, some future raising would be possible and would be allowed for in the designs. The overriding scheme objective is reducing flood risk and this is the preferred option for achieving this.

Option 4: Remove Floodplain Obstructions

Removal of obstructions is technically feasible and would reduce the flood risk. However, it would require the removal or reconstruction of most of the river crossings, including Harrington Bridge, Trent Bridge, Ladybay Bridge and Radcliffe Railway Viaduct. The associated impacts on the local environment and likely construction costs make this option unviable.

2.2.4 Selection of preferred option – Option 3: Flood Defences

Raising flood defences is the only option that would adequately reduce the flood risk to the left bank through Nottingham.

The optimum standard of protection is against events with a 1% annual probability of occurrence. A higher standard is not economically attractive for reasons such as:

- an additional 2.6km of new or raised flood defence would be required;
- there would be difficulties in maintaining public access across the extended defences.

The scoping process concluded that flood defences are environmentally preferred because it would reduce the flood risk to 16,000 homes and businesses. This is the overriding positive environmental benefit which significantly outweighs the associated adverse impacts. These impacts include temporary disturbance during construction and a slight increase in peak water levels to the surrounding

communities during extreme events. Ways to reduce the latter were considered in the design of the proposed works and investigations into remedial works for those communities affected are ongoing; refer to *Section 8*.

The construction of flood defence also provides opportunities to enhance the amenity value around the scheme area and the existing environment through a range of reinstatement and enhancement measures.

Table 2.2 summarises the conclusions of the remaining suitable options for Nottingham. Flood defences are technically feasible, environmentally acceptable and based on the Defra guidance are also economically preferred.

Table 2.2 Summary of Option Selection

Option	Technical	Environmental	Economic
Option 1: Do-nothing	All maintenance, debris clearance and flood warning work would cease. A technically feasible option.	No reduction in the flood risk to approximately 16,000 properties and businesses.	The economic baseline against which all other options are compared.
Option 2: Do-minimum	Current maintenance of the defences would continue. A technically feasible option.	No reduction in the flood risk to approximately 16,000 properties and businesses.	Has a benefit/cost ratio of 2.76.
Option 3: Flood Defences	Raise or rebuild the existing defences to increase the standard of protection. A technically feasible option.	Reduced flood risk to approximately 16,000 properties, Listed Buildings, Scheduled Monuments, Conservation Areas, Registered Parks & Gardens. Construction and permanent impacts to SSSI. Temporary disturbance during construction. Slight increase in peak water levels to surrounding communities during extreme events. Investigations into this are ongoing and separate schemes have begun to reduce the flood risk to these properties; refer to <i>Section 8</i> .	Has a benefit/cost ratio of 8.94 and is therefore economically preferred.

Raising the defences to protect thousands of properties and businesses will have a very positive environmental impact on Nottingham. It will enhance the amenity value of the river and improve the existing environment through a range of mitigation and enhancement measures.

2.2.5 Selection of preferred flood defence alignment

In developing the outline design for flood defences through Nottingham, alternative alignment options were considered in some locations. The alternative flood defence alignments considered for each area are described in the respective appendices.

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3 PROPOSED PROJECT

3.1 Introduction

This section provides an overview of the project, including the construction and operational stages. It identifies those activities that may have potentially significant environmental impacts. A summary of the potential opportunities to use recycled or reused materials is included.

3.2 Outline of the Proposed Project

The scheme extends over a distance of 27km from Sawley, through the centre of Nottingham, to the Radcliffe Railway Viaduct in Colwick. For ease of reference, the scheme is split into a number of geographic areas. Table 1.1 lists the areas and the relevant local planning authorities. The scheme is illustrated in more detail in Figures contained within *Annex 4*.

The limit of the study area is the floodplain for a flood event with a 1% annual probability of occurrence on the left bank of the River Trent, as shown in Figure 1.1. However, the study area may vary slightly for the assessment of impacts on individual receptors; refer to *Section 7*.

The following paragraphs briefly describe the existing sites and the proposed works in each of the four areas. Separate technical appraisals which assess the environmental impacts in each area are provided in the appendices documentation.

3.2.1 Sawley and Trent Meadows

Area of Works

The Sawley and Trent Meadows scheme area extends from the M1 crossing of the River Trent at Sawley to the county boundary at the confluence with the River Erewash; refer to Figure 1.1. *Appendix A* describes the works and the associated environmental impacts through Erewash Borough Council's area. It explains in detail the baseline and the proposed mitigation measures.

Site Description

The residential communities of Sawley and Long Eaton form much of this area. Nearer the river, the agricultural fields are crossed by a network of informal footpaths, which are regularly used by local residents. The Trent Lock Golf Club, Trent Meadows Picnic Area and Cranfleet Canal are important local recreational resources.

There are a number of Local Wildlife Sites (LWS) on or close to the existing defence line, including the Erewash Canal, Lock Lane, Barton Pool and Trent Meadows.

Currently protection against flood events with a 4% annual probability of occurrence is provided by a combination of the following:

- 2.4km of formal flood embankments;
- 2.95km of a railway embankment which acts as a flood defence;
- 0.85km of high ground;

- raised sections of road on Tamworth Road, Pasture Lane and Trent Lane;
- ‘Sheetstores’ Flood Gates at the Erewash Canal.

Both Harrington Bridge and All Saints Church are Listed Structures. The flood defences downstream of the church run adjacent to a Scheduled Monument, which may date back to Roman or medieval times.

Works to be carried out

The Sawley and Trent Meadows reach was subdivided into twelve reaches which are characterised by the type of flood defence work that is proposed. The works are summarised in Table 3.1 and more detailed information, including the appraisal of impacts and proposed mitigation measures, are provided in *Appendix A*.

Table 3.1 Summary of Proposed Works within Erewash Borough Council Jurisdiction (Sawley and Trent Meadows)

Reach	Description
<i>Wilne Road to Harrington Arms Public House (PH)</i>	<ul style="list-style-type: none"> • 450m of existing flood embankment to be raised by approximately 0.5m.
<i>Harrington Arms PH to Church Farm</i>	<ul style="list-style-type: none"> • 40m of new flood wall around the boundary of No. 396 Tamworth Road (0.4m-1.3m high dependent on ground level). • The existing raised section of the B6540 Tamworth Road at the entrance to the Harrington Arms PH car park to be raised by 0.3m.
<i>Church Farm to Sawley Viaduct</i>	<ul style="list-style-type: none"> • 820m of existing flood embankment to be raised by approximately 0.5m. • 60m of new flood embankment, of height 1.4m to extend existing embankment. • 45m of new floodwall to be constructed to tie into high ground at Church Farm.
<i>Sheetstores Flood Gates</i>	<ul style="list-style-type: none"> • A new flood gate structure to replace the existing flood gates on the Erewash Canal. • 75m of new flood embankment of height 0.45 to 1.1m.
<i>Trent Farm</i>	<ul style="list-style-type: none"> • 200m of existing flood embankment to be raised by approximately 0.3m.
<i>Trent Lane to Newbery Avenue</i>	<ul style="list-style-type: none"> • The existing 6m wide raised section of Trent Lane, adjacent to the New Sawley Pumping Station, to be raised by 0.5m. • 12m of new flood embankment.
<i>Newbery Avenue to Owen Avenue</i>	<ul style="list-style-type: none"> • Replace the existing 150m of flood embankment with a new wall up to 1.5m high along the boundary Nos. 71 to 81 Newbery Avenue, inclusive and New Sawley Brook.
<i>Owen Avenue to Home Farm</i>	<ul style="list-style-type: none"> • 600m of existing flood embankment to be raised by approximately 0.6m. • The existing raised section of Pasture Lane to be raised a further 0.55m.
<i>Trent Meadows Picnic Area to Barton Pool LWS</i>	<ul style="list-style-type: none"> • 200m of existing flood embankment to be widened to 4m at the crest, with minimal raising works. • 65m of new flood embankment of height 1.8m.
<i>Barton Pool LWS to River Erewash</i>	<ul style="list-style-type: none"> • 740m of new flood wall up to 1.8m high at 1m offset from the railway boundary fence. The wall will pass through the Barton Pool LWS and Trent Meadows pLWS on a new 240m long embankment 2.5m high.
<i>Golden Brook, north of railway line</i>	<ul style="list-style-type: none"> • 190m of new 1.5m high flood embankment on the northern side of the railway embankment. The embankment to tie-in to Network Rail’s Bridge over the River Erewash, which is within the Attenborough Junction Tip Wildlife Site.

3.2.2 Attenborough, Erewash and Rylands

Area of works

The Attenborough, Erewash and Rylands scheme area extends from the county boundary at the River Erewash to Beeston Lock, Rylands; refer to Figure 1.1. *Appendix B* describes the works and the associated environmental impacts through Broxtowe Borough Council's area. It explains in detail the baseline and the proposed mitigation measures.

Site Description

The urban communities of Attenborough, Chilwell and Rylands form much of this scheme area. Attenborough village is located near the Nottingham-Derby railway with the newer residential and commercial areas situated behind. The land is dominated by the Attenborough Gravel Pits Site of Special Scientific Interest (SSSI) and Nature Reserve (Attenborough SSSI). This contains a series of interconnected lakes which were formed as a result of aggregate mining activities. Aggregate mining in the wider area is expected to continue for another 15 to 20 years.

Attenborough village has a number of attractive Listed Buildings, including St Mary's Church, Rose Cottage and Ireton House, and the majority of the village is designated as a Conservation Area. Six medieval and possibly post-medieval fishponds are located south east of the church and are designated as a Scheduled Monument.

Much of the area currently has no formal flood defences except for the Rylands reach near Beeston Lock. Currently protection against flood events with a 4% annual probability of occurrence is provided to the area by a combination of:

- 0.8km of formal flood embankments;
- 2.4km of railway embankment, which acts as a low level flood defence;
- 1.3km of high ground;
- raised sections of road along The Strand and Riverside Road;
- Nottingham and Beeston Canal lock gates.

Works to be carried out

This scheme area is subdivided into fourteen reaches which are characterised by the type of work which is proposed. The works are summarised in Table 3.2 and more detailed information, including the appraisal of impacts and proposed mitigation measures, are provided in *Appendix B*.

Table 3.2 Summary of Proposed Works within Broxtowe Borough Council Jurisdiction (Attenborough, Erewash and Rylands)

Reach	Description
<i>Toton Sewage Treatment Works (STW) South</i>	<ul style="list-style-type: none"> • 25m of new flood embankment of height 0.6m.
<i>Toton STW North</i>	<ul style="list-style-type: none"> • 60m of new 1m high flood wall where there are space restrictions in Toton STW. • 220m of new flood embankment of height 0.8m around Toton STW.

Reach	Description
<i>Field south of Nottingham Road</i>	<ul style="list-style-type: none"> • 265m of new flood embankment of height 1.4m from the Chilwell Retail Park to No. 317 Nottingham Road.
<i>Nottingham Road properties and Manor Garage</i>	<ul style="list-style-type: none"> • 380m of new 1m high flood wall along boundaries of the Nottingham Road properties, wall at 2m offset from the riverbank.
<i>River Erewash to Barton Lane</i>	<ul style="list-style-type: none"> • 715m of new flood wall up to 0.9m high, 1m offset from the railway boundary fence. The wall to pass through the Attenborough SSSI. • 130m of sheet piling at 12m to 35m offset from the flood wall just upstream of Barton Lane. The sheet piling is required to prevent water seeping beneath the defence during flood events. A buried geomembrane cover will tie the sheet piles to the flood wall and create an impermeable barrier to water. • The road level of Barton Lane to be raised by 0.68m.
<i>Barton Lane to St Mary's Close</i>	<ul style="list-style-type: none"> • 495m of new flood wall up to 1.8m high built at a 1m offset from the railway boundary fence. The wall will pass through the Attenborough SSSI. • 495m of sheet piling, 14m offset from the flood wall. A buried geomembrane cover will tie the sheet piles to the flood wall and create an impermeable barrier to water. • 300m of the western edge of Church Pond will be temporarily infilled to provide a working area. New lake margins to be created from infilled material on completion. • Flood gates to be installed to the east of the gate house on Barton Lane.
<i>St Mary's Close to The Strand</i>	<ul style="list-style-type: none"> • 460m of new flood wall up to 2.7m high. • 535m of sheet piling along the proposed flood defence alignment. • 75m of new flood embankment of height 2.3m through pasture adjacent to St Mary's Church. • 360m of the edge of Church Pond to be temporarily infilled to provide a working area. New lake margins to be created from infilled material on completion. • A new flood gate will be installed in the flood wall to allow owners of Ireton House access to their property. • A new flood gate will be installed in the flood wall at the end of Church Lane to maintain the footpath into Attenborough SSSI.
<i>The Strand</i>	<ul style="list-style-type: none"> • 345m of new flood wall up to 2m high, parallel to the road and replacing the existing hedgerow. • The Strand is to be raised and reprofiled to ensure that the wall appears no higher than 1.5m when viewed from The Strand. • Flood gates to be installed at the entrances to the Old Fisherman's Car Park, the cricket club and bowling club. • 345m of continuous sheet piling, offset from the flood wall, where required. • A submersible pump in a buried chamber at the entrance to the Old Fisherman's Car Park. The surrounding drainage to be diverted into the pumping station.

Reach	Description
<i>The Strand to Cemex Works Site</i>	<ul style="list-style-type: none"> • 320m of new flood wall up to 1.4m high is to be built around the boundary of No. 51 The Strand and No.7 Ferndale Close. This wall to continue along the edge of Works Pond. • 165m of new flood embankment between 0.5 and 1m high is to be built from the end of the new flood wall at the north end of Ferndale Close. • 485m of continuous sheet piling along the proposed flood defence alignment. • 280m of the edge of Works Pond to be permanently infilled to provide an adequate foundation for the new flood wall.
<i>Cemex Works Site to Siemens</i>	<ul style="list-style-type: none"> • 1280m of new flood wall up to 2.5m in height, 1m offset from the railway boundary fence. The average height of the wall will be 1.2-1.5m high. The wall will pass through the Cemex Works site. • 153m of replanting and/or fencing to maintain visual screening of the Cemex Works. • 750m of sheet piling, 4m offset from the flood wall. A continuous buried concrete slab to tie the sheet piles to the flood wall and create an impermeable barrier.
<i>Chilwell Manor Golf Course</i>	<ul style="list-style-type: none"> • 350m of new flood embankment of height 0.3m along the edge of Chilwell Manor Golf Club.
<i>Siemens to Beeston Lock</i>	<ul style="list-style-type: none"> • 400m of 0.4m high masonry wall, offset 1m from access road to be built along the western edge of the Siemens site. • 75m of existing flood embankment to be raised through the western part and the construction of 40m of new 0.7m bored piled wall through the eastern part of the Beeston Marina and Mobile Home Complex. • A new 100m long flood wall up to 2.3m high will be constructed adjacent to the allotments. • Raise 260m of existing embankment through recreation ground. • The two existing ramp on Riverside Road are to be raised. • Existing outfall on Siemens Stream to be replaced.
<i>Beeston Lock to Turnover Bridge</i>	<ul style="list-style-type: none"> • Replace and raise Beeston Lock gates. • 25m of wall around the Beeston Lock landing stage will be demolished and replaced with a new 1.8m high wall. • 90m of flood wall cast against existing concrete wall around Beeston Lock Cottage with a further 65m of new wall, 0.7m high constructed around the cottage. • 600m of embankment to be raised and reprofiled to create a 2m wide berm along the canal.
<i>Turnover Bridge to opposite Boots</i>	<ul style="list-style-type: none"> • 650m of existing wall to be raised by between 75-200mm.

3.2.3 Meadows and Colwick Country Park

Area of works

The Meadows and Colwick Country Park scheme area extends from Wilford Toll Bridge on the Victoria Embankment, to Nottingham City Council's boundary at Colwick Country Park; refer to Figure 1.1. *Appendix C* describes the works and the associated impacts through Nottingham City Council's area. It explains in detail the baseline and the proposed mitigation measures.

Site Description

The urban community of Meadows, the Daleside Road Industrial Park and Colwick Country Park form much of this area. Victoria Embankment is a large recreation area, which attracts local residents and visitors, and is a venue for public events. The Memorial Gardens are located on the embankment. The Nottingham Canal joins the River Trent just downstream of Trent Bridge, and the river is well used by recreational boats. The river frontage from Trent Bridge through to Colwick Country Park contains a number of industrial units, which are part of the proposed Waterside Regeneration Area. Further downstream, Colwick Country Park and Nottingham Racecourse dominate the natural floodplain.

Avenues of mature London Plane trees line Victoria Embankment and the area has a high historic and landscape value containing a Registered Park & Garden, and a number of Listed Buildings.

Currently protection against flood events with a 2% annual probability of occurrence is provided by a combination of the following:

- 1.4km of formal flood walls;
- 0.2km of formal flood embankments;
- 3.3km of high ground;
- the Meadow Lane (Nottingham and Beeston Canal) lock flood gates.

Works to be carried out

This scheme area is subdivided into four reaches that are characterised by the type of work that is proposed. The works are summarised in Table 3.3, and more detailed information, including the appraisal of impacts and proposed mitigation measures, are provided in *Appendix C*.

Table 3.3 Summary of Proposed Works within Nottingham City Council Jurisdiction (Meadows and Colwick Country Park)

Reach	Description
<i>Wilford Toll Bridge to Suspension Bridge</i>	<ul style="list-style-type: none"> • A new wall and access embankment will be constructed between the Wilford Toll House and the existing flood wall. 700m of the existing flood wall will be demolished and replaced with a 1.45m high wall. • A road ramp across Victoria Embankment with localised reduction in road width. Ramp height will be approximately 1.45m. • A new 400m embankment, between 1.8-3.1m high will be constructed across Wilford Grove Recreation Ground. • A new 85m long, 1.5m high wall will be constructed through the landscaped area adjacent to the bandstand to tie in with Victoria Embankment opposite the suspension bridge.
<i>Suspension Bridge to Trent Bridge</i>	<ul style="list-style-type: none"> • 160m of new wall approximately 1m high, with natural stone cladding will be constructed on the front edge of the Memorial Gardens, either side of the War Memorial. • 80m of Victoria Embankment will be raised approximately 1m in front of the war Memorial. The area will be landscaped for the benefit of pedestrians. • 365 of new wall will be constructed along Victoria embankment. It will be constructed along the existing boundary walls of properties on Fraser Road. The wall will be around 1m high. The wall will incorporate access from the rear for the property onto Victoria Embankment. • The junction of Bunbury Street and Victoria embankment will be raised by 0.5m and a flood gate installed.
<i>Trent Bridge to Ladybay Bridge</i>	<ul style="list-style-type: none"> • The 140m long wall immediately downstream of Trent Bridge will be raised by 200mm. • 20m of existing wall between the River Trent and the Lock Keeper's Cottage will be demolished and rebuilt to a level 1.2m higher than the existing wall. • 15m of new wall in front of the Lock Keeper's Cottage will be constructed to replace the existing wall. • 20m of existing concrete wall between the cottage and the lock is to be raised by 100mm. • 20m of reinforced concrete wall between the County Trucks building and Meadow Lane Lock is to be raised by 100mm with the existing building forming the flood defence. • An automated flood gate to replace the existing at Meadow Lane Lock. • An automated penstock to the Nottingham and Beeston Canal overflow to replace the existing. • A 0.6m high wall, 80m long with sheet pile cut-off will be constructed immediately downstream of Tinkers Leen through Arla Depot. This will be at an offset of 2m from the river frontage. • A new pumping station at the Tinkers Leen outfall to pump water when the River Trent is in flood. The existing penstock will be modified. • A new 135m, 1.1m high wall will be built at an offset of 3m from the crest of the river bank at Personal Storage.
<i>Colwick Park Car Park</i>	<ul style="list-style-type: none"> • 275m of new flood embankment 2.5m high, between Daleside Road and the existing Candle Meadow embankment.

3.2.4 Colwick

Area of works

The Colwick scheme area extends from the council boundary near Colwick Country Park, to Radcliffe Railway Viaduct; refer to Figure 1.1. *Appendix D* describes the works and the associated impacts through Gedling Borough Council's area. It explains in detail the baseline and the proposed mitigation measures.

Site Description

The Crosslands Meadow housing development, which is on an old landfill site, and the large Colwick Industrial Estate, dominate this area. The old course of the River Trent is still visible and forms the boundary of Colwick Country Park, which is an important local recreational resource.

A riverside footpath follows the route of the Trent throughout the area, with the exception of a 0.5km stretch through the industrial estate.

There is limited ecological or archaeological interest, given the urbanised nature of the area.

Currently protection against flood events with a 2% annual probability of occurrence is provided by a combination of the following:

- 0.7km of formal flood walls;
- 2.7km of formal flood embankments;
- sections of raised road at River Road and Private Road No.5 (Colwick).

Works to be carried out

The reach is subdivided into three reaches which are characterised by the type of the work which is proposed. The works are summarised in Table 3.4, and more detailed information, including the appraisal of impacts and proposed mitigation measures, are provided in *Appendix D*.

Table 3.4 Summary of Proposed Works within Gedling Borough Council Jurisdiction (Colwick)

Reach	Description
<i>River Road to Colwick Industrial Estate</i>	<ul style="list-style-type: none"> • 825m of existing flood embankment to be raised by up to 0.5m. • 280m of new embankment of height 0.85m. • The existing raised section of River Road is to be raised by 0.3m.
<i>Colwick Industrial Estate</i>	<ul style="list-style-type: none"> • The outfalls of the Riverview pump storage facility are to be raised to above the design flood level to improve maintenance and performance. • 130m of existing flood embankment to be raised by up to 0.5m and reprofiled. • 130m of new 1.22m high flood wall founded on sheet piles along the route of the existing kerb line at the rear of Kitchen World. • 85m of existing wall will be removed and a new 1.72m high reinforced concrete wall constructed at the same location at the rear of Biffa Waste. The new wall will include security fencing at a 1m offset on the landward side. • Existing flood gate to be replaced. • Wall to be removed by Colwick Quay Development and replaced with 160m of 1.12m high reinforced concrete wall constructed at a 2m offset on the landward side. • A new pumping station will be required to over-pump flows in Holme's Dyke watercourse. The existing outfall arrangement will also be modified. • The 120m existing embankment at Total Oil is to re-profiled and raised by between 0.2m and 0.62m. • 165m of existing embankment is to be removed and replaced with a new 2.3m high reinforced concrete flood wall founded on sheet piles at the rear of British Drilling. • 60m of existing wall by the Armitage Pet Centre is to be raised using steel sheet piles and a capping beam. • 80m of existing wall by the lorry depot will be removed and replaced with a wall between 1.5m and 2.07m high. • 130m of existing wall by the Driving Standards Agency will be demolished and replaced with a 1.92m wall • Fire-fighting pumping station belonging to Total Oil to be relocated. • Private Road 5 to be raised.
<i>Colwick Industrial Estate to Railway Viaduct</i>	<ul style="list-style-type: none"> • 350m of existing embankment to be raised and re-profiled locally by up to 0.62m.

3.3 Programme of Implementation

The indicative construction programme is summarised in Table 3.5 and this shows the duration of works within each scheme area. The current proposed start date is May 2009. However, the start date, duration and phasing of works in the reaches are indicative and subject to funding, planning approval and detailed design. The order and timings of the works could also change as a result of restrictions on access or the working methods, or to realise efficiencies in the sourcing of materials. Site clearance may also start in scheme areas in advance of the main construction periods shown.

Appendices A to D contain a more comprehensive construction programme for the work in each of the four areas.

Environmental mitigation works to reinstate areas affected by our construction activities will be carried out immediately on completion of the main works in each scheme area. The exception is Attenborough, where considerable mitigation works in and around the Attenborough SSSI are required to create new habitat. This is likely to take over 12 months to complete and their construction might not be completed until after the FAS is delivered. Some advance mitigation works to create reedbed habitat at Attenborough SSSI will begin in 2009, although this not detailed in Table 3.5.

Table 3.5 Proposed Delivery Programme

Scheme Area	Indicative Construction Period																			
	2009				2010				2011				2012							
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1			
Sawley																				
Trent Meadows																				
Attenborough																				
Erewash																				
Rylands																				
Meadows																				
Colwick Country Park																				
Colwick																				

Q1:Jan/Feb/Mar Q2:Apr/May/June Q3:Jul/Aug/Sept Q4:Oct/Nov/Dec

	Erewash Borough Council jurisdiction		Broxtowe Borough Council jurisdiction
	Nottingham City Council jurisdiction		Gedling Borough Council jurisdiction

The proposed hours of working are 7.30am to 6pm, Monday to Friday. Construction activities outside these hours, on weekends, public holidays and overnight working will be avoided as far as possible. There will be some seasonal restrictions to the working, for example:

- canal closure (winter)
- work on existing defences (summer)
- sensitive bird areas (outside breeding season)

These site specific restrictions are described in more detail in the appendices.

3.4 Construction Activities

The works in each reach will comprise the establishment of the site and reinstatement on completion of one or more of the following activities:

- construct a new wall;
- demolish and build a new wall;
- construct a new embankment;
- raise an existing embankment;
- replace an existing embankment with a wall;

- construct a new pumping station;
- raise an existing road;
- replace a canal lock flood gate;
- install a sheet pile cut-off.

The typical outline methodology for the key activities is provided below. Site specific considerations are provided in the relevant appendix.

Site Establishment – all reaches

The initial tasks to establish the site working areas will include the following:

- fencing off the working areas, construct temporary haul roads and install temporary flood defence measures;
- temporarily closure of the footpaths, bridleways and those areas of public access affected by the works and provide alternative routes;
- installation of appropriate tree protection measures;
- provision of adequate signage at site access points;
- provision of utility services that may be required on site and at access points;
- establishment of the main compounds and the storage areas;
- clearance of woody vegetation from the site working areas.

Construct a new wall

- the site working width required is typically 20m;
- the footprint of the structure will be excavated and the ground sealed with a thin layer of concrete;
- the steel reinforcement cage will be fabricated and boards erected around it before the concrete is poured around the steel cage. Around 24 hours later the boards will be removed to reveal the concrete wall. The wall will be constructed in approximately 7.5m lengths.
- the reinforced concrete wall finish will be agreed with appropriate local planning authority.

The reaches of each scheme area where a new flood wall is required are as follows.

Scheme Area	Reaches with a New Flood Wall													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Sawley & Trent Meadows		✓	✓							✓	✓			
Attenborough ¹		✓		✓	✓	✓	✓	✓	✓	✓		✓	✓	
Meadows ²	✓	✓	✓	✓										
Colwick		✓												

¹: Includes the scheme areas of Attenborough, Erewash and Rylands

²: Includes the scheme areas of Meadows and Colwick Country Park

Demolish and build a new wall

- fencing off the working areas and construct temporary haul roads;
- take down existing wall and recycle material as appropriate;
- the same methodology as for constructing a new wall will then be followed.

The reaches of each scheme area where a flood wall will be replaced are as follows.

Scheme Area	Reaches with a Raised Flood Wall													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Sawley & Trent Meadows														
Attenborough ¹													✓	✓
Meadows ²	✓		✓											
Colwick														

¹: Includes the scheme areas of Attenborough, Erewash and Rylands

²: Includes the scheme areas of Meadows and Colwick Country Park

Construct a new embankment

- the site working area will extend approximately 5m from the base of the new embankment on the river side and up to 20m on the dry side;
- topsoil will be stripped from the working areas and stockpiled in a series of low mounds along the length of the works;
- the embankment will be constructed using a suitable cohesive fill compacted in layers;
- where possible, construction will take the form of a benched clay core, bulk fill secondary material to the sides, with a clay capping to seal the fill against water ingress;
- topsoil will be re-laid and where access is required on top of the embankment it will be appropriately surfaced prior to grass-seeding.

The reaches of each scheme area where a new embankment is required are as follows.

Scheme Area	Reaches with a new Embankment													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Sawley & Trent Meadows			✓		✓		✓			✓	✓	✓		
Attenborough ¹	✓	✓	✓				✓		✓		✓			
Meadows ²	✓			✓										
Colwick	✓													

¹: Includes the scheme areas of Attenborough, Erewash and Rylands

²: Includes the scheme areas of Meadows and Colwick Country Park

Raise existing embankment

- the site working area comprises a corridor up to 5m wide from the base of the existing embankment on the river side and up to 20m on the dry side;
- topsoil will be stripped from working areas and stockpiled in a series of low mounds along the length of the works;

- the clay of the existing embankment will be benched to provide a key for the new material, and the clay stockpiled for reuse;
- imported material will be brought to site and deposited in storage areas. This will be handled and transported to the embankments;
- the stockpiled clay will be replaced and compacted to seal the fill;
- topsoil will be re-laid and where access is required on top of the embankment it will be appropriately surfaced prior to grass-seeding.

The reaches of each scheme area where an existing embankment is to be raised are as follows.

Scheme Area	Reaches with Embankments to be Raised													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Sawley & Trent Meadows	✓		✓			✓			✓	✓				
Attenborough ¹												✓	✓	
Meadows ²														
Colwick	✓	✓	✓											

¹: Includes the scheme areas of Attenborough, Erewash and Rylands

²: Includes the scheme areas of Meadows and Colwick Country Park

Replace an existing embankment with a wall

- the site working area will be principally confined to the footprint of the existing embankment. An additional 2m may be required for safety reasons from the base on both sides of the embankment;
- the existing embankment will be excavated. Suitable clay will be transported to stockpiles for use elsewhere in the project;
- a suitable temporary access road will be constructed to facilitate delivery of materials, such as steel reinforcement, shuttering, concrete, bricks and mortar;
- the footprint of the structure will be excavated and blinded with concrete;
- steel fixing, shuttering concreting and striking will progress along the wall in sections;
- the reinforced concrete wall finish will be agreed with appropriate local planning authority.

The reaches of each scheme area where an existing embankment is being replaced with a flood wall are as follows.

Scheme Area	Reaches with Wall to replace an Embankment													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Sawley & Trent Meadows								✓						
Attenborough ¹														
Meadows ²														
Colwick		✓												

¹: Includes the scheme areas of Attenborough, Erewash and Rylands

²: Includes the scheme areas of Meadows and Colwick Country Park

Construct a new pumping station

- the site working area will be established, with the position of any local utilities identified and secured;
- the chamber will be excavated to the required depth using temporary works. Supporting walls will be formed and the base blinded with concrete;
- submersible pumps with the associated mechanical and electrical apparatus will be installed;
- the required access ladder arrangements, manhole cover slab and control panel/kiosk will be fitted. The surrounding improvements to the existing drainage will be carried out with the installation of the rising main and discharge outfall;
- the excavated area will be backfilled and the surrounding area reinstated.

The reaches of each scheme area where a new pumping station is required are as follows.

Scheme Area	Reaches with a New Pumping Station													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Sawley & Trent Meadows														
Attenborough ¹								✓						
Meadows ²			✓											
Colwick		✓												

¹: Includes the scheme areas of Attenborough, Erewash and Rylands

²: Includes the scheme areas of Meadows and Colwick Country Park

Raise an existing road

- traffic management will be agreed with the local police and highways authority;
- the existing kerbs and footpath surfacing will be broken out. Any retaining structures at the rear of the footpath will be installed;
- the existing road surface will be planed out at the tie-ins and a regulating layer added to the carriageway;
- the wearing course will be laid;
- on completion of the new road surface, white lining will be reapplied and the traffic management will be removed.

The reaches of each scheme area where an existing road is being raised are as follows.

Scheme Area	Reaches with Road Raising													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Sawley & Trent Meadows		✓					✓		✓					
Attenborough ¹					✓	✓		✓	✓			✓		
Meadows ²	✓	✓												
Colwick	✓	✓												

¹: Includes the scheme areas of Attenborough, Erewash and Rylands

²: Includes the scheme areas of Meadows and Colwick Country Park

Replace a canal lock flood gate

- the temporary closure of the canal lock will be agreed with British Waterways. This is likely to be during the winter months;
- the site working area will be established, which will require the temporary closure of the canal towpath;
- the canal will be temporarily blocked either side of the flood gate structure with stop logs or another form of temporary works;
- water will be pumped out of the lock chamber to provide a dry working area;
- the existing flood gates will be removed and replaced by newly configured gates by a crane sited nearby;
- any additional lighting and ancillary finishes will be agreed with British Waterways during the detailed design phase, and added to the structure;
- the lock chamber will be refilled with water and the temporary works removed;
- on completion, the footpath will be reinstated, site fencing removed and any permanent fencing erected.

The reaches of each scheme area where a canal lock flood gate is required are as follows.

Scheme Area	Reaches with a Replacement Canal Lock Flood Gate													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Sawley & Trent Meadows					✓									
Attenborough ¹													✓	
Meadows ²														
Colwick														

¹: Includes the scheme areas of Attenborough, Erewash and Rylands

²: Includes the scheme areas of Meadows and Colwick Country Park

3.5 Operational Phase

The scheme is designed to be low maintenance. Routine inspections of the defences will be required and a 1-5m corridor will be maintained alongside all defences for maintenance and inspection purposes by the Environment Agency Operations Team. The crests of the raised and new embankments will be a minimum 3m wide to facilitate maintenance and inspection. There will be a regular mowing regime for the grassed embankments.

Sluices, floodgates and other structures will be inspected and maintained in accordance with the Environment Agency's procedures and the manufacturer's recommendations. Access to these will be by means of the routes along the flood defences described above.

3.6 Use of Natural Resources and Waste Generation

3.6.1 Sustainable Construction

In 2000, the Government published its Strategy for Sustainable Construction Building - A Better Quality of Life which presented a way forward for Government and industry and suggested 10 practical actions that the construction industry could take to target sustainable construction.

A review was carried out in 2006 to highlight the activities undertaken by industry and Government during the past six years that have contributed to that agenda (DTI, 2006). It aims to provide a listing of current work, initiatives and Government policies relevant to sustainable construction, in order to increase awareness of sustainability in the context of construction. It also aims to provide an effective basis to guide future government policies where they are relevant to construction and to outline where the industry wishes to see itself going in its future development.

Sustainable Construction builds upon the principles of sustainable development which the Government as a whole is committed to support. These are outlined in the UK Strategy for Sustainable Development 'Securing the Future' published in March 2005, which sets the agenda to deliver a better quality of life using long-term solutions that will benefit everyone.

Together with the most recent policy and guidance, we have used the principles of the 10 actions set out in the 2000 Strategy and noted how they can be applied to the Nottingham Trent Left Bank scheme in terms of the use of natural resources and waste generation.

Re-use of existing built assets – The planning work identified all structures and materials that can be left in situ or recycled into the project. The Site Waste Management Plan will record and monitor the extent to which this is achieved. This will effectively reduce waste production, transport requirements for disposal, the use of raw materials and the transportation of remotely procured goods and material.

Design for minimal waste - Very little waste from the construction and operation of defences is anticipated. Such waste, which will include office and construction materials, will be carefully stored and segregated to enhance its recycling potential. All legal requirements for waste management, including the "duty of care", will be met by the contractor and audited for compliance and best practice.

Aim for lean construction - Careful planning will prevent the over ordering of materials and consumables. Buyers will operate on a "just enough" and "just in time" manner, to reduce storage and handling requirements. This will bring efficiencies to materials use and energy requirements. It will reduce waste and the potential to damage goods.

Minimise energy in construction – Ready-mixed concrete and other raw materials will be sourced as locally as possible, subject to quality and economic constraints. Sources of ready-mix will be evaluated for its recycled content. All other materials that have recycled content options will be evaluated in the same way. This will

include macadam, bricks and blocks, ducting and precast products. The contractor will preferentially use local labour who will be encouraged to share transport to the site.

Minimise energy in use - Plant will be sized according to need and it will not be oversized. All operators will be trained in the efficient use of the plant and will not leave engines running when the plant is unattended. Plant will be clean, well maintained and regularly inspected to ensure efficiency.

Do not pollute - This EIA identifies potential pollutant sources, and specifies methods of working and contingency plans to minimise the risks. All static plant will be kept on drip-trays or contained within bunds. No refuelling will be permitted near waterbodies or watercourses. Dedicated refuelling areas will be established and refuelling will be the responsibility of trained operatives. Equipment for the containment and clean up of spills will be strategically located around the site, and all operatives will be competent in the use of the equipment. An emergency spill response plan will be developed and a spill response team will be established and trained. The plan will be tested regularly using simulated events.

Preserve and enhance biodiversity - Mitigation measures were identified to minimise the impacts on protected species and habitats. Strict adherence by the contractor to the requirements of the Environmental Action Plan (EAP) will ensure that biodiversity is preserved. Additionally, the contractor will train staff on site to identify at-risk species and habitats, and will strictly maintain a working corridor using fencing and other means. Regular auditing by the client, the contractor and an external body will ensure that preventative and protective measures are maintained.

Conserve water resources - *Section 7.9* describes the water resources at the sites. Very little water will be used in the construction process.

Respect people and their local environment – *Section 5* details the consultation undertaken to date. Contact with statutory consultees and residents will continue throughout the construction period. This will facilitate dialogue and mutual understanding, as a constructive means to help minimise any disturbance to local residents and the environment. The Considerate Contractors Scheme will be used to establish a formal and auditable mechanism to ensure that due consideration is given to local residents and workers. High standards of housekeeping will be maintained at all times and litter and untidiness will not be tolerated.

Set targets - As a government body, the Environment Agency sets targets for their economic, social and environmental performance.

The Environment Agency is also developing sustainable procurement guidance and this will be applied to this scheme. Further details of the main materials to be used and potential sources are included in the scheme area appendices.

3.6.2 Site Waste Management Plan

Since 2008 it is a statutory requirement to produce a Site Waste Management Plan (SWMP) for all projects over £300,000 to comply with the Site Waste

Management Plan Regulations 2008. SWMP generate both environmental and financial savings by applying a waste hierarchy and minimising the amount of waste going to landfill.

A SWMP was completed during the outline design of the works and included details on responsibility for the waste, a description of the works, materials resource efficiency, waste management and waste controls and handling. Waste issues will continue to be considered during the detailed design stage and fed into the specifications for the works. Through this, effort will continue to be made to:

- minimise the materials used by promoting the economic use of materials and minimising waste before it is generated;
- reduce the waste in construction;
- reuse surplus materials;
- recycle waste.

During construction the SWMP will be regularly reviewed and monitored to ensure that all waste created is going to a properly licensed or exempt facility and all efforts are made to minimise, reduce and recycle waste.

3.7 Public Liaison

A public liaison officer will be appointed for the scheme to inform the public on construction activities, proposed timings and durations of works, access arrangements and other queries.

A site noticeboard will be erected which will inform the public on the proposed works and who to contact and newsletters/letters will be issued as appropriate throughout the scheme.

4 PLANNING CONTEXT

This section examines the development plan policies which are relevant to the proposed works, together with the consents and approvals which are required.

4.1 National and Regional Plans

The national and regional plans and strategies are shown in Table 4.1.

4.2 County and Local Authority Plans

4.2.1 Local Development Plans

Table 4.2 lists the four scheme areas and identifies the affected Administrative Counties and Local Planning Authorities.

Table 4.2 Administrative Counties, Local Planning Authorities and Associated Development Plans

Area	County	Local Planning Authority	Relevant Development Plans
Sawley and Trent Meadows	Derbyshire	Erewash Borough Council	<ul style="list-style-type: none"> Erewash Borough Local Plan (Replacement Plan) adopted on 25 July 2005 Derby and Derbyshire Joint Structure Plan adopted January 2001
Attenborough, Erewash and Rylands	Nottinghamshire	Broxtowe Borough Council	<ul style="list-style-type: none"> Broxtowe Local Plan adopted in September 2004 Nottingham and Nottinghamshire Joint Structure Plan adopted February 2006
Meadows and Colwick Country Park	Nottinghamshire	Nottingham City Council	<ul style="list-style-type: none"> Nottingham and Nottinghamshire Joint Structure Plan Nottingham Local Plan adopted November 2005
Colwick	Nottinghamshire	Gedling Borough Council	<ul style="list-style-type: none"> Gedling Borough Local Plan adopted July 2005

In accordance with new planning legislation (Planning and Compulsory Purchase Act, 2004), all local planning authorities are preparing a series of Local Development Documents (LDDs) which will eventually replace the Local Plans. Under the act old policies can be saved for a period of three years from either the date of the commencement of the act or the date of adoption of the Local Plan. Following this period policies can be saved for a longer period by applying to the Secretary of State six months before their expiry date. Policies in the Nottingham Local Plan have been saved until November 2008. The Erewash and Gedling Local Plans expired in July 2008 and the Broxtowe Local Plan expired in September 2007. However, requests were made to and approved by the Secretary of State to save certain policies in these local plans until the LDD are finalised.

Planning policies relating to each environmental receptor are presented under the individual headings in *Annex 1*.

Table 4.1 Relevant National and Regional Plans and Strategies to the Nottingham Trent Left Bank FAS

Plan, Strategy or Initiative	Summary Description	Plan/Strategy/Initiative influence over the Nottingham Trent Left Bank FAS	Nottingham Trent Left Bank FAS response to Plan/Strategy/Initiative
Water Framework Directive	<p>The Nottingham Trent Left Bank FAS falls within the Humber River Basin District. The final version of the River Basin Management Plan (RBMP) will be published by December 2009.</p> <p>The RBMP will contain a programme of measures to progress the standards of waterbodies to good status by 2015.</p>	The Water Framework Directive will contribute to mitigating the effects of floods, though this is not one of the principal objectives of the directive (Commission of European Communities 2004).	The Nottingham Strategy, developed during the appraisal of the scheme, will form an important reference document for the RBMP.
‘Making Space for Water’ (Environment Agency)	The Environment Agency’s strategy for delivering a holistic approach to flooding, addressing such issues as land-use planning, integrated urban drainage management and living with flood risk.	Floodplains should be used for their natural purposes, continue to function effectively and are protected from inappropriate development.	Contribute to the Environment Agency’s objectives.
Fluvial Trent Strategy (Environment Agency, 2005)	Refer to <i>Section 1.3</i> .		
Local Contribution Plan (Environment Agency, 2006/11)	The Midlands Local Contribution 2006/11 published by the Environment Agency is a five-year strategy for the area. It sets out locally agreed targets that the Midlands Area team will work towards. These will contribute to the achievement of the Environment Agency’s National Targets outlined in ‘Making Space for Water’ and deliver the Environmental Vision objectives for the next 20 years.	Outlines objectives and targets for the area that were used to develop Environment Agency objectives.	Contribute to the objective to reduce the proportion of properties exposed to a high risk of flooding and, where possible, help deliver biodiversity gain.
PPS25: Development and Flood Risk, 2006	This guidance explains how flood risk should be considered at all stages of the planning and development process, to reduce future damage to property and loss of life. The planning system should seek, where possible, to reduce and certainly not increase flood risk. It should help ensure that floodplains are used for their natural purposes, continue to function effectively and are protected from inappropriate development.	Floodplains should be used for their natural purposes, continue to function effectively and are protected from inappropriate development.	Support PPS25 principles by, where practical, maximising the available floodplain.

Plan, Strategy or Initiative	Summary Description	Plan/Strategy/Initiative influence over the Nottingham Trent Left Bank FAS	Nottingham Trent Left Bank FAS response to Plan/Strategy/Initiative
Catchment Flood Management Plan (CFMP)	<p>The Trent CFMP is currently in development. It is a study which considers flooding over an area covering the River Trent catchment and all of its tributaries. The CRMP will result in policies which will take into consideration the existing conditions across the area. The CFMP will consider potential future changes to condition in the catchment from climate change; changes to the way land is used; changes to the rural landscape and the way agricultural land is managed and increased pressure from urban development.</p>		
Regional Spatial Strategy (RSS) for the East Midlands (March 2005)	<p>Sets out a long-term strategy for the spatial development for the East Midlands. The RSS is primarily concerned with the scale, location and phasing of development, including future housing provision. It identifies priorities for the environment, transport, infrastructure, economic development, retailing, renewable energy, agriculture, minerals, and waste treatment and disposal.</p> <p>A draft new RSS (2006) has been published for public consultation and will replace the old RSS. The issue of the final Regional Plan by the Secretary of State is due in late 2008 / early 2009. In due course the policies in the RSS will also replace those in the adopted Structure Plans. Both the existing and draft RSS state that 'when considering the provision, maintenance or improvement of riparian and sea defences emphasis should be on a more natural approach to flood defences, maximising environmental (<i>and other public benefits</i>) throughout.</p>	The adopted and new RSS provide the latest long term vision of development in the East Midlands area.	The FTS explored more sustainable alternatives to hard defences. For the Nottingham area, however, it was considered that hard defences were the preferred option; refer to <i>Section 1.3</i> . Environmental gains will be sought through enhancement measures.

Plan, Strategy or Initiative	Summary Description	Plan/Strategy/Initiative influence over the Nottingham Trent Left Bank FAS	Nottingham Trent Left Bank FAS response to Plan/Strategy/Initiative
<p>PPS9: Biodiversity and Geological Conservation</p>	<p>This sets out the national planning policies for the protection of biological and geological conservation throughout the planning system. It highlights that the aim of planning decisions should be to prevent harm to biodiversity and geological conservation interests. When granting planning permission LPAs need to be satisfied that there are no reasonable alternatives if a development was to harm these interests. Where a planning decision would result in significant harm to biological and geological interests which can not be prevented or adequately mitigated against, appropriate compensation should be sought. If that significant harm can not be prevented, adequately mitigated against or compensated for then planning permission should be refused.</p> <p>Where a proposed development on land within or outside a SSSI is likely to have an adverse effect on the SSSI planning permission should not normally be granted. An exception should only be made when the benefits of the development clearly outweigh both the impacts that it is likely to have on the features of the site and any broader impacts on the national network of SSSI. LPAs should use conditions and/or planning obligations to mitigate the harmful aspects of the development.</p>	<p>The Environment Agency has a duty to conserve and enhance the environment.</p>	<p>Construction works within Attenborough SSSI have been minimised as much as practicable. Compensatory habitat within the SSSI is proposed to reduce the impact of permanent land take within the SSSI; refer to Appendix F.</p>

Plan, Strategy or Initiative	Summary Description	Plan/Strategy/Initiative influence over the Nottingham Trent Left Bank FAS	Nottingham Trent Left Bank FAS response to Plan/Strategy/Initiative
<p>Structure and Local Plans (see <i>Annex 1</i>)</p>	<p>Structure Plans take account of the government’s Regional Planning Guidance, which is being superseded by the RSS, in relation to the Nottingham, Nottinghamshire and Derbyshire area and provides a strategic framework for the Local Plans prepared by the local planning authorities of Erewash, Broxtowe, Nottingham and Gedling.</p> <p>The Local Plans provide the basis for development within specific local planning authorities and identify the precise boundaries of policies contained in the Structure Plan, such as the key residential and industrial allocations, and the green belt/open space between towns.</p> <p>The Structure and Local Plans are statutory documents and take account of both national and regional planning guidance. However, in September 2004, the Planning and Compulsory Purchase Act 2004 brought in major changes to development plans. The old system of Structure Plans, Local Plans and Supplementary Planning Guidance is currently being replaced with the Local Development Frameworks (LDFs).</p>	<p>The Structure and Local Plans are the key documents that will help to shape the future land use development in terms of protecting its environment whilst promoting economic growth and social cohesion.</p> <p>Their policies may restrict potential alignment options by protecting key features from development (e.g. areas designated for nature conservation importance, Conservation Areas, development areas, transport networks). Refer to Annex 1 for each LPA.</p>	<p>Support planning policies in the development of alignment options and design.</p> <p>Provide defined standard of flood protection to existing and future industrial, commercial, housing or transport in the area. Refer to Annex 1 for details of each LPA.</p>
<p>National and Local Biodiversity Action Plans (see Tables 4.3 and 4.4)</p>	<p>The overall objective of the UK Biodiversity Action Plan (BAP) is <i>‘to conserve and enhance biological diversity within the UK and to contribute to the conservation of global biodiversity through all appropriate mechanisms’</i>. It contains Habitat and Species Action Plans for the most threatened, both to protect them and increase their numbers. Local Authorities produce Local BAPs (LBAPs) to identify local priorities and to determine the contribution they can make to the delivery of the national Species and Habitat Action Plan targets.</p> <p>Derbyshire LBAP covers the Sawley and Trent Meadows scheme area</p> <p>Nottinghamshire LBAP covers the Attenborough, Erewash & Rylands, Meadows and Colwick Country Park, and Colwick scheme areas</p>	<p>Identifies species and habitats within the study area that require careful consideration in terms of impact due to flood risk management options.</p>	<p>Where possible, contribute to the UK and LBAP targets through opportunities to improve habitats.</p>

Nottinghamshire Minerals Local Plan

The new Minerals Local Plan was adopted on 5 December 2005 following several periods of public consultation and a public inquiry. It replaces the “Replacement Nottinghamshire Minerals Local Plan Revised Deposit” (May 2003) and reflects new legislation and changes in the demand for minerals.

No future proposals for minerals abstraction in the study area was highlighted in the plan. Cemex plan to continue abstracting gravel from Attenborough for a further 15 years.

Derby and Derbyshire Minerals Local Plan

The City Council, together with the County Council, adopted the Minerals Local Plan on 5 April 2000. This will guide decisions on planning applications for the extraction of minerals and associated works in the area. The Plan was revised in 2002 to take account of changes in government policy on coal extraction.

No future proposals for minerals abstraction in the study area was highlighted in the plan.

Derby and Derbyshire Joint Transport Plan

The second Derby Joint Transport Plan, LTP2 covers the period 2006 to 2011 and sets out the longer term approach to travel and transport in Derby and the surrounding rural area. It also explains the transport strategy up to the year 2021. The proposed works would not affect implementation of this plan.

Greater Nottingham Local Transport Plan

The plan is produced jointly by Nottingham City Council and Nottinghamshire County Council, and includes the City of Nottingham, the boroughs of Broxtowe, Gedling, Rushcliffe and the Hucknall part of Ashfield. It covers the period April 2006 to March 2011. The proposed works would not affect implementation of this plan.

Nottingham Waterside Regeneration Plan

Nottingham City Council advised that the majority of the river frontage between Trent Bridge and Ladybay Bridge (in Meadows and Colwick Country Park scheme area) will be developed in the next ten years, as part of a Nottingham Regeneration programme. The programme is described in more detail in *Section 12, Appendix C*.

To ensure best use of public money and compliance with planning guidance, the proposed works will only address flood protection to those areas that are not being considered for regeneration. Such an approach is only possible because a breach in those particular defences through Meadows would only result in localised flooding.

4.3 Other Non-Statutory Plans

Biodiversity Action Plans

In June 1992, the Convention of Biological Diversity was signed by 159 governments at the Earth Summit. It was the first treaty to provide a legal framework for biodiversity conservation. It called for the creation and enforcement of national strategies and action plans to conserve, protect and enhance biological diversity.

In 1994, the UK government launched the “Biodiversity: the UK Action Plan”, which outlined the UK plan for dealing with biodiversity conservation in response to the Rio Convention; refer to Table 4.1. Local Authorities produce ‘Local BAPs’ to identify their priorities and to determine the contribution they can make to the national targets.

Derbyshire and Nottinghamshire County Councils published Local BAPs to promote and implement good practice and management needs to benefit habitats and the wildlife they support. The habitats and species potentially present in the River Trent floodplain with Action Plans are presented in Tables 4.3 and 4.4.

Table 4.3 Local and National Habitat Biodiversity Action Plans Relevant to River Trent Floodplain

BIODIVERSITY ACTION PLAN				
Vegetation Type	Lowland Derbyshire BAP	Nottinghamshire BAP	UK Priority Habitat	UK Broad Habitats (where not assigned to a priority habitat)
Woodland	<ul style="list-style-type: none"> • Lowland broadleaved mixed woodland • Wet woodland • Lowland wood pasture, parkland and veteran trees 	<ul style="list-style-type: none"> • Mixed ash-dominated woodland • Oak-birch woodland • Wet Broadleaved Woodland 	<ul style="list-style-type: none"> • Wet woodland • Lowland wood pasture and parkland 	<ul style="list-style-type: none"> • Broadleaved, mixed and yew woodland
Grassland	<ul style="list-style-type: none"> • Semi-natural grassland 	<ul style="list-style-type: none"> • Lowland calcareous grassland • Lowland dry acid grassland • Lowland wet grassland • Unimproved neutral grassland 	<ul style="list-style-type: none"> • Lowland calcareous grassland • Lowland dry acid grassland • Lowland meadow 	<ul style="list-style-type: none"> • Neutral grassland • Improved grassland
Wetlands & Waterbodies	<ul style="list-style-type: none"> • Lowland swamps, mires, fens and reedbeds • Rivers and streams • Standing open water (including ponds, lakes and canals) • Floodplain grazing marsh 	<ul style="list-style-type: none"> • Reedbed • Rivers and streams • Eutrophic and mesotrophic standing waters 	<ul style="list-style-type: none"> • Reedbeds • Fens • Eutrophic standing waters • Mesotrophic lakes • Coastal and floodplain grazing marsh 	<ul style="list-style-type: none"> • Fen, marsh and swamp • Rivers and streams • Standing open water and canals
Hedgerows	<ul style="list-style-type: none"> • Ancient and/or species-rich hedgerows 	N/A	<ul style="list-style-type: none"> • Ancient and/or species-rich hedgerows 	<ul style="list-style-type: none"> • Boundary and linear features
Agricultural	<ul style="list-style-type: none"> • Cereal field margins 	N/A	<ul style="list-style-type: none"> • Cereal field margins 	<ul style="list-style-type: none"> • Arable and horticulture
Urban	N/A	<ul style="list-style-type: none"> • Urban and post-industrial habitats 	N/A	<ul style="list-style-type: none"> • Urban

Table 4.4 Local Priority Species Biodiversity Action Plans Relevant to River Trent Floodplain

Lowland Derbyshire BAP		Nottinghamshire BAP
Sausage-beard moss <i>Didymodon tomaculosus</i>	White-clawed crayfish <i>Austropotamobius pallipes</i>	Barn owl <i>Tyto alba</i>
Flamingo moss <i>Tortula cernua</i>	Argent and sable (moth) <i>Rheumaptera hastata</i>	Bats
Beaked beardless-moss <i>Weissia rostellata</i>	Square-spotted clay (moth) <i>Xestia rhomboidea</i>	Grizzled skipper <i>Pyrgus malvae</i> and dingy skipper <i>Erynnis tages</i>
Spruce's bristle-moss <i>Orthotrichum sprucei</i>	Hairy wood ant <i>Formica lugubris</i>	Nightjar <i>Caprimulgus europaeus</i>
Pink waxcap <i>Hygrocybe calyptriformis</i>	Shining guest ant <i>Formicoxenus nitidulus</i>	Otter
Oak polypore <i>Piptoporus quercinus</i>	Great-crested newt <i>Triturus cristatus</i>	Water vole
Tower mustard <i>Arabis glabra</i>	Bullfinch <i>Pyrrhula pyrrhula</i>	White-clawed crayfish
Cornflower <i>Centaurea cyanus</i>	Corn bunting <i>Emberiza calandra</i>	
Red hemp-nettle <i>Galeopsis angustifolia</i>	Grey partridge <i>Perdix perdix</i>	
Pennyroyal <i>Mentha pulegium</i>	Lapwing <i>Vanellus vanellus</i>	
Shepherd's needle <i>Scandix pecten veneris</i>	Linnet <i>Carduelis cannabina</i>	
Grass-wrack pondweed <i>Potamogeton compressus</i>	Reed bunting <i>Emberiza schoeniclus</i>	
Brown hare <i>Lepus europaeus</i>	Skylark <i>Alauda arvensis</i>	
Dormouse <i>Muscardinus avellanarius</i>	Tree sparrow <i>Passer montanus</i>	
Otter <i>Lutra lutra</i>	Turtle dove <i>Streptopelia turtur</i>	
Bats	Spotted flycatcher <i>Muscicapa striata</i>	
Water vole <i>Arvicola terrestris</i>	Song thrush <i>Turdus philomelos</i>	

4.4 Consents and Approvals

The following section introduces the consents and approvals which are required for construction of the flood defences.

4.4.1 Planning Permission

All of the proposed works comprise engineering or building operations and, therefore, constitute 'development' as defined in Section 55 of the Town and Country Planning Act 1990. By virtue of Section 57, planning permission is required for some of the works. The local planning authorities made the decision whether or not our development proposals required planning permission. They were consulted on our original proposals in 2007 and we have checked with them regarding the effect of our revised proposals. Table 4.5 and Figures 4.1 to 4.4 indicate the scheme areas that require planning permission.

Some of the works constitute ‘permitted development’ by virtue of Parts 14 and 15 of the Town and Country Planning (General Permitted Development Order). Under the Water Resources Act 1991, the Environment Agency has powers to maintain and improve main rivers for the efficient passage of flood flow and the management of water levels. Figure 4.1 indicates which works will be undertaken under the Agency’s Permitted Development powers.

Planning permission was received from Erewash Borough Council for some sections of the works through Sawley and Trent Meadows in 2007. This was based on our original proposals and supported by the Environmental Statement published in 2007. We have consulted with Erewash Borough Council on the changes to our proposals. They have confirmed that the planning permission we have received remains valid and the changes are within our permitted development rights.

Table 4.5 Scheme Reaches Requiring Planning Permission

Area	County	Local Planning Authority	Planning Permission Required
Sawley and Trent Meadows	Derbyshire	Erewash Borough Council	Some Reaches; refer to Figure 4.1 for locations ¹
Attenborough, Erewash and Rylands	Nottinghamshire	Broxtowe Borough Council	Some Reaches; refer to Figure 4.2 for locations
Meadows and Colwick Country Park	Nottinghamshire	Nottingham City Council	Not required; refer to Figure 4.3
Colwick	Nottinghamshire	Gedling Borough Council	Not required; refer to Figure 4.4

¹Planning permission from Erewash Borough Council was received in June 2007.

4.4.2 Environmental Impact Assessment

The principal aim of the EC Directives on EIA (85/337/EEC & 2001/42/EC) is to ensure that the authority giving the primary consent makes its decision in the knowledge of any likely significant effects on the environment. EIA is a process of drawing together, in a systematic way, an assessment of the project’s likely significant environmental effects. This helps to ensure that the importance of the predicted effects, and the scope to reduce them, are understood by the public and the relevant competent authority before it makes its decision; refer to paragraph 9 Circular 02/099 EIA.

Flood defence schemes are considered to be ‘land drainage and flood relief works’ subject to Schedule 2 of the Town and Country Planning (Environmental Impact Assessment) Regulations 1999 (SI 1999/293 as amended by SI 2005/1399). Schedule 2 developments only require an EIA if they are likely to have significant effects on the environment by virtue of factors such as nature, size or location.

The Regulations identify thresholds and indicative criteria, which apply to Schedule 1 and 2 developments. In the case of flood defence works, the DETR Circular 02/99, “Environmental Impact Assessment”, provides additional guidance and specifies that EIA should be required for a Schedule 2 development, namely flood relief works of greater than 1ha in an “environmentally sensitive location”. The circular states that “special considerations apply to Sites of Special Scientific

Interest (SSSI)” and that “in practice, the likely environmental effects of development will often be such as to require EIA if it is to be located in or close to such sites”.

Responsibility for determining whether an EIA is required under the Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999 (as amended) lies initially with the LPA. In this instance, a formal screening opinion was sought from all four affected LPAs. Nottingham City Council was the only LPA to respond on this issue and is of the opinion that an EIA is required for the proposed development; refer to *Appendix E*. This is because the proposed works fall within Class 10 (Infrastructure Projects) of Schedule 2 of the Town & Country Planning (Environmental Impact Assessment) Regulations 1999; ‘the works have the potential to cause significant impacts to physical and ecological aspects of the environment’ and ‘the area of the proposed works would exceed 1ha’.

Some areas of the scheme are proposed under permitted development powers. This ES is also being produced under Statutory Instrument (SI) No. 99/1783. The Environmental Impact Assessment (Land Drainage Improvement Works) Regulations 1999 (as amended).

SI 99/1783 applies to improvements to existing land drainage infrastructure. The Regulations require that improvements which are likely to have significant environmental effects should be subject to an EIA and have an ES. The Environment Agency, acting as the competent authority, assessed that due to the length of the scheme and its potential to have significant cumulative environmental effects, an EIA is required under SI 99/1783.

For land drainage improvement works that do not require planning permission, the permitted development rights are not lost if an ES is deemed necessary under the Environment Agency’s (Land Drainage Improvement) EIA Regulations.

4.4.3 Other Consents

Land Drainage Consent

Land Drainage consent, which is granted by the Environment Agency, is required under the Water Resources Act for any works in, on, under, or over a main river or within the byelaw width of 8m. Land Drainage consent will be required for sections of the scheme.

Scheduled Monument Consent

Scheduled Monument Consent is required from the Secretary of State for Culture, Media and Sport under the Ancient Monument and Archaeological Areas Act 1979, if works are to be carried out to a Scheduled Monument. ‘Works’ are defined by the Act as; ‘demolishing, destroying, damaging, removing, repairing, altering, adding to, flooding or tipping material onto the monument’. Scheduled Monument Consent is still required if planning permission is granted.

Scheduled Monument Consent is required for works within Fishponds Scheduled Monument at Attenborough village; refer to *Section 7.11*.

Listed Building Applications

A separate application under the Planning (Listed Buildings and Conservation Areas) Regulations 1990 (SI 1990/1519) is required for works adjacent to the Listed Buildings along Victoria Embankment, Meadows. Confirmation has yet to be received from Broxtowe Borough Council whether Listed Buildings consent is also needed for Ireton House and St Mary's church, Attenborough.

Hedgerow Consent

Although the Environment Agency is exempt from The Hedgerow Regulations 1997, we will follow best practise and submit a Hedgerow Removal Notice to the relevant LPA for all hedgerows to be removed in reaches not subject to planning permission. Where planning permission is granted, separate approval is not required.

Conservation Areas Consent

The demolition of a structure requires conservation area consent if it is within a Conservation Area under the Planning (Listed Buildings and Conservation Areas) Regulations 1990 (SI 1990/1519).

4.5 Conclusions

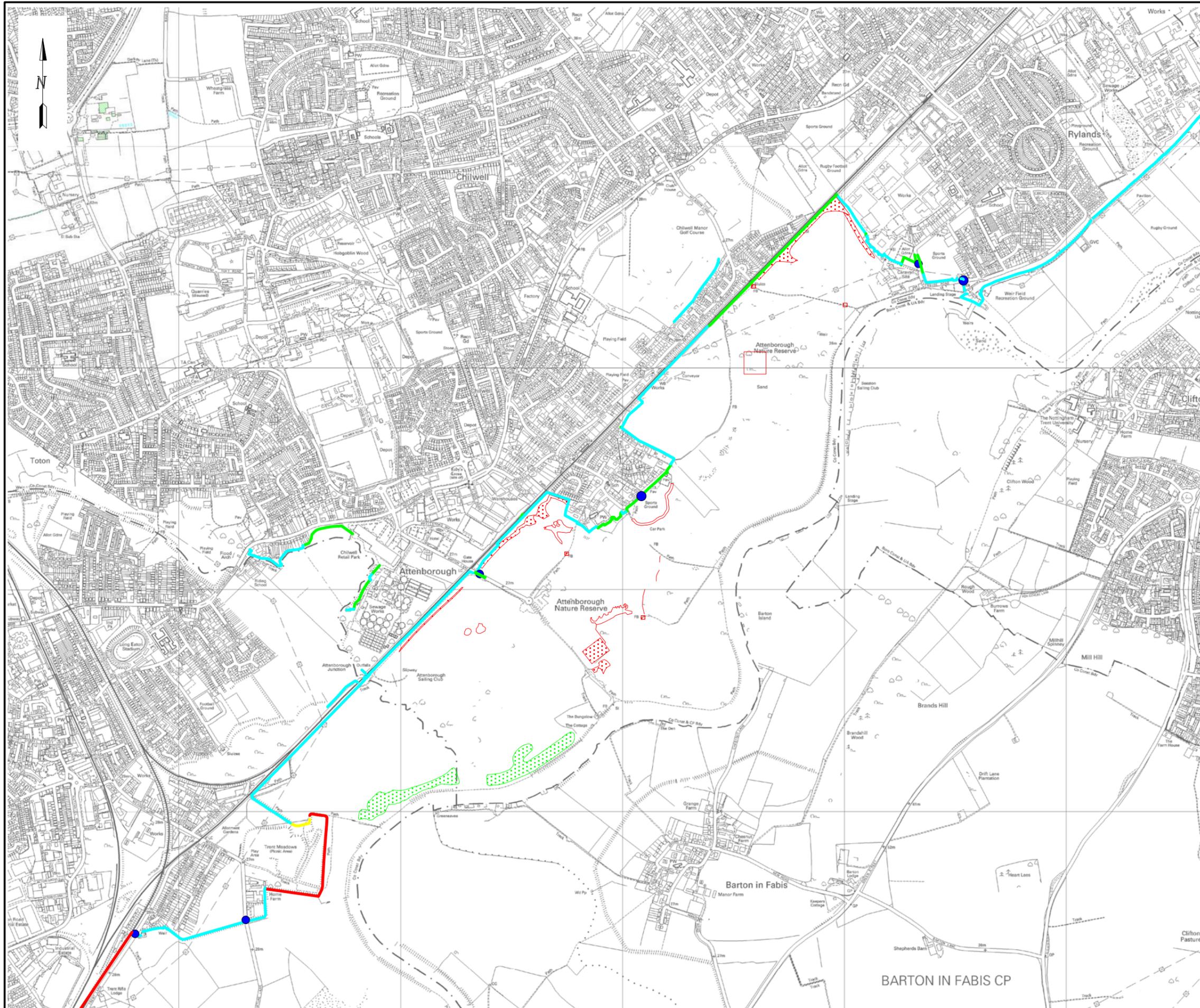
In summary, this ES serves to meet the requirements of The Town and Country Planning (Environmental Impact Assessment) Regulations 1999 (as amended) and The Environmental Impact Assessment (Land Drainage Improvement Works) Regulations 1999 (as amended) to undertake an assessment of the environmental effects of the flood alleviation scheme. It is an integral part of the planning application procedure.

The proposed scheme has been shown to be consistent with the government policy, the detailed provisions of the extant development plans for the areas of proposed development. The scheme is not fully consistent with RSS as the construction of flood defence is not considered in the strategy to be a natural approach to flood defences. However; the scheme has maximised areas for flood plain storage within the constraints of providing flood risk management to a major city. The Nottingham Left Bank FAS will provide environmental enhancements to the areas and will enable future regeneration in Nottingham to occur.

Where adverse impacts have been identified, the mitigation measures put forward are considered appropriate to reflect the requirements of those policies' application to sensitive areas.

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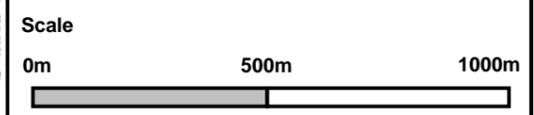
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Drawn	JP	Date:	Oct 08
Checked	CJ	Date:	Oct 08
Reviewed	ES	Date:	Oct 08

Rev.	Nature of Revision	Drawn	Chkd.	Rwtd.	Appd.	Date

- Key**
- Sections requiring planning permission
 - Sections covered by permitted development
 - No works proposed
 - Sections for which planning permission has been granted (Erewash BC)
 - Mitigation/ compensation works (created in 2008)
 - Mitigation/ compensation works
 - Mitigation works (structures)
 - Section of road to be raised



**NOTTINGHAM TRENT LEFT BANK
FLOOD ALLEVIATION SCHEME**

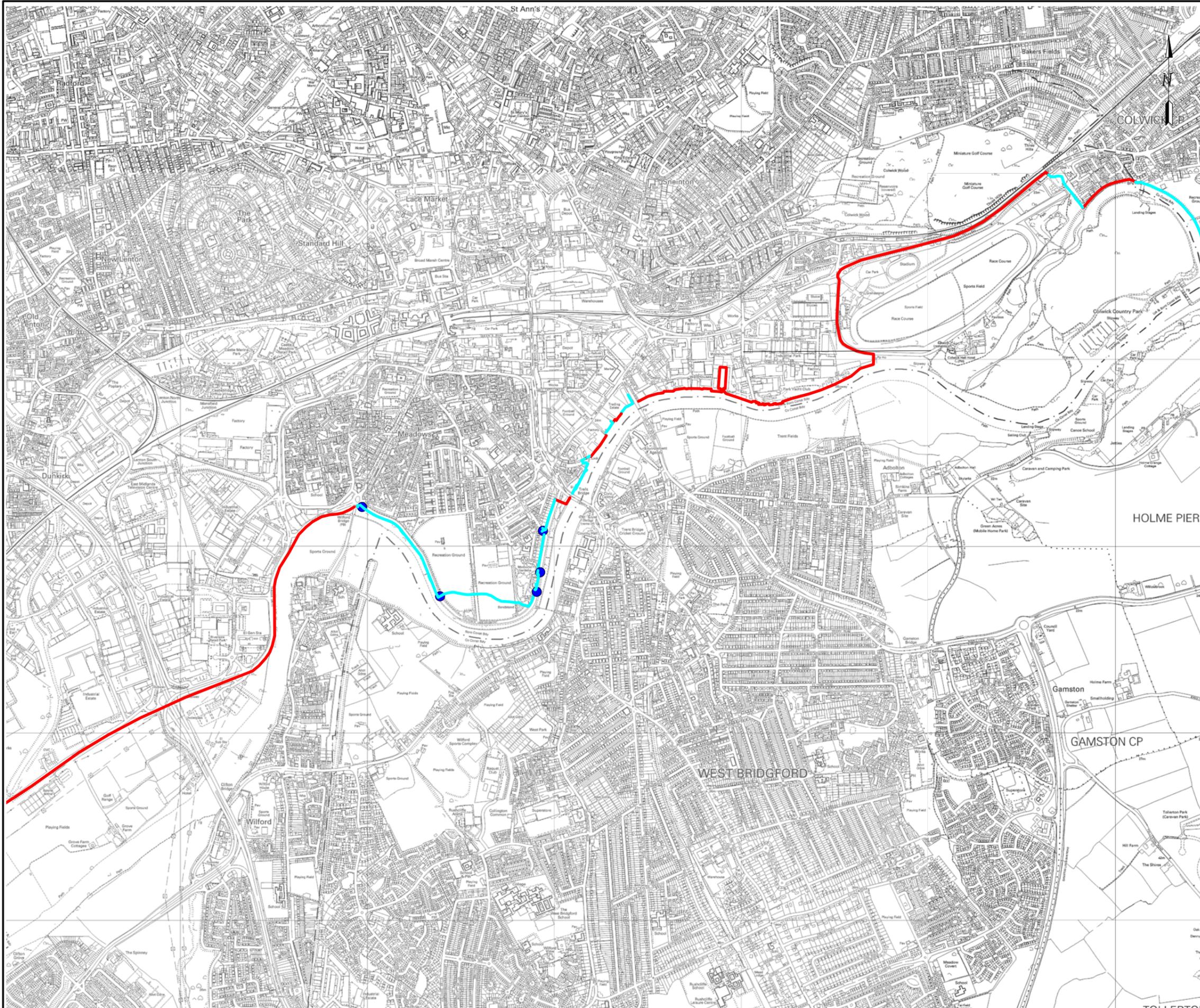
Areas of Permitted Development, Planning
Applications & Mitigation Measures:
Broxtove Borough Council



Contract no. 108806	Approved: SB	Date: Oct 08
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Reviewed	ES	Date:	Oct 08

Rev.	Nature of Revision	Drawn	Chkd.	Rvwd.	Appd.	Date

- Key**
- Sections requiring planning permission
 - Sections covered by permitted development
 - No works proposed
 - Section of road to be raised

Scale

0m 500m 1000m

NOTTINGHAM TRENT LEFT BANK FLOOD ALLEVIATION SCHEME

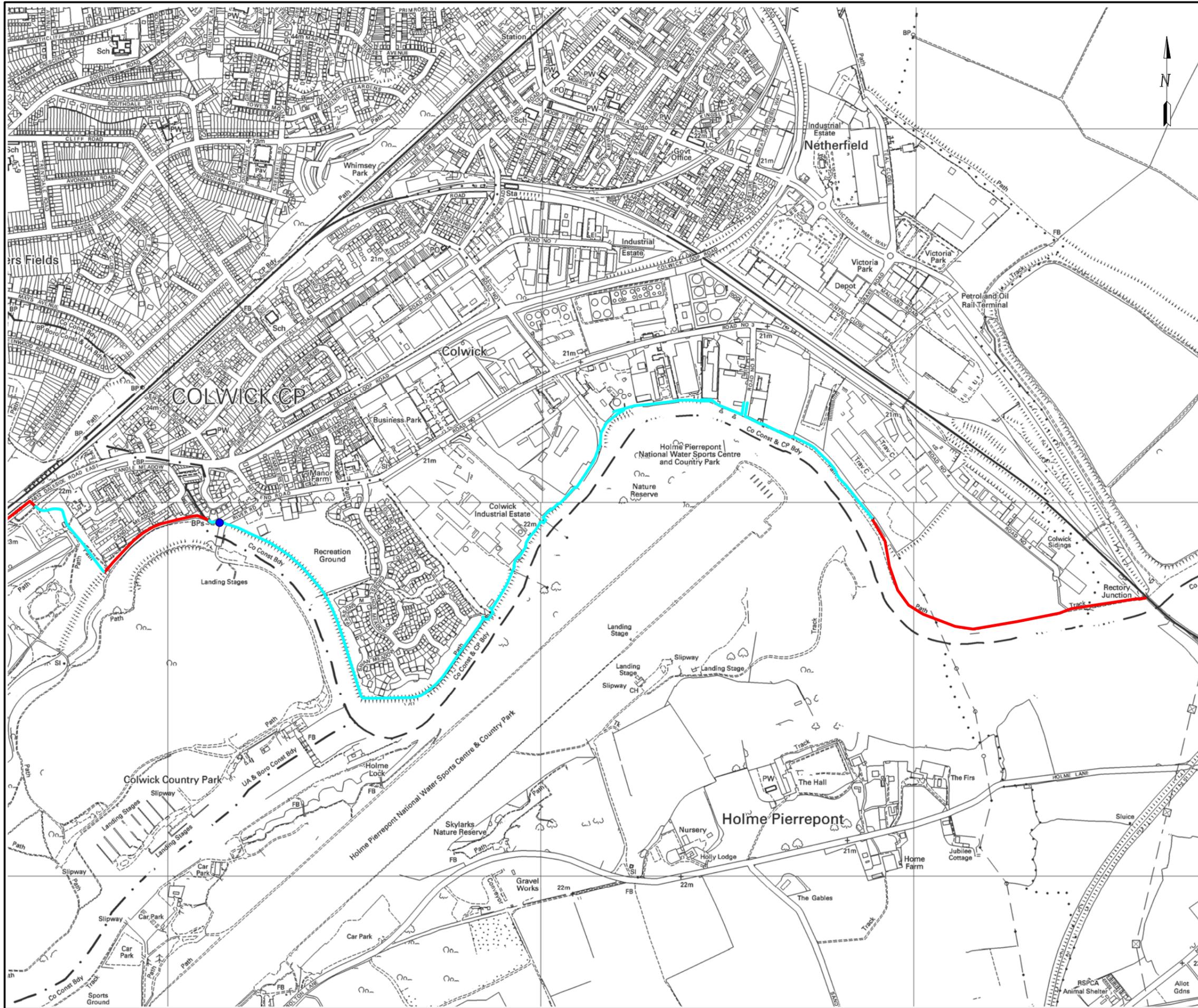
Areas of Permitted Development, Planning Applications & Mitigation Measures:
Nottingham City Council

Environment Agency

Contract no. 108806	Approved: SB	Date: Oct 08
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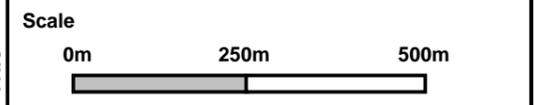


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Reviewed	ES	Date:	Oct 08			
Rev.	Nature of Revision	Drawn	Chkd	Rvwd.	Appd.	Date

- Key**
- Sections requiring planning permission
 - Sections covered by permitted development
 - No works proposed
 - Section of road to be raised



NOTTINGHAM TRENT LEFT BANK FLOOD ALLEVIATION SCHEME

Areas of Permitted Development, Planning Applications & Mitigation Measures:
Gedling Borough Council



Contract no. 108806	Approved: SB	Date: Oct 08
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5 CONSULTATION

5.1 Introduction

A Communications Plan was prepared and updated as the scheme progressed. Its aim was to:

- identify key stakeholders with a likely interest in the scheme;
- clarify the roles and responsibilities of the project team for specific aspects of external communication;
- establish a programme for future consultation.

This section summarises the consultation undertaken with stakeholders and interested parties. *Appendix E* has more detail on the consultation process and provides a full list of those contacted.

5.2 Internal Consultation

Internal consultation within the Environment Agency has been carried out throughout the design development. *Appendix E* provides a full list of the internal staff consulted and their specialist role.

5.3 External Consultation

5.3.1 External Consultees

A large number of external parties were consulted and are identified in *Appendix E*. A number of these made significant contributions which influenced the design, including:

- Erewash Borough Council
- Broxtowe Borough Council
- Nottingham City Council
- Gedling Borough Council
- Nottinghamshire County Council
- Natural England (NE)
- English Heritage
- Nottinghamshire Wildlife Trust (NWT)
- Attenborough village residents
- Cemex (landowner of Attenborough SSSI)
- Network Rail

5.3.2 Stages of Consultation

Consultation on flood risk management for Nottingham comprised the following key stages:

- Fluvial Trent Strategy – March 2005
- Masterplan and Constraints Plans – August 2005
- Scoping Report – November 2005
- Screening Opinion – November 2005 to November 2006
- Scheme Alignment Leaflet – August 2006
- Environmental Statement – April 2007
- Addendum to Environmental Statement – August 2007

A summary of these different consultation stages is provided below. A more comprehensive review of those consulted and a summary of the responses is provided in *Appendix E*.

Fluvial Trent Strategy (FTS)

External consultation on flood risk management in Nottingham began during the preparation of the FTS, which was finalised in March 2005. This study appraised a range of flood risk management options and identified those most suitable; refer to *Section 2.2*.

Masterplan and Constraints Plans

The first stage of consultation that focused on Nottingham was the Masterplan and Constraints Plans, which were issued in August 2005 to key stakeholders. Their purpose was to introduce the scheme and canvass early opinion on alignment options, constraints and opportunities to improve biodiversity, recreation and landscape. *Section E3.2.2, Appendix E*, summarises the main comments received on the Masterplan and Constraints Plans.

Scoping Report

The EIA Scoping Report was issued in November 2005 and over 1000 copies were sent to interested parties throughout Nottingham. The report presented the preferred option of hard defences and their alternative alignments through a number of reaches to raise public awareness. A Non-Technical Summary was produced in a leaflet format and sent to an additional 1500 households. Public exhibitions were held at the Attenborough Nature Reserve Visitors Centre, Attenborough Village Hall, and the Bridgeway Centre, Meadows, on consecutive weekends during December 2005. At these exhibitions, members of the project team were available to answer queries. *Section E3.2.3, Appendix E*, summarises the main comments received on the Scoping Report.

Screening Opinion

A request for Screening Opinion was made to each LPA. Under the “Town and Country Planning (Environmental Impact Assessment) (England & Wales) Regulations 1999” (SI99/293) an applicant “who is minded to carry out a development may request the relevant planning authority to adopt a screening opinion” (5.-(1)) on whether statutory environmental assessment will be required.

Further, under SI99/293 an applicant “who is minded to make an EIA application may ask the relevant planning authority to state in writing their opinion as to the

information to be provided in the environmental statement (a “scoping opinion”)" (10.-(1)). In accordance with this regulation, an opinion on the Scoping Report was requested. A summary of the Screening Opinion provided by each LPA is provided below and copies of the responses included in *Appendix E*.

Table 5.1 Local Planning Authority Screening Opinions

LPA	Area of Interest	Summary of Comments 2007	Summary of Comments 2008
Erewash Borough Council	Sawley and Trent Meadows	<ul style="list-style-type: none"> • The alignment between Barton Pool Nature Reserve and the railway (Option 1) is preferred. • This option will require a planning application. <p>The following elements of the works require planning permission:</p> <ul style="list-style-type: none"> • Raising a section of Tamworth Road in Sawley • New section of embankment to tie in with existing embankment at Trent Meadows. • Work at Sheetstores Flood Gates will require a planning application. 	<ul style="list-style-type: none"> • Changes to the proposed scheme in Erewash Borough Council do not require a separate planning application. • The planning permission given in 2007 is still applicable to the scheme.
Broxtowe Borough Council	Attenborough, Rylands and Erewash	<p>The following elements of the works require planning permission:</p> <ul style="list-style-type: none"> • Section of embankment from properties on Nottingham Road to Chilwell Retail Park • Several lengths of new embankment around the Toton Water Waste Water Treatment Works • Length of flood wall (up to 2.2m high in places) along the railway north of Barton Lane • Length of new embankment south of St Mary’s Church • A new flood wall along The Strand, Attenborough 	<ul style="list-style-type: none"> • There are no changes to what works require planning permission.
Nottingham City Council	Meadows and Colwick Country Park	<ul style="list-style-type: none"> • The works can be carried out by the Environment Agency under Permitted Development rights by virtue of Schedule 2 Part 15 Paragraph A (b) of the Town and Country Planning (General Permitted Development) Order 1995. • Works will require Statutory EIA. 	<ul style="list-style-type: none"> • The amendments to the works proposed can still be carried out under Permitted Development rights.
Gedling Borough Council	Colwick	<ul style="list-style-type: none"> • The works can be carried out by the Environment Agency under Permitted Development rights by virtue of Schedule 2 Part 15 of the Town and Country Planning (General Permitted Development) Order 1995 (as Amended) 	<ul style="list-style-type: none"> • The amendments to the works proposed can still be carried out under Permitted Development rights.

Scheme Alignment Leaflet

The Scheme Alignment Leaflet was issued in August 2006 and presented the preferred alignments throughout the entire scheme. Its purpose was to invite comment before submission of the planning applications and the accompanying ES. Over 2000 copies of the leaflet were sent to those who received a copy of the Scoping Report and others who had expressed an interest in the scheme. Many more copies were downloaded directly from the scheme's website. *Section E3.2.5, Appendix E*, summarises the main comments received on the Alignment Leaflet.

Environmental Statement (ES)

The original ES was published in April 2007, and distributed to statutory consultees, stakeholders, public libraries and council offices. Statutory notices were placed in three Nottingham newspapers. The ES was also submitted in conjunction with the planning applications to Erewash and Broxtowe Borough Councils.

Addendum to Environmental Statement

An addendum to the original ES was produced in August 2007. This incorporated changes in the compensation package for the Attenborough Gravel Pits. This addendum was submitted with an amendment to the planning application to Broxtowe Borough Council.

Attenborough Consultation

The sensitive setting of the Attenborough SSSI and the adjacent village was evident very early in the scheme development. Due to the contentious issues through this reach, an in depth consultation exercise was undertaken with the Attenborough residents, Cemex, NE and NWT. The specific consultation associated with Attenborough is described in *Appendix E*.

Website

A scheme website was developed to support the launch of the Scoping Report. The website can be found at www.nottinghamflooddefence.co.uk and it contains background information on the scheme, key dates, frequently asked questions and electronic copies of formal consultation documents, including the FTS, Scoping Report, Scheme Alignment Leaflet, and this ES. Over the past 30 months, the website has received more than 225,000 hits.

The website will continue to be updated during detailed design and construction phases, to inform the interested public of progress.

5.4 Environmental Statement Consultation

This ES has been submitted to each LPA and all statutory consultees. It is available to view at the following locations:

- Erewash Council Planning Offices
- Broxtowe Council Planning Offices
- Nottingham City Council Planning Offices
- Gedling Borough Planning Offices
- Environment Agency Offices – West Bridgford, Nottingham

The Non-Technical Summary, copies of relevant drawings and a copy of the ES on CD are also available to view at the following libraries:

- Beeston Library
- Inham Nook Library
- Meadows Library
- Nottingham Central Library
- Radford/Lenton Library
- Sneinton Library
- Toton Library
- West Bridgford Library

Due to the size of the ES, we will not issue copies to all consultees. A Non-Technical Summary will be issued to all previous consultees on this scheme.

The Non-Technical Summary, at the beginning of this document, describes where comments should be returned to. The consultation period runs to 5 December 2008.

5.5 Future Consultation

There is a formal consultation period on the ES until 5 December 2008, which will be last formal chance to provide comment on the scheme prior to the detailed design process. Consultation will, however, continue with affected landowners, residents and interested parties throughout the detailed design and construction phases.

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6 METHODOLOGY, APPROACH AND SCOPE OF ASSESSMENT

6.1 Introduction

This section describes the main features of the approach to and scope of the EIA for the Nottingham Trent Left Bank FAS. The approach to the EIA has been informed by the requirements of:

- Environmental Impact Assessment (Land Drainage Improvement Works) Regulations 1999 (SI 99/1783 as amended by SI 2005/1399).
- The Town and Country Planning (Environmental Impact Assessment) Regulations 1999 (SI99/293).
- National and Local Planning Policy.
- Relevant guidance such as Environment Agency EIA Policies and Procedures Documentation.
- The specific nature and location of the proposed development.

6.2 Scope of EIA

Technical Scope

The focus of the ES is the construction of the flood defences, including the associated operational and maintenance aspects.

Temporal Scope

The flood defences will have a design life of 100 years. Their impacts will focus on the following periods:

- Construction: it is considered at this stage that this will commence in 2009 and take around 3-4 years to complete. The construction of each scheme area will be shorter than 3 years and phased as necessary; refer to *Section 3.3*.
- Operation and maintenance.

Spatial scope

The footprint of the proposed scheme is shown on the General Arrangement Drawings in *Appendices A to D*. The permanent impact of the proposed works will be restricted to the:

- footprint of the defences;
- mitigation adjacent to the scheme;
- easement for maintenance purposes;
- floodplain with a 1% annual probability of flooding;
- surrounding villages.

6.3 Methodology for Assessment of Impact Significance

The EIA covers the direct and indirect, cumulative, short, medium and long term, permanent and temporary, reversible and irreversible, adverse and beneficial impacts of the proposed scheme during the construction and operation phases.

A number of criteria were used to determine whether the potential impacts of the proposed scheme are 'significant'. These are outlined with reference to specific

environmental issues in the subsequent topic sections of this ES. Wherever possible, a quantitative assessment of the impacts was undertaken. Where this was not possible, a qualitative assessment was undertaken, based on the available information.

Where possible, the anticipated impact is compared against appropriate legal requirements and standards, such as air quality and noise, and each section includes a commentary on legislation. Where there are no such standards, interpretation and professional judgement were employed. The assessment of significance in all cases takes into account the deviation of the impact from the established baseline conditions and the sensitivity of the environment.

In carrying out this EIA, a general method for grading the significance of environmental impacts was adopted, to ensure consistency in the terminology of significance, whether for a beneficial or an adverse impact. The two principal criteria are the sensitivity of the receptor and the magnitude of the change arising from the scheme, as shown in Table 6.1.

Table 6.1 Determination of Impact Assessment

MAGNITUDE OF CHANGE	SENSITIVITY OF RECEPTOR		
	High (e.g. international, national protection)	Medium (e.g. regional, local protection)	Low (e.g. no protection)
High (e.g. >75% of area or receptor affected)	Major (H,H)	Major (H, M)	Moderate (H, L)
Medium (e.g. 25-75% of area or receptor affected)	Major (M, H)	Moderate (M, M)	Minor (M, L)
Low (e.g. 5 to 25% of area or receptor affected)	Moderate (L, H)	Minor (L, M)	None (L, L)
Very Low (e.g. >0, but <5% of area or receptor affected)	Minor (VL, H)	None (VL, M)	None (VL, L)
No Change	None (NC, H)	None (NC, M)	None (NC, L)

As shown in Table 6.1, the assessment of significance is classed as major, moderate, minor or none; either positive beneficial (positive) or adverse (negative). This is standard for an EIA categorisation which is derived from the *Guidelines for Environmental Impact Assessment* (IEMA, 2004) and the *Design Manual for Roads and Bridges* (Highways Agency, 2008).

Another consideration is the duration of the impact. For example, whether it is temporary or permanent, and if temporary, whether it is short, medium or long term. Defining the duration of the impact can be subjective, depending on the receptor. For example, following temporary clearance of land, it may take many years for an area of woodland to re-establish. Although in ecological terms, this period may not be long, for the people who use the woodland, it is significant in

relation to their lifetime, and could therefore be considered permanent. Scale of impacts are assessed relative to receptor. Table 6.2 sets out the duration of impact used in the EIA (IEMA, 2006; Highways Agency, 2008).

Table 6.2 Duration of Impacts

Nature of change	Duration	Definition/ Description
Temporary	Short-term	Impact continues during construction (1 to 3 yrs) and up to 1 year following construction
	Medium-term	Impact continues 1 to 5 years following construction
	Long-term	Impact continues 5 to 10 years after construction
Permanent		Due to the length of time period for the human population, those impacts >10 years can subjectively be defined as permanent

Where appropriate, specific assessment methods and criteria to determine significance are described in *Section 7*.

Mitigation

Avoidance is the best form of mitigation and has been considered during the assessment of alternative options and alignments. Where adverse impacts could not be totally avoided, mitigation measures have been identified to reduce the overall impact of the development on the built and natural environmental receptors. Some mitigation measures were identified specifically for this scheme and, where applicable agreed with statutory consultees. Discussions have been held with other stakeholders and agreement on the final detail will be gained prior to the works commencing. Others relate to good practice in construction projects, taking due account of environmental impacts.

One of the Environment Agency's Framework Contractors will be used to construct the works. All such contractors have worked on a number of the Environment Agency's projects and are experienced in the construction of flood defences. All contractors on the framework are registered on the Considerate Contractors Scheme. An EAP has been prepared to formalise the measures to mitigate many potential impacts of the construction works. The EAP can be found in *Section 13* and will be updated as detailed design progresses.

All relevant mitigation measures are identified in the following sections and their anticipated effectiveness is noted in the discussion of residual impacts. Some adverse consequences will stem from the scheme, but will be mitigated. In some cases enhancement opportunities exist and many of these will be taken up such as footpath enhancements, biodiversity enhancements and landscape designs; refer to *Section 9*.

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7 SUMMARY OF EXISTING ENVIRONMENT, ASSESSMENT OF IMPACTS AND MITIGATION MEASURES

7.1 Introduction

Section 7 outlines the assessment of the environmental receptors through the EIA process. Each sub-section for each receptor is structured in the following way:

- The relevant legislation and policies on the receptor are described.
- The methodology is given for gathering the baseline environmental conditions and describing the scope of the assessment.
- The baseline environment is described.
- The impact assessment sections list the impacts considered during the EIA and the significance given to the impact and durations following the terminology given in *Section 5*.
- Mitigation measures and monitoring of the impacts are identified.
- Residual impacts which remain following mitigation are identified and their significance expressed.

7.2 Baseline Surveys

All the areas of the scheme were assessed for baseline environmental conditions during the Scoping Stage of this study. These preliminary surveys informed the scope of detailed studies to fully assess the potential impacts and identify worthwhile mitigation measures.

The environmental surveys that were undertaken are detailed in Table 7.1. Figures V2.1 to V2.5 in *Annex 2* show the extent and location of the ecological surveys. The specialist survey reports were provided to the relevant statutory consultees and, if required, they can be obtained from the Environment Agency. The scope of the surveys was established from feedback on the Scoping Report (November 2005).

The scope of the ecological surveys was further defined in the scoping documents 'Scope of Ecological Surveys for Environmental Statement' (April 2006) and 'Scope of Ecological Survey Updates for Environmental Statement (March 2008). These detail the proposed methodology and survey areas, and were issued to key nature conservation consultees for comment.

As part of the consultation and information gathering process, environmental groups were contacted, as detailed in *Section 5*.

The following sections are a summary for each receptor of the EIA, for each of the scheme areas. Full details are provided in *Appendices A to D*.

Table 7.1 Environmental Survey Details

Survey Type	Surveyor	Date	Summary of Methodology
Extended Phase 1 Habitat Survey	Black and Veatch (B&V)	May/ June 2006 Updated in May/ June 2008	Extended Phase 1 Habitat Survey as per Institute of Environmental Assessment (1995).
Water vole/otter	B&V	May/ June 2006 Updated in May/June 2008	All suitable waterbodies surveyed for field signs such as burrows, latrines/spraints, feeding stations, holts etc.
	Nicholas Pearson Associates (NPA)	September 2006	Re-survey of brook around Attenborough village to provide updated information for alignment review.
Badger	B&V	May/ June 2006 Updated in May/June 2008	Field signs such as setts, latrines, paths mapped.
Bats	Ecological Services Ltd	July/ August 2006	Walkover survey to identify potential roosts. Emergence watches and transect surveys carried out at potential roosts.
	B&V	August 2007 Updated in May/June 2008	Emergence survey of an alder tree by the Harrington Arms pub in Sawley.
Great crested newt	B&V	April -June 2006	Four surveys at each pond including torch surveys, bottle-trapping and egg searches following EN (2001).
Wintering bird	NPA	Jan-March 2006	Six surveys at Attenborough SSSI including night surveys.
Breeding bird	NPA	April- June 2006	Three surveys at each site (each survey consisting of an evening/dusk survey followed by a dawn survey).
Invertebrates	Hopkins Invertebrate Surveys Ltd	July –Sept 2006	Sites for detailed survey selected by an initial walkover survey. Water & pitfall traps used at each detailed survey site plus active searching (direct observation, sweep netting, hand beating and sorting of litter).
	Nottinghamshire Wildlife Trust	May 2008	Kick sampling for crayfish of the water bodies adjacent to Clifton Pond in Attenborough Nature Reserve, which are known to contain spiny-cheek crayfish.
Reptile	B&V	May/ June 2006	The methodology was based on methodologies described in the Herpetofauna Workers Manual (Gent & Gibson 1998) using a combination of direct observation and artificial refugia.
Botanical	NPA	June – Sept 2006	Where practical stands identified to NVC using standard NVC survey protocol (JNCC, 2006). Other areas recorded by means of a transect survey.
Hedgerow	NPA	September 2006	The hedges at Attenborough village green were assessed against the botanical criteria under the Hedgerow Regulations.
Tree	Vivien Hodge (Arboricultural Associates)	July/ August 2006 Updated in 2008	The trees were inspected visually from ground level using non-invasive means. Trees/groups of trees were mapped and, where access was possible, tagged.
Geotechnical Investigations	Fugro Engineering Services	March 2005 to September 2006	Boreholes, cores, core penetration tests and trial pits were undertaken to determine the ground conditions and soil parameters in the vicinity of the proposed works.

Survey Type	Surveyor	Date	Summary of Methodology
Archaeological site evaluation	Archaeological Project Services (APS)/Trent & Peak	August-September 2006	Following on from the Archaeological Desk Studies carried out in winter 2006, trial trenches were carried out in area of high known or potential archaeological interest.
Landscape and Visual Impact Assessment	Ferguson McIlveen	August/ Sept 2006	Walkover survey following 'Guidelines for Landscape and Visual Impact Assessment' (GLVIA).
	Ryder Landscape Consultants	July 2008	Walkover survey to assess the impacts of the changes in scheme design.

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7.3 Human Population

This section considers the impacts of the scheme on human population, i.e., the implications of the scheme on the local community and for recreational users within the study area.

7.3.1 Relevant Legislation and Policy

The European Union EIA Directive and subsequent UK regulations require an assessment of the development on the population. Local planning policies relevant to the works are provided in *Annex 1*. Legislation relating to the impact of noise and vibration on the human population is included in *Section 7.6*.

7.3.2 Methodology

Scope of Assessment

The scope, which was identified through the scoping process, was to:

- Examine the potential impact on land use, including recreation.
- Identify the implications of the proposed works for the local economy.
- Assess the potential for disruption to Public Rights of Way (PRoW) or recreational routes near to the scheme area.
- Identify the likely impacts on waterway users.
- Identify the overall impact on undefended areas on access and recreation issues.

The visual impacts of the scheme and the disturbance effects on the human population, arising from noise and vibration, air quality and traffic and transport are considered in subsequent sections.

The results of the Health Impact Assessment are presented in *Section 7.4*. A Design and Access Statement will be submitted to Broxtowe Borough Council under Section 32 of the Planning and Compulsory Purchase Act 2004.

The sensitivity of a human receptor or resource is based on factors such as its size and importance; refer to Table 7.2. The magnitude of the impact is based on the disruption it may cause.

Table 7.2 Sensitivity of Human Receptors and Magnitude of Effect

		DESCRIPTION
SENSITIVITY	High	Resource designated under international / national legislation. Nationally important recreational resource. Industry/business/development/critical infrastructure of nationally strategic importance. Grade 1 agricultural land (permanent loss).
	Medium	Regional, County (or City) recreational resource. Industry/business/development/critical infrastructure of Regional, County (or City) strategic importance. Long distance footpaths/cycleways. Schools, hospitals, hospices etc particularly sensitive to disturbance. Grade 1 agricultural land (temporary loss).
	Low	Recreational facilities used by local community. Local footpaths, cycleways etc. Individual private/residential property. Local business/industry/development. Grade 2-3 agricultural land. Allotments.
MAGNITUDE	High	Impact causes closure or relocation. Permanent closure. Significant permanent modification or improvement to use.
	Medium	Direct or indirect impact but resource can continue to operate.
	Low	No direct impact. Minor indirect impact. Duration of impact very short.

General Data Collection

Information on the local community was collated through a number of site visits, consultation with the local authority and landowners, and a review of the data in the Development Plans. A qualitative evaluation of the impacts on the human population during construction and operation was undertaken using constraints mapping.

We define the ‘local community’ as that which would be directly affected by the construction works and who live and work within 200m from the works. A 200m radius was selected as this is the radius where the most significant construction impacts are considered to occur; refer to *Section 7.6*. We also consider impacts on the broader ‘local’ population who live within the 1% annual probability of occurrence floodplain who will benefit from the scheme.

7.3.3 Environmental Baseline

The baseline conditions are summarised below. Further detail for each scheme area can be found in *Appendices A to D*.

Local Population

There are some 16, 000 properties presently at risk of flooding from an event with a 1% annual probability of occurrence as shown in Table 7.3. It also shows the number of properties within 200m of the proposed works.

The study area is formed predominantly by the large urban communities of Sawley, Long Eaton, Chilwell, Attenborough, Beeston, Rylands, Meadows and Colwick. These comprise principally residential properties with several industrial/commercial/business parks. In particular, the scheme runs along the edge of the Meadow Lane Industrial Estate (Meadows) and the Colwick Industrial Estate (Colwick). The land immediately adjacent to the river downstream of Trent Bridge (Meadows) has been identified for redevelopment (Nottingham Regeneration Ltd); refer to *Section C12 in Appendix C*. Overall, the population has a medium sensitivity.

Table 7.3 Number of Properties Presently at Risk of Flooding from a Flood Event with a 1% Annual Probability of Occurrence

Scheme Area	No of properties currently at risk from a flood event with a 1% annual probability of occurrence	Approximate number of properties within 200m of proposed works
Sawley	4,555	640
Trent Meadows	2,768	
Attenborough ¹	3,191	1,260
Meadows ²	4,524	1,338
Colwick	1,344	323

¹: Includes the scheme areas of Attenborough, Erewash and Rylands ²: Includes the scheme areas of Meadows and Colwick Country Park

Key Local Businesses and Employment

The key local businesses potentially directly affected by the works are listed in Table 7.4.

Table 7.4 Key Local Businesses Potentially Affected by the Nottingham Trent Left Bank FAS

Scheme Area	Key local businesses	Sensitivity of receptor value
Sawley and Trent Meadows	Harrington Arms PH	Low
	Sheetstores Industrial Estate	Low
Attenborough, Erewash and Rylands	Toton STW	Medium
	Cemex Works Site	Medium
	Siemens site	Low
	Beeston Marina & Mobile Home Complex	Low
Meadows and Colwick Country Park	The Meadow Lane Industrial Estate, in particular Arla Depot and Personal Storage	Low (for individual businesses)
Colwick	Colwick Industrial Estate - directly affected units are Kitchen World, Biffa, British Drilling, Colwick Quays Development, Armitage Pet Care, Total Oil, Driving Standards Agency development and Tarmac	Low (individual businesses)

Local Farming and Commerce

Agricultural land (low sensitivity) is directly affected at Sawley, Trent Meadows, Attenborough, Rylands and the Erewash scheme areas:

- At Sawley and Trent Meadows, there are two farms in close proximity to the works and may be affected by construction traffic.
- In the Erewash scheme area, the works will directly affect pasture land used by a riding school.
- At Attenborough Village the works will affect pasture land near St Mary's Church.
- In the Rylands scheme area, the working area and site compound are proposed adjacent to arable fields.

Sensitive Sites

Sawley and Trent Meadows

There are two churches close to the works, namely Sawley Baptist Church and Sawley All Saints Church. The latter is a meeting place for several groups and societies, and also holds an annual three day flower festival around the August Bank Holiday.

There is an allotment site off Meadow Lane in Trent Meadows. The existing access track through the allotment will be used as the temporary haul road.

Attenborough, Erewash and Rylands

There is one church close to the works, St. Mary's Church in Attenborough. It is a focal point of the village, in that it provides a meeting place for various interest groups and hosts fetes, festivals and concerts.

Attenborough Village Green is a key local recreational resource. It is used all year for cricket and football.

The Attenborough Preparatory School is a private school for approximately 80 pupils, aged 4 to 11. The Upper School is located on The Strand and the Lower School is on Shady Lane. The school uses Attenborough Village Green for recreational purposes.

The land on the riverside of the railway line is dominated by Attenborough SSSI. The nature conservation features of the area are set out in more detail in *Section 7.5*.

Beeston Marina & Mobile Home Complex and an allotment site are located off Riverside Road in Rylands. The southern part of the allotment site will be used as an access route but it is not currently in horticultural use.

Meadows and Colwick Country Park

The King's School is situated less than 50m from Victoria Embankment. Emmanuel School and Beckett School are on the opposite river bank. The latter is likely to close in the 2008/9 school year and work on a new site commenced in 2006 to the south of West Bridgford.

Small events are held throughout the year at The War Memorial. A civic event is held annually in November on Remembrance Sunday.

Ladybay Youth Centre (The Arches) is located between the arches of Ladybay Bridge. This centre is designed to promote activities and recreation for young people, such as use of the river, climbing and urban art.

Colwick

There is a playground immediately adjacent to the proposed working area and site compound.

Recreation

The river corridor throughout the scheme provides a significant recreational focus for the local community and visitors. There is network of footways and cycleways throughout the floodplain, and there are initiatives to have a continuous link along the river (Trent Valley Way). The key amenity resources in each scheme area are listed in Table 7.5.

The River Trent and the Erewash, and Nottingham and Beeston Canals provide an important regional resource for boating, canoeists, kayakers and fishing.

A review of NE's Country and Registered Common Land Maps indicates that there is no common land or open access countryside.

Table 7.5 Key Recreational Resources

Scheme Area	Key recreational resources	Sensitivity of receptor value
Sawley and Trent Meadows	Trent Lock Golf Club	Low
	Trent Meadows Picnic Area	Low
	Erewash Canal	Medium
Attenborough, Erewash and Rylands	Attenborough SSSI and visitor centre	Medium
	Attenborough Sailing Club	Low
	Attenborough village green (cricket/football)	Low
	Attenborough Village Green Bowling Club	Low
	Attenborough Lawn Tennis Club	Low
	Chilwell Manor Golf Course	Low
	Rylands playing fields	Low
	Nottingham and Beeston Canal	Medium
Meadows and Colwick Country Park	Victoria Embankment and recreation ground	Medium
	Nottingham and Beeston Canal	Medium
	Colwick Country Park	Medium
Colwick	Colwick Country Park	Medium
	Crosslands Meadow Recreation Ground	Low
All Areas	Trent Valley Way	Medium

Critical Infrastructure

National infrastructure comprises those facilities, systems, sites and networks necessary for the functioning of the country and the delivery of the essential services upon which daily life in the UK depends. These services fall within the sectors of energy, water, communications, transport, finance, government, health, food and emergency services. Within these sectors there are certain ‘critical’ elements of infrastructure, the loss or compromise of which would have a major impact on the availability or integrity of essential services leading to severe economic or social consequences or to loss of life. These critical elements make up the nation’s critical national infrastructure.

Flooding is most likely to affect organisations that provide utilities (water, energy and telecommunications) and transport (where the focus is on the national road and rail networks. Other sectors have been excluded from this assessment as follows:

- finance and government sectors as they would also be subject to loss of the infrastructure which is already being assessed;
- the food sector as its diversity, complexity and competitiveness makes it very resilient as a network to natural hazards and means it is most vulnerable through the loss of other infrastructure providers, such as the transport network; and
- the geographically widespread nature of both the emergency services and health sector also provides a high level of resilience and redundancy to natural hazards.

For the purpose of this ES, critical national infrastructure within the study area has been identified through the basic study of Ordnance Survey maps and internet

searches. Further searches have not been undertaken as there are issues in publicising critical infrastructure for security reasons. The critical infrastructure that the Nottingham Trent Left Bank FAS would reduce the annual risk of flooding to 1% is:

- Toton Sewage Works (Erewash)
- Lilac Grove Sewage Treatment Works (Rylands)
- Railway stations at Attenborough and Beeston Rylands.

7.3.4 Impact Assessment

A summary of the main potential impacts on ‘Human Population’ is provided on Figure 7.1.

Construction Impacts

Impact on local properties as a result of construction activities occurring in close proximity (less than 50m)

Details of the effects on residential properties for each scheme area are provided in *Appendices A to D*. Table 7.6 summarises the numbers of residential properties directly and indirectly affected by the scheme. The following properties will be subject to direct disturbance from works occurring within or on their boundaries:

- **Sawley and Trent Meadows:** Two properties on Tamworth Road, Trent Farm, 6 River View, seven properties within Newbury Avenue and one on Owen Avenue.
- **Attenborough, Erewash and Rylands:** 17 properties along Nottingham Road; Ireton House, Poseidon House, two properties on Adenburgh Drive, 49 and 51 The Strand, 7 Ferndale Close, Lock Keeper’s Cottage on the Nottingham and Beeston Canal. In addition, 15 further properties along The Strand will experience significant disruption to access along the road and to their driveways for up to 10 months. Caravans are also located within 50m of the works at Rylands but are not included in the figures in Table 7.6. However the impact on residents in the caravans has been considered in this assessment.
- **Meadows and Colwick Country Park:** 24 properties along Fraser Road (including a block of flats) and the Meadow Lane Lock Keeper’s Cottage.

Table 7.6 Number of Properties in Close Proximity to the Scheme

Scheme Area	No. of residential properties with works within property boundary ¹	Total no of residential properties within 50m ²
Sawley and Trent Meadows	12	43
Attenborough, Erewash, Rylands	25	313
Meadows and Colwick Country Park	25	107
Colwick	0	13

1. Impacts will include permanent and/or temporary land take, disruption to access and disturbance.

2. Main potential impacts will be disruption to access and disturbance.

Properties will be subject to disturbances from construction noise and vibration, inconvenience, disruption and dust creation; refer to *Sections 7.6 and 7.7*. Disturbance will occur during construction and may include restrictions on access and land availability/use. The overall significance of these impacts is considered moderate as:

- direct impacts to properties are relatively few in relation to the length of the scheme;
- where construction impacts will occur they will cause a medium to high magnitude of impact and direct impacts to individual properties may last for many weeks;
- given the mainly urban/sub-urban nature of the scheme, many residential properties will be subject to indirect impacts.

The *overall significance* of these impacts was assessed *prior to mitigation* as being **moderate adverse** and **short-term**.

Impact on key businesses as a result of construction activities occurring in close proximity (less than 50m)

Details of the effects on key businesses for each scheme area are provided in *Appendices A to D*. The following businesses will be subject to direct disturbance from works occurring within/adjacent to their boundaries:

- **Sawley and Trent Meadows:** Harrington Arms Public House.
- **Attenborough, Erewash and Rylands:** Toton STW, Manor Garage, Cemex and Siemens.
- **Meadows and Colwick Country Park:** Four businesses including Arla Depot and Personal Storage Depot.
- **Colwick:** Ten businesses including Kitchen World, Biffa, Colwick Quays Development, Total Oil, British Drilling, Armitage Pet Care, Lorry Depot, Tarmac and the Driving Standards Agency Development.

Businesses will be subject to disturbances from construction noise and vibration, inconvenience, disruption and dust creation; refer to *Sections 7.6 and 7.7*. Disturbance will occur during construction and may include restrictions on access and land availability/use. However, the significance of these impacts is considered moderate as while local businesses would be disturbed, they would still be able to operate.

The *overall significance* of these impacts was assessed *prior to mitigation* as being **moderate adverse** and **short-term**.

Impact on local farming and commerce as a result of construction activities

- Temporary loss of pasture at Sawley.
- Disturbance to the riding stables off Wilne Road at Sawley and a reduction in available grazing land. Disturbance to Grounds Farm, Trent Farm and Home Farm, and potential disruption of the access to these farms.
- Reduction in pasture and disturbance to St. Leonard's Riding School, off Nottingham Road at Erewash.

- Temporary loss of agricultural land in Rylands whilst it is being used as a working area and site compound.

The overall significance of these impacts is considered minor as the temporary loss of agricultural land (low sensitivity) is quite localised and the remainder of the land will be unaffected, without any severance issues. Therefore, the overall viability of the farms should not be significantly affected and the magnitude of the impact is considered medium.

The *overall significance* of the *impact* was assessed *prior to mitigation* as being **minor adverse** and **short-term**.

Impact on canal moorings as a result of construction activities in close proximity

- Closure of Erewash Canal (Sawley) at Sheetstores.
- Closure of Nottingham and Beeston Canal (Rylands) at Beeston Lock.
- Closure of Nottingham and Beeston Canal (Meadows) at Meadow Lane Lock.

The moorings are of high sensitivity but closure of the canal could have a high magnitude impact.

The *overall significance* of the *impact* was assessed *prior to mitigation* as being **major adverse** and **short-term**.

Impact on sensitive sites as a result of construction activities occurring in close proximity (<50m) to the sites

Table 7.7 summarises the impact on sensitive sites from the construction of the Nottingham Left Bank FAS.

The *overall significance* of these *impacts* was assessed *prior to mitigation* as being **minor adverse to moderate adverse** (impacts along the Strand and potentially to mobile homes) and **short-term**.

Impacts on local recreational resources as a result of construction activities

Details of the impacts on the local resources for each scheme area are provided in *Appendices A to D* and summarised in Table 7.8. The maximum duration of footpaths, bridleways or cyclepath diversion/closures will be **six months**. Closure of the locks will be up to **16 weeks** and while recreational use will be able to continue, the canals are considered to be of medium value and closure will affect their connectivity and overall level of usage. Other county value recreational resources such as Victoria Embankment and Wilford Grove Recreation Ground and Attenborough SSSI would also be directly affected and while operation of these sites could continue, the overall impact on recreation is considered moderate adverse. Attenborough Village Green is of local value (low sensitivity) but construction will have a high impact on the use of the site.

The *overall significance* of these *impacts* was assessed *prior to mitigation* as being **moderate to major** (canal closures) **adverse** and **short-term**.

Table 7.7 Summary of Sensitive Sites in Close Proximity to the Scheme and Potential Impacts

Scheme Area	Sensitive Site (sensitivity in brackets)	Nature of Disturbance	Magnitude of Change
Sawley and Trent Meadows	All Saints Church (low)	General disturbance from construction noise and vibration	Low
	Meadow Lane Allotments (low)	Access track to allotments will be used access to works in Trent Meadows. This is likely to cause impacts to the users of the allotment both from general disturbance (i.e. noise and vibration) and the partial loss of function of the site. Some plots may not be usable because of risk of construction traffic running over them or from the creation of dust which could affect crop yield.	Medium
Attenborough, Erewash, Rylands	St Mary's Church (low)	Construction noise and vibration Dust creation	Low
	Attenborough Preparatory School (medium)	Restrictions on access for 10 months during works to The Strand.	Medium
	Attenborough Village Green (low)	To be used as a temporary access route for the residents of The Strand for up to 10 months. Attenborough Cricket Clubs and other recreational users will not be able to use it for this period.	High
	Beeston Marina and Mobile Home Complex (low)	A flood wall is proposed through a section of the Beeston Marina and Mobile Home Complex which will cause construction disturbance to the mobile homes there.	Medium (high if mobile homes need to be temporarily relocated)
	Riverside Road Allotments (low)	Construction of an embankment through the allotment will cause construction disturbance and will lead to the permanent loss of allotment space. The construction of a wall adjacent to the allotments may result in the temporary loss of some plots.	High
Meadows and Colwick Country Park	War Memorial (medium)	General construction disturbance to services at the War Memorial at Meadows from piling activities and the presence of construction works nearby.	Low
	King's School (medium) and Ladybay Youth Centre (low)	General disturbance from construction noise and vibration.	Low
Colwick	Children's playground (low)	General disturbance from noise and vibration, dust creation and the presence of construction machinery.	Low

Table 7.8 Summary of Impacts on Recreation Resources for each Scheme Area

Scheme Area	No. of PRoWs, bridleways and cycle paths temporarily closed and diverted	Canal closures	Works within other recreational areas	Recreational resources disturbed or access disrupted
Sawley and Trent Meadows	7	1		Pride of Derby Angling Club's huts Trent Lock Golf Club Trent Pistol and Rifle Club Cranfleet Farm
Attenborough, Erewash and Rylands	13	1	Attenborough village green (cricket/football clubs, also used by school) Old Fisherman's Car Park (compound only) Attenborough SSSI Chilwell Manor Golf Club	Attenborough Sailing Club Bowling Green
Meadows and Colwick Country Park	2	1	Victoria Embankment and Wilford Grove Recreation Ground Colwick Country Park	Memorial Gardens
Colwick	2	0	Colwick Country Park Crosslands Meadow recreation ground	

Operational Impacts

Impact on local population as a result of reduction in flood risk

The scheme will provide an improved standard of flood protection to approximately 16,000 properties and businesses in the entire Nottingham Trent Left Bank scheme area. This has additional benefits in respect of property values.

The *overall significance* of these impacts has been assessed as being **major beneficial** and **permanent**. No mitigation required.

Impact on villages outside the scheme area

There will be an increased flood risk to the villages outside the scheme area as a result of the scheme. The predicted increase is up to 0.07m in a flood event with a 1% annual probability of occurrence. This is discussed in full in *Section 8*.

The *overall significance* of this impact has been assessed *prior to mitigation* as being **moderate adverse** and **permanent**.

Reduction in flood risk to critical infrastructure

The scheme will provide an improved standard of protection to critical infrastructure including two sewage treatment works.

The *overall significance* of this impact has been assessed *prior to mitigation* as being **major beneficial** and **permanent**.

7.3.5 Mitigation Measures and Monitoring

Mitigation measures for the potential impacts on the human population are as follows:

- Liaise with residents, churches, schools, local businesses and managers/users of recreational sites about the nature and timing of works.
- Full reinstatement of the gardens/property.
- Maintain access to businesses and properties.
- Widely advertised notification of canal closures. Carry out works to the lock gates during the low season (October to January) with a break in the works over the Christmas holiday period. Provide alternative canal moorings where required.
- No works during services or events at Victoria Embankment.
- Formal closure and temporary diversion of footpaths and bridleways, with clear signage. Reinstatement footpaths/cycleways to the existing or improved standard.
- Alternative facilities sought for cricket/football at Attenborough Village Green. Fence off working area to allow continued use of unaffected areas of the Village Green.
- Carry out works in Chilwell Manor Golf Course during the winter to minimise impact on golfers.
- Maintain pedestrian access to “The Nottingham Princess”.
- Ensure no access restrictions during the Great Nottinghamshire Bike Ride and the Robin Hood Marathon.
- Provide alternative parking and assistance to the residents of The Strand during road closures.
- Mitigation for outlying villages is described in *Section 8*.

A public liaison officer will be appointed for the duration of the construction works. The EAP will be followed and monitored by an Environmental Clerk of Works.

Mitigation measures to address the impacts related to landscape and visual amenity, local traffic and noise and vibration are addressed in subsequent sections. Details are provided in the relevant appendices.

7.3.6 Residual Impacts

Table 12.1 summarises the residual impacts on the human population.

The **adverse** impacts to local residents and businesses caused by construction related disturbances will be **short-term**. Direct impacts on property cannot be avoided and will remain a **moderate adverse** impact but mitigation will reduce the magnitude of indirect impacts to **minor adverse**. By considerate timing of construction e.g. to avoid peak seasonal usage, adverse impacts on recreational resources should be reduced to **minor to moderate** (closure of canals and impacts to Attenborough Village Green).

On completion, the reduction in flood risk to approximately 16,000 properties and businesses and the reduced stress associated with coping with a flood event is considered to be a **major beneficial** and **permanent** impact.

The impact of increased flood risk to villages outside the scheme area and how it will be managed is discussed in *Section 8*, but is considered to be a **moderate adverse** and **permanent** impact.

A number of recreational enhancements are proposed for the scheme area; refer to *Section 9* and *Appendix F*.

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7.4 Health Impact Assessment

7.4.1 Introduction

Health Impact Assessment (HIA) is a combination of procedures and methods by which a policy, plan, programme or project may be judged as to the effects it may have on the health of the population². Health in this instance refers to social, economic, cultural and psychological fitness, not simply the medical well-being of the population.

The recent growth in the field of HIA, and its subsequent inclusion into EIA, highlights the importance being given to preserving or limiting the impacts of a development upon many aspects of the local population.

The process behind HIA follows a similar path to that used in more general EIA, this being screening, scoping, assessment and the following decision making. This chapter describes the baseline, methods and the conclusions drawn for the HIA with relation to the Nottingham Trent Left Bank FAS.

7.4.2 Methodology

Consultation

The consultation undertaken for this scheme has been discussed in *Section 5* and *Appendix E*. A communication plan outlining key requirements for consultation during the project has been prepared for this scheme. Specific organisations with a key interest in community well-being, recreation, health issues and access that were included in the consultation are listed in *Appendix E*, they can however be grouped into the following categories:

- sports clubs/groups;
- watersports societies;
- angling societies;
- schools and universities;
- local resident groups and community projects;
- libraries;
- interest groups.

Methods of Assessment

A review of health issues relating to typical flood risk management (FRM) schemes by the Environment Agency identified three health issues that may be associated with typical Environment Agency FRM schemes, namely:

- access within the community and the provision of amenities;
- community welfare;
- local environmental surroundings.

Following the EIA scoping exercise and consultation with key stakeholders for this project, it was apparent that these health issues would play an important role in

² Glasson et al. (2005) Introduction to Environmental Impact Assessment: 3rd Edition. p.330. Routledge, Abingdon

influencing the selection of the preferred option for the Nottingham Trent Left Bank FAS. Consequently, the health impact assessment considers all of these aspects of the scheme.

The potential impacts on health were identified by the project team, with reference to the responses received from both internal and external consultees, as described within *Section 5*. Due to the nature of the potential impacts, the assessment of the significance of each impact is qualitative, based on indicators such as the existing use of a particular facility and the anticipated impact on that use, and the duration of the impact, whether temporary or permanent.

7.4.3 Environmental Baseline

A high level desk-based exercise and numerous site visits have indicated the setting of the study area. The general character of the scheme corridor and surrounding area is described in *Section 1*, however the key aspects are summarised below:

- The proposed scheme runs from Sawley in the west, through Nottingham City Centre to Colwick in the east. As the works will cover a distance of 27km, there will be differences in demographics, economy and population density.
- Due to the large extent of the proposed works, the affected population characteristics vary greatly along the route of the defences. The scheme has been split into four areas to reflect local planning authority boundaries. These areas also reflect population groups of similar characteristics.
- The economy of the city is mixed and diverse. Nottingham's Gross Domestic Product (GDP) in 1996 was 145% of the national average, the third highest in England. A report by the Joseph Rowntree Foundation showed that it is creating more jobs than any other city in the country³. Although the economy is strong, there are areas within the city experiencing economic difficulties; Nottingham lies 87th in the nationally ranked Index of Multiple Deprivation 2007⁴. Unemployment varies spatially, the scheme runs through areas typical of post-1970s urban decline, but also areas on the urban-rural fringe, as a result it is difficult to quantify the unemployment in the areas directly affected by the scheme.
- The scheme is concentrated to the River Trent corridor. The direct effect to the community will occur predominantly during construction.
- The city of Nottingham has a long and complex history. A settlement has been known on the present site since the sixth century BC. The character of the city dates back to the Middle Ages. The construction of Nottingham Castle in the twelfth century linked the city with the folklore of the Robin Hood tales. This folklore is still prominent today, and provides a valuable asset for tourism and also international recognition.
- The existing flood defences throughout Nottingham are in varying states of repair. This scheme proposes raising sections of the existing defences and constructing new defences in Sawley, Trent Meadows, Rylands, Meadows and Colwick. Attenborough has no formal existing defences, in the past the railway line has acted as an informal defence; this scheme is proposing to construct new sections of defence throughout Attenborough.

³ Department for Transport and the Regions (2002) *Our Towns and Cities: The Future - Delivering an Urban Renaissance*.

⁴ <http://www.communities.gov.uk/documents/communities/xls/576504.xls> (Accessed 02-10-2008)

A general description of the local environmental setting is provided in *Appendices A to D* of this ES. However, in relation to HIA, the existing amenity facilities and the community services in the vicinity of the River Trent frontage are discussed below.

Sawley and Trent Meadows

This scheme area has a rural setting, comprising a small village settlement and surrounding agricultural land. Existing flood embankments are used as footpaths and bridleways for recreational users. The embankments are also located close to stables, paddocks, training grounds and a picnic area. This scheme area also contains a golf course, shooting club as well as recreational use of the Erewash Canal along with river moorings at Trent Lock.

Attenborough, Erewash and Rylands

Attenborough has a nationally important nature reserve, Attenborough SSSI. This area is designated for the importance of the breeding bird population, and as a result attracts a large number of visitors to watch birds. A large number of footpaths within the reserve provide recreational value for many visitors. Derbyshire Wildlife Trust (DWT) has a visitors centre located on Barton Lane, to highlight the importance of the nature reserve and cater for visitors.

Attenborough village is set in a semi-rural setting, the village and its amenities are designated as a Conservation Area. In the vicinity of the proposed scheme are situated Attenborough Cricket Club, Attenborough Bowls Club and Attenborough Football Club, which all make use of the village green, this land is also used by the local school as a play area for exercise and recreation.

A site comprising temporary homes is in proximity to the scheme in Rylands, alongside this is a large sports ground, currently used for football and cricket.

Meadows and Colwick Country Park

This scheme area is the closest to Nottingham City Centre is opposite Nottinghamshire County Council offices and close to Nottingham Forest Football Club located at The City Ground and Notts County Football Club located at Meadow Lane. The Meadows and Colwick Country Park scheme area incorporates Victoria Embankment and Wilford Grove Recreation Ground which is a large area of park land, consisting of footpaths, sports grounds, Memorial Gardens and a children's play area; this location is also used for the annual Riverside Festival. Victoria Embankment is used by large numbers of people for recreational purposes, and is often used for stages of the Robin Hood Marathon and certain cycle races. Downstream of Victoria Embankment, there is a youth/community centre situated under the arches of Ladybay Bridge. This centre provides recreation and activities for local youths, and utilises the river for watersports, and also has a play area situated on the premises.

Works within Colwick Country Park will include embankment construction through a car park. Colwick Country Park is a large area of former gravel pits that now comprises grassland and waterbodies, which is also designated as a SINC. This area is extensively used for recreational walking, sailing and fishing.

Colwick

The Colwick scheme area includes a small amount of construction work on the edge of the Colwick Country Park (see Meadows and Colwick Country Park above). At present, certain sections of the existing flood defences are used as footpaths and cyclepaths. In the vicinity of the proposed works there is also a children's play area and sports ground.

Colwick Industrial Estate lies to the east of the scheme area and is a source of employment for the local population. The industrial units extend to the rivers edge, this scheme proposes to extend the Trent Valley Way, by continuing a riverside path along the river frontage through the industrial estate.

Further information on the human aspects of the environment, landscape and land use within each scheme area is contained in *Appendices A to D*.

7.4.4 Impact Assessment

The potential health impacts, whether adverse or beneficial, and the proposed mitigation measures associated with the scheme are detailed in the following sections. A qualitative assessment of the significance of these impacts is provided. It should be noted that due to the wide-reaching nature of health aspects, many of the human-related issues are addressed within other sections of this ES.

Construction Impacts

Access within the Community and Provision of Amenities

A range of access-related impacts have been identified, such as the temporary closure of public rights of way (PRoW) in the vicinity of the works during the construction works; these impacts are discussed in *Section 7.3*. However, those aspects which have a specific health and well-being and/or community impact in relation to the provision of amenities are discussed in greater detail below. Loss of recreational and community focus resulting from the temporary severance from or loss of access to the river and riverbanks during the construction period may occur. Particular impacts to sensitive sites are as follows:

Attenborough SSSI and Village (Attenborough)

- the access road to Attenborough Visitor Centre, Barton Lane will require a full lane closure for approximately 2-3 weeks;
- an area of Old Fisherman's car park will be used a site compound/material deposit point, this will restrict the use of the area for ten months;
- use of The Strand for vehicles and vehicle access to properties will be restricted for ten months during construction;
- access to and use of the Attenborough village green will be restricted for ten months during construction;
- 24 PRoW, bridleways and cyclepaths will be temporarily closed or diverted for up to six months.

Victoria Embankment (Meadows)

- the informal footpath along Victoria Embankment will be diverted;
- access to Victoria Embankment and the riverside will be restricted for 11 months;
- parking at the War Memorial will be restricted permanently although this is considered as a beneficial impact.

Colwick Country Park (Meadows and Colwick Country Park & Colwick)

- one car park at Colwick Country Park will be temporarily closed for up to five months during construction, this will impact upon the users of Colwick Country Park;
- River Road will be temporarily closed to vehicles for the duration of the works (two weeks), therefore restricting access to the country park for service and maintenance vehicles as well as recreational users.

In summary, the scheme will have a **short-term adverse** impact due to partial loss of access to amenities during the construction phase.

Community Welfare (including safety, identity and economic status)

The potential impacts of the proposed scheme on community welfare are detailed below. A qualitative assessment of the significance of these impacts is provided.

- potential for community and/or individual anxiety regarding the perceived or actual impacts arising from the works;
- potential safety risks for construction workers and operations personnel;
- potential for trespassers (including children) to enter the construction site and suffer injury.

In summary, the scheme will have a **short-term adverse** impact on community welfare during the construction phase.

Local Environmental Surroundings

A list of the impacts of the proposed scheme on the local surroundings is provided below. These impacts are addressed in other sections of the ES and within each technical appendix, as indicated.

- visual impact of the scheme on the built and natural environment (refer to *Section 7.8, Volume 1* and *Section 7 in Appendices A to D*);
- impact on air quality (refer to *Section 7.7, Volume 1* and *Section 6 in Appendices A to D*);
- increase in noise and vibration levels (refer to *Section 7.6, Volume 1* and *Section 5 in Appendices A to D*);
- increase in traffic movements and disruption to transport (including public safety and nuisance) (refer to *Section 7.10, Volume 1* and *Section 9 in Appendices A to D*);
- use of resources e.g. energy and waste disposal (*Section 13 in Appendices A to D*);

- Land take (*Section 12 in Appendices A to D*).

Operational Impacts

Access within the Community and Provision of Amenities

- Long-term beneficial protection of recreational or community facilities (including open space, play areas, amusements, accommodation, leisure facilities and car parking) from flooding.

Community Welfare (including safety, identity and economic status)

- change to the existing community setting and culture due to disturbance from construction works and a perception from local residents that a defence structure is 'out of keeping' with the character of the local area such as a village and its green;
- long-term beneficial impact on public health and safety from the reduction in the risk of flooding of properties and the protection of livelihoods;
- potential for members of the public to climb onto, over and along the new walls and suffer injury by slipping and falling.

Construction Safety

- Public and operator risk has been reduced during the operation of the scheme through measures which separate the public and operators from hazards. This will allow safe crossing of the defence structures and continued access to the river. There will also be adequate signage to meet Environment Agency requirements on key risks.

It is considered that the scheme will have a **moderate beneficial** operational impact due to the improved protection provided to the local affected communities and improved recreational facilities.

Economic Status

A consideration of community welfare includes the assessment of economic aspects. The following economic impacts have been identified:

- reduction in flood risk to housing stock and people;
- potential increase in housing prices due to reduced flood risk;
- reduction in flood risk to commercial, industrial and leisure facilities in the area with associated opportunities for employment and economic regeneration.

The overall impact of the scheme upon community welfare will be a **major beneficial** impact due to the decreased risk of flooding to properties and the potential for the retention of livelihoods.

7.4.5 Mitigation Measures

Access within the Community and Provision of Amenities

General mitigation measures are as follows:

- the communication plan will be amended during the detailed design stage to include actions to communicate with the general public regarding any temporary or permanent loss of access to amenity facilities and the proposed mitigation measures;
- communication with local authority footpath officers will minimise any closures to rights of way, whilst also ensuring that the work will be conducted safely;
- the design of the scheme complies with the Disability Discrimination Act 1995;
- consultation with local users of the surrounding area will identify any time constraints for the construction period. Construction periods will avoid where possible affecting locally important activities.

Site specific mitigation measures include:

Sawley & Trent Meadows

- no construction activity within Sawley All Saints Annual Flower Festival;
- allotment owners will be consulted over access and alternative arrangements made.

Attenborough, Erewash & Rylands

- a traffic management system will be put into operation to reduce the impact of any restrictions upon residents and users of The Strand;
- alternative facilities for sporting activities will be found;
- construction activity will be timed to avoid annual village fete, biennial flower festival and Christmas Bazaar;
- access maintained to Attenborough Sailing Club and Attenborough SSSI in Reach 5 and 6;
- works at Beeston Lock gates in Reach 13 will be during low season, with a break over the Christmas period;
- work in Reach 11 will be conducted during winter months to minimise disruption to the golf club.

Meadows & Colwick Country Park⁵

- the construction period will be timed to avoid the least disruption to the users of Victoria Embankment, particularly during the Riverside Festival.
- a TMP will be developed to allow restricted access along River Road for essential vehicles.
- Access will be maintained to Colwick Country Park.

⁵ Colwick Country Park is contained within the Meadows & Colwick Country Park scheme area, but also has boundaries with Colwick scheme area.

Colwick

- Working area in Reach 1 will be minimised to allow continued use of the football pitches and playground.

Construction Safety

The design will follow the hierarchy of risk control: eliminate, reduce, isolate, control. Residual risks will be communicated to the contractor and Environment Agency Operations Team using a risk register.

Public and operator risk has been reduced during the construction phase through the following measures, which separate the public and operators from construction hazards:

- all working areas will be fenced to prevent the public accessing the construction site;
- a TMP will be implemented by the contractor, including contingency measures for emergency access;
- working close to the high voltage cables (132kv) at Attenborough will be avoided where possible. When working within 3m of the cables, work will be supervised by Central Networks upon approval of a suitable working method. 11kv cables within the working area will be diverted before construction commences.

7.4.6 Environmental Enhancements

In the development of the design and in consideration of the construction works, recreational enhancement measures are proposed. These are in *Appendix F* and *Section 9* in *Appendices A to D*.

The following enhancement measures will be developed at each of the scheme areas:

- construction of new footpaths along the crest of new embankments;
- upgrading and extending of existing footpaths along the embankments to multi-access;
- improvement of the cycleways;
- improvements to recreational areas.

A summary of the Community Welfare Enhancements are listed below:

- *Annex 4* and *Section 7* in *Appendices A to D* present photo sketches and artist's impressions of the completed scheme. Through consultation with statutory and non-statutory consultees, positive feedback was received regarding the preferred options, and where possible the views of the stakeholders have been implemented in the design process. The features of existing defences will be maintained where possible and incorporated into the new design. Raising the existing defences will not diminish the utility of the embankment for recreational use; in many places the opportunity to resurface the footpath will provide opportunity to extend the use to other interest groups.

- Consultation with local authorities highlighted the requirement to gate the footpaths on top of any embankment, particularly close to Colwick Country Park. This will prevent use of the path by motorcycles and unauthorised vehicles. These gates do not restrict access to wheelchair users, pedestrians or cyclists.

7.4.7 Residual Impact

Once completed, the proposed scheme will reduce the risk of flooding by improving the standard of flood defence for the city of Nottingham. Overall, this is a **major permanent beneficial** effect on the welfare of the population.

The adverse impacts of the scheme are related almost entirely to the construction phase of the works. There will be human-related disturbance in the form of general construction activities, noise and reduced access to PRoWs and public amenities, which will impact on local residents, businesses and recreational users. However, wherever possible mitigation measures will be put in place to reduce the disturbance and disruption.

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7.5 Flora and Fauna

This section considers the impact of the scheme on local flora and fauna at the site and surrounding area.

7.5.1 Relevant Legislation and Policy

Legislation

Nature conservation policy is implemented by a series of areas, habitats and species designated under legislation from a local to an international level. All designated sites are protected from damage and destruction, and their important scientific conservation features are appropriately managed. The key pieces of legislation relevant to the scheme are listed below, with fuller details provided in *Annex 2*:

- *Conservation of Wild Birds Directive.*
- *Conservation of Natural Habitats and of Wild Flora and Fauna ('the Habitats Directive')* implemented in the UK by *The Conservation (Natural Habitats, & c.) Regulations 1994* (as amended).
- *Wildlife and Countryside Act 1981* (as amended).
- *Countryside and Rights of Way Act 2000.*

Natural Environment and Rural Communities Act 2006, Part 3, Section 40, subsection 1, imposes a 'duty to conserve biodiversity' upon all public authorities, including the Environment Agency and Local Planning Authorities. It states:

'Every public authority must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity'.

The key legislation for individual species that is relevant to this flood defence scheme is summarised in *Annex 2*.

The series of Red Data Books, which are mainly published by the Joint Nature Conservatory Council (JNCC), list rare, endangered and vulnerable species in the UK. Some of these are now national or local BAP species but unless they are named in other legislation, they are not statutorily protected.

Planning Policy

Local planning policy in relation to flora and fauna is summarised in *Annex 1*.

7.5.2 Methodology

Data Collection

A desk study was carried out, including consultation with the following organisations:

- Derbyshire County Council
- Nottinghamshire County Council
- North West Leicestershire District Council
- Erewash, Gedling and Broxtowe Borough Councils
- Environment Agency Specialists
- Natural England (formally English Nature)
- Nottinghamshire Biological and Geological Records Centre
- Derbyshire Wildlife Trust
- Leicestershire County Council Environmental Resources Centre
- Nottinghamshire Wildlife Trust (NWT)
- Derbyshire Bat Conservation Group
- Derbyshire Badger Group
- Nottingham City Council
- Rushcliffe Borough Council
- British Trust for Ornithology (BTO)
- Royal Society for the Protection of Birds (RSPB)

Field surveys were carried out between December 2005 and June 2008; refer to Table 7.1. Survey locations and the methodologies are detailed in *Annex 2*.

Impact Assessment

The impacts on ecology largely arise during the construction phase and this assessment concentrates on the potential construction impacts, including post-construction reinstatement.

This ecological assessment is based on the Institute of Ecology and Environmental Management (IEEM 2006) *Guidelines for Ecological Impact Assessment, 26 June 2006* (EcIA). Details on the methodology are provided in *Annex 2*.

The value or potential value of the ecological resource was determined within a geographical context; refer to *Annex 2*. However, for a protected species, although it may be assessed as being at the international or national level, only the affected population was assessed. For instance, where a protected species is relatively abundant and stable in the district, a small population may be valued at the district level.

The value of the invertebrate habitat was made using modified criteria from Colin Plant Associates (2006); refer to *Annex 2*.

In accordance with IEEM (2006) guidance, a degree of confidence in the impacts predictions is given; refer to *Annex 2*.

7.5.3 Environmental Baseline

The study area is all within the Trent Valley and Rises Natural Area (English Nature 1999).

The baseline for flora and fauna is described for each scheme area in detail in *Appendices A to D*. The key nature conservation interest of the scheme area is associated with Attenborough SSSI and other designated sites. This section, therefore, concentrates on these ecological receptors.

Statutory Sites of Nature Conservation Interest

Only Attenborough SSSI will be directly affected by the scheme; refer to Figure 7.2. The citation was updated in 29 July 2008 which notified the SSSI for its lowland, eutrophic open waters with emergent vegetation, wet floodplain woodland, unimproved floodplain grassland, a rich assemblage of breeding birds associated with lowland open waters and their margins and wintering shoveler *Anas clypeata* and bittern *Botaurus stellaris*.

Two other biological SSSIs are located within 2km of the proposed scheme, both on the right bank of the River Trent. These are Lockingham Marshes and Holme Pit SSSIs; refer to Figure AA3.1 (*Appendix A*) and Figure BB3.1 (*Appendix B*) respectively.

There are no Special Protection Areas (SPA), Special Areas of Conservation (SAC), or Ramsar sites in the 2km search area. Forbes Hole Local Nature Reserve (LNR) is located on the north side of the main railway line in Trent Meadows.

Non-statutory Nature Conservation Designations

There are 85 designated non-statutory Sites of Interest for Nature Conservation (SINC) and Local Wildlife Sites (LWS) within 2km of the scheme. The following SINC/LWS have the potential to be directly affected by the scheme:

Sawley and Trent Meadows

- Lock Lane
- Erewash Canal
- Trent Meadows
- Barton Pool
- Attenborough Junction Tip

Meadows and Colwick Country Park

- Colwick Country Park

The general locations of these SINC/LWS are shown in Figure 7.3. Further information is provided in the relevant appendix.

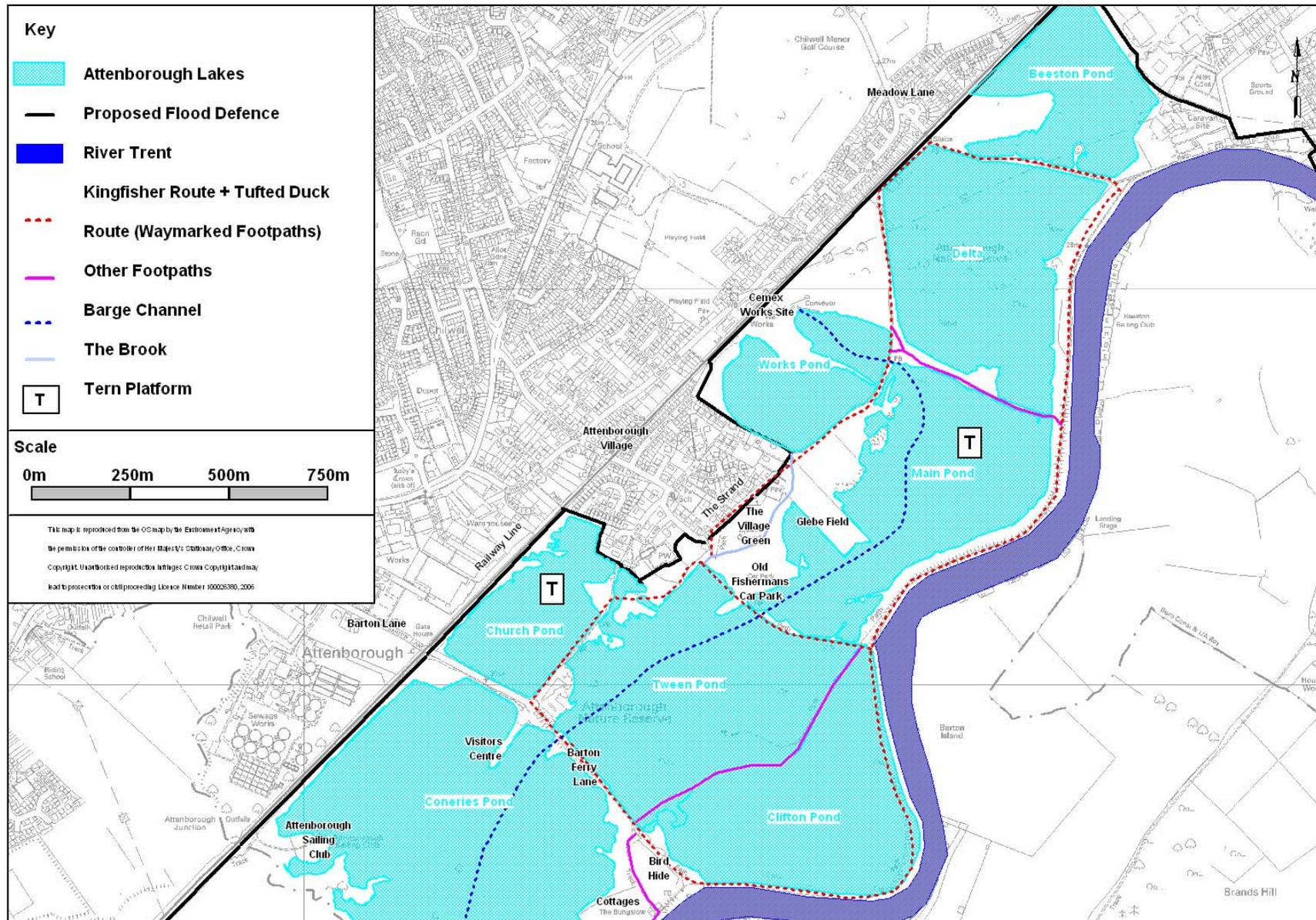


Figure 7.2 Attenborough Gravel Pits SSSI

Habitats

National and Nottinghamshire BAP habitats are listed in Table 4.3 *Section 4*.

The Phase 1 Habitat Survey data is shown on the General Arrangement drawings in *Appendices A to D*. The results of the botanical surveys are detailed in *Appendices A and B*. Key habitats of conservation note are described below.

Waterbodies

All waterbodies within 15m of the scheme are listed in Table 7.18 in *Section 7.9 Water*. The main features are the lakes within the Attenborough SSSI and Colwick Country Park.

Grasslands

Fields outside the designated nature conservation areas are generally improved, species poor semi-improved or amenity grassland. The grasslands of most botanical value are:

- An area of species-rich MG9 grassland between Glebe Field and The Brook (Attenborough SSSI).
- Glebe Field, which is a good example of MG4 flood meadow supporting a number of rare plants (Attenborough SSSI).
- A small area of MG5b adjacent to the railway within Attenborough Junction Tip LWS (Trent Meadows).

Vegetation of Open Habitats

Many of the open habitat communities are species-poor and of low intrinsic botanical value. However, in the north east of Glebe Field within Attenborough SSSI, there are two small stands of OV26c close to The Brook. These are diverse and of high botanical interest.

The Old Fisherman's Car Park within Attenborough SSSI supports a stand of low-growing, semi-open early successional vegetation, and is typical of many dry, nutrient-poor urban brownfield sites. However, within the context of the SSSI, it provides a valuable additional habitat and educational resource.

Swamps

Marginal and emergent (swamp) communities are best represented within Attenborough SSSI, and though small within the area surveyed, some of these are very diverse. Of particular note is a small area of herb-rich fen vegetation between The Brook and Works Pond.

Woodlands and Scrub

The main woodland type in the botanical survey area is W6b willow carr. It is found within Barton Pool LWS and Attenborough SSSI, with the oldest and most diverse example at the north-eastern end of Attenborough SSSI.

There are a number of mature trees throughout the scheme area; refer also to 'Bats' and *Section 7.8*.

Hedgerows

Hedgerows, other than garden hedgerows, would only be affected in two scheme areas; refer to Figure 7.3:

- At Sawley and Trent Meadows, where the hedgerows are species poor and have many gaps in them.
- At Attenborough village green the hedgerow along The Strand meets the definition of an 'Ancient and/or species-rich Hedgerow', in the UK BAP, on the grounds that it supports an average of five woody species. None of the hedgerows around the village green were found to satisfy the criteria of biological importance of the Hedgerow Regulations.

Species

Breeding Birds

A total of 47 species were recorded during the breeding bird survey, of which 37 were considered to be breeding or possibly breeding i.e. habitat suitable to support the species is present.

Sawley and Trent Meadows

Railside hedgerows and scrub were found to support small numbers of RSPB-listed (RSPB *et al.*, 2002) willow warbler and bullfinch. These species remain common and widespread in both a local and national context.

Attenborough, Erewash and Rylands

The waterbodies alongside the railway corridor through Attenborough SSSI support common waterbirds. Common terns also nest on specially provided tern rafts in the gravel pits. All of these species are generally common at gravel pits, both locally and nationally.

The reedbeds/willow carr at Works Pond support modest numbers of reed warblers, with one or two of these species in scattered smaller reedbeds. Reed warblers are of conservation concern, having undergone a major decline in their UK population.

Woodland at the Delta supports a variety of species, including the RSPB-listed stock dove and song thrush. However, the greater part of this habitat is well removed from the proposed working corridor and much of it separated from the railway by the open gravel processing plant area.

Railside hedgerows and scrub support small numbers of RSPB-listed dunnock, willow warbler and bullfinch. Of note, however, is a tree sparrow nest-box scheme in the south west corner of Beeston Pond and an adjoining garden. This has proved successful for this seriously declined species.

Other Scheme Reaches

Outside the reaches surveyed, all the trees and scrub provide habitat for a range of passerine birds. Waders and wildfowl may nest or feed on the agricultural fields.

Wintering birds

Data from the Wetland Bird Survey (WeBS) shows Attenborough SSSI does not currently support waterfowl populations of international or national importance; refer to *Appendix B*. The numbers of waterfowl recorded during this survey are broadly similar to those obtained through WeBS counts between 1999 and 2004.

Bats

Table 7.9 summarises where bat roosts or potential bat roosting sites were found during the 2006 bat survey. The survey areas are shown in Figures V2.1 to V2.5 (*Annex 2*).

Table 7.9 Bat Roosts along the Nottingham Trent Left Bank FAS

Reach	Confirmed Roost	Potential Roosts
Sawley and Trent Meadows		
Wilne Road to Harrington Arms PH	-	Possibility of a common pipistrelle emerging from T40.
Church Farm to Sawley Viaduct	-	Possible emergence of common pipistrelles was noted from T46 in the grounds of Sawley All Saints Church.
Barton Pool LWS to River Erewash	-	Many mature trees within Barton Pool LWS having suitable features for bats, it was difficult to determine which trees the bats were emerging from.
Attenborough, Erewash and Rylands		
Barton Lane to St Mary's Close	-	Tree T87 but no bats seen to emerge.
The Strand	-	T115; no bats were seen to emerge but staining around the holes suggests previous use by bats.
Meadows and Colwick Country Park		
Colwick Car Park to Candle Meadow	Three bat boxes in car park. Nine soprano pipistrelles were found in the bat box on tree T10.	-

All areas surveyed are considered to have value as feeding or commuting corridors. Seven species of bat were recorded during the 2006 surveys.

In 2007 and 2008 T5 and T7 in Sawley were also noted as being potential bat roosting sites during surveys/inspections.

No bat surveys were undertaken of the mature trees along Victoria Embankment as the trees due to be removed along the embankment are not considered to be potential bat roosts as there were no cracks or crevices on the trees.

Badgers

The only badger desk study record is for Attenborough SSSI, where the first record of a badger was reported in the Clifton Pond area in 2002. It was thought to be a wandering male. No badger setts or other field signs were recorded during the field surveys.

Otter

There are desk study records of otter along the River Trent and its floodplain but no holts or resting places were found during the 2006 or 2008 surveys. Otter footprints and spraints were recorded in 2006 along the River Trent, between the Sawley Viaduct and Harrington Bridge.

Water Vole

Water vole field signs, including footprints and latrines, were found during the 2006 survey along the River Trent, between Harrington Bridge and the Sawley Viaduct. There are water vole records for Golden Brook, the River Erewash, Attenborough SSSI and Colwick Country Park, but none were found during the 2006 or 2008 surveys in these locations.

Amphibians (including great crested newts)

Derbyshire Wildlife Trust holds the only records of great crested newts for the scheme area; approximately 350m from the proposed scheme at the Sheetstore Flood Gates at Sawley. However, no great crested newts or significant population of smooth newts were found during the 2006 surveys.

A pond at the Cemex Works Site at Attenborough had been reported to have a good population of smooth newts. However, during a visual inspection in 2008, the pond was dry, possibly due to woodland encroachment. Although it may hold water at some points of the year (it was examined in May 2008, during the peak time of year for newt breeding), it is considered unlikely that this pond was used as a newt breeding site in 2008.

Reptiles

The proposed scheme area through Attenborough SSSI contains a range of habitats, which provides good potential for reptiles. A survey in May 2006, however, did not record any reptiles and it is considered unlikely that there is a significant population present. No optimum reptile habitat is present elsewhere.

Invertebrates

The only species with conservation designation recorded during the invertebrate surveys was the ground beetle *Demetrius imperialis* found in Attenborough SSSI, which has Nationally Scarce (B) status. This is the lowest category of national designation.

All sites surveyed were assessed to be either of County, District or Local importance. Table 7.10 lists sites of District or County importance affected by the scheme; refer to Figure V2.3 for locations.

Table 7.10 Sites of District Importance for Invertebrates Affected by the Scheme

Reach	Site Name	Likely Significance	Justification
Sawley and Trent Meadows	Barton Pool	District	The survey area comprises an area of scrub and woodland around a small pond. The fauna was diverse.
Attenborough, Erewash & Rylands	Attenborough near Footpath Junction	District	A diverse mixed fauna was recorded including a Nationally Scarce (Notable) species to formally meet the criteria.

Mammals

Other than the above protected species, there are desk study records of small mammals in the area, including common shrew, pygmy shrew, water shrew, hedgehogs, brown hare, bank vole, short-tailed vole, field vole, wood mouse, harvest mouse, fox, stoat, weasel and American mink. Most of these records are from the Sawley and Trent Meadows scheme area (Golden Brook) and Attenborough SSSI.

Invasive Species

There are isolated stands of Japanese knotweed *Fallopia japonica* throughout the study area. None was present in the designated working areas or access routes, except through Attenborough SSSI. Japanese knotweed is also present along the railway embankment at Trent Meadows and Attenborough SSSI and it has also been located in the vicinity of Kitchen World in Colwick. The working areas may fall within a 7m buffer zone which is the radius considered potentially contaminated by rhizomes from any individual plant. Any soils within this zone must be considered as contaminated.

Himalayan balsam *Impatiens glandulifera* was recorded along the River Trent but only within the proposed working area at Colwick.

Summary of Ecological Interest

The flood defences will pass through predominantly agricultural or urban land with low biodiversity. The main biodiversity interest is associated with Attenborough SSSI, the numerous SINC/LWS and the River Trent. The following ecological receptors are present and are considered during the following ecological impact assessment (EcIA) within Volume 1. Each of these ecological resources is valued

on a geographical scale (*given in brackets*) and the definition of these values is given in *Annex 2*:

- Attenborough SSSI (*national*)
- SINC/LWS, six of which may be potentially affected by the scheme (*county*)
- trees (woodland and standard trees) (*local to county*)
- hedgerows (*local to national*)
- breeding birds (*local to county*)
- wintering birds (*regional*)
- bats (*local to district*)
- invertebrates (*district*).

Invasive species are also discussed. Otters, water voles and amphibians are known to be present in the local area but are currently not found within the proposed working areas. Due to the possible time delay until construction, protected species will be subject to further surveys prior to construction and impacts and mitigation assessed and agreed with NE if found.

7.5.4 Impact Assessment

Figure 7.3 shows the main potential impacts on flora and fauna. Table 12.1, *Section 12* summarises the impact, mitigation and significance of all the ecological receptors. The assessment of significance (in brackets) moderates the EcIA assessment to the standard determination of Impact Assessment; refer to Table 6.1 and *Annex 2*. Details of impacts, on each ecological receptor, are discussed in greater detail in the relevant appendices covering the scheme areas. The key impacts are assessed to be those associated with Attenborough SSSI and the SINC/LWS, and most emphasis is given to these receptors in this section.

Attenborough SSSI - The potential impacts on Attenborough SSSI are as follows. Most of these impacts could occur both during construction of the defence and also the construction of the compensatory habitat; refer to *Section 7.5.5*.

- permanent and temporary land-take. Definitions of what constitutes permanent and temporary land take for different habitats is given in *Section B4.4, Appendix B*;
- disturbance to fauna, particularly birds, during construction. Impacts on the different species are discussed under separate headings below;
- risk of a pollution incident or sediment runoff to terrestrial habitat or the ponds;
- silt displacement;
- dust pollution;
- creation of a physical barrier to the landward movement of species, in particular, terrestrial mammals. There will still be opportunity for movement into the reserve via the River Trent, the floodplain upstream and downstream and the main access points (e.g. Barton Lane);
- hydrological impacts (discussed in *Section 7.9*).

A summary of land take for the SSSI is provided in Table 7.11. Of most significance is the loss of an area of wet woodland. The swamp communities in Beeston Pond are considered to be high value habitats and will be partly lost.

The alignment of the proposed defences along The Strand through Attenborough mean that the high value habitats associated with Glebe Field and The Brook will not be directly affected; refer to *Section B2.5.5, Appendix B* for alignment options considered for The Strand. Part of the Old Fisherman's Car Park in the SSSI will be used as a temporary storage area. Only the hard standing area that is already used as a temporary car park and storage area will be affected.

Table 7.11 Summary of Land Take within Attenborough SSSI

Permanent (ha)	Temporary ⁽¹⁾ (ha)	Total Land Take (ha)	% of SSSI directly affected
1.68ha	5.31	6.99	3.16%

⁽¹⁾ This figure includes 0.7ha of wet woodland, which is considered a permanent impact in EIA terms but will be re-instated and therefore no additional compensatory habitat is proposed.

In summary 6.99ha (3.16%) of the total area of the Attenborough SSSI would be directly affected by the scheme, either permanently or temporarily. However, there will be wider impacts on the fauna of the site, in particular birds, outside the construction area due to disturbance and vibration. Birds are one of features of interest of this SSSI; refer to the following text on birds below.

The *overall impact* was assessed *prior to mitigation* as being **significant adverse and short-term to permanent** (permanent landtake/impacts on woodland) at a **National** level. (**Moderate adverse**)

Sites of Interest for Nature Conservation (SINC)/Local Wildlife Sites (LWS) - The flood defences run through six SINC/LWS; refer to Table 7.12. The definition of permanent and temporary habitat loss is provided in *Section A4.4, Appendix A*.

Of most significance is the permanent loss of wet woodland in Barton Pool LWS and a small area of MG4 transition grassland in Attenborough Junction Tip LWS.

The highest percentage of impact directly affected is at Barton Pool (51%) which is a medium level of change. There will be wider impacts on all the SINC/LWS outside the construction area due to disturbance, pollution and vibration.

Three SINC/LWS, namely Trent Lock Margins (potential), Sawley Carr and Attenborough Pastures, may be subject to impacts from construction related pollution, such as dust and run-off.

Table 7.12 Land Take within SINC/LWS

SINC/LWS	Total area of SINC/LWS (ha)	Permanent (ha)	Temporary (ha)	Land Take Total (ha)	% of SINC/LWS directly affected
Lock Lane	3.94	0.03	0.05	0.08	2%
Barton Pool	0.84	0.15	0.28	0.43 ⁽¹⁾	51%
Trent Meadows (potential)	22.5	0.48	2.00	2.48	11%

SINC/LWS	Total area of SINC/LWS (ha)	Permanent (ha)	Temporary (ha)	Land Take Total (ha)	% of SINC/LWS directly affected
Attenborough Junction Tip	12.3	0.27	0.54	0.81	7%
Erewash Canal (works to Sheetstores flood gates)	4.1	0	Works to existing flood gates only	0	-
Colwick Country Park	87	0.045	0.045	0.091	<1%

⁽¹⁾ This figure includes 0.2ha of wet woodland, which is considered a permanent impact in EIA terms but will be re-instated and therefore no additional compensatory habitat is proposed.

The SINCS/LWS are all of county value and will be impacted from both permanent and temporary land take and possible pollution effects and disturbance from construction activities. The significance of this impact is considered moderate as in addition to the significant impact to Barton Pool, indirect disturbance has the potential to affect over 25% of the area of many other SINCS/LWS.

The *overall impact* was assessed *prior to mitigation* as being **significant adverse and short-term to permanent** (permanent landtake/impacts on woodland) at a **County Level. (Moderate adverse)**

Habitats

Woodlands and Trees – Approximately 196 trees would be lost and a further 116 groups of trees will be removed or partially lost for the construction of the defences. 567 trees and tree groups were surveyed during the arboricultural assessment. The trees and other woody vegetation within the survey area were noted as making an important contribution to the landscape character of the area and have high wildlife value. The majority of trees surveyed were classed in the highest two quality grades and many of these will be permanently lost from the construction of the FAS. The main tree loss will be the areas of wet woodland at Barton Pool and Attenborough SSSI although the impacts on tree loss in designated sites are assessed above.

The *overall impact* was assessed *prior to mitigation* as being **significant adverse and permanent** at a **Local to County level. (Minor adverse)**

Hedgerows - 8 hedgerows will be crossed by the defence through the Sawley and Trent Meadows scheme area. In total, approximately 150m will be lost, of which 85m will be permanently lost under the footprint of the new defence. However, this will not impact on their overall connectivity. All the affected hedgerows are species poor.

Two hedgerows through Attenborough will be completely lost, one of which fulfils the species-richness criteria of the UK Biodiversity Action Plan for 'Ancient and/or Species-rich Hedgerows'. However, this BAP habitat is not scarce, either nationally or regionally and is therefore assessed to be of district importance. In total, 230m of hedgerow would be permanently lost in the Attenborough, Erewash and Rylands scheme area.

The loss of one species rich hedge is a moderate adverse impact as it is a BAP habitat. However, the loss of hedgerows from the Nottingham Trent Left Bank FAS is small in magnitude and there will be no effects on the hedgerow network throughout the scheme area. Therefore the overall impact is assessed as being minor adverse.

The *overall impact* was assessed *prior to mitigation* as being **significant adverse** and **permanent** at a **Local** level. (**Minor adverse**)

Breeding Birds – Within the SSSI, the working area is extremely narrow for much of its length and, hence, breeding birds are relatively few in both number and species in comparison to the rest of the reserve. However, construction works would cause disturbance to birds nesting in the vicinity, as a result of both land-take and noise disturbance. Most impact would occur during the breeding season of mid-March to September.

The impact on local breeding bird populations elsewhere is likely to be minimal, with the species affected being largely abundant and widespread, both locally and nationally. The greatest area of impact will be along the railway line, next to Barton Pool LWS. However, species likely to be affected are largely abundant and widespread both locally and nationally. The more notable species of skylark and grasshopper warbler in the Trent Meadows pLWS are sufficiently removed from the working areas to be unaffected.

Overall Attenborough supports the highest breeding bird interest (county value) and site clearance and construction activity in the breeding season could have a significant impact on the integrity of its population.

The *overall impact* was assessed *prior to mitigation* as being **significant adverse** and **short-term** at a **Local to County** (Attenborough SSSI) level. (**Minor to moderate** (Attenborough SSSI) **adverse**)

Wintering Birds - The results of the wintering bird survey indicate that disturbance from the railway line is currently keeping birds away from the proposed working area within the Attenborough SSSI. Natural England (NE) also do not regard the noise from construction activity likely to disturb wintering birds, many of whom use areas of the ponds away from the railway line (NE pers. comm.). Therefore, while the wintering bird population is of a regional value, the magnitude of change is considered low.

The *overall impact* was assessed *prior to mitigation* as being **not significant** and **short-term** at a **Regional** level. (**Minor adverse**)

Bats –Five potential bat trees, or groups of trees, will be lost:

- T5, T7 and T40 (Sawley and Trent Meadows)
- Barton Pool (Sawley and Trent Meadows)
- T87 (Attenborough, Erewash and Rylands)

The removal of tree and scrub lines through the scheme will result in the temporary loss of a feeding corridor. The bat boxes in Colwick Country Park would be

undisturbed. For the location of these trees, refer to *Appendix A* (Sawley & Trent Meadows) and *Appendix B* (Attenborough Erewash & Rylands).

The *overall impact* was assessed *prior to mitigation* as being **significant and long term** (temporary land take) **to permanent** (permanent land take and loss of potential roosts) at a **Local** level. (**Minor adverse** (for the temporary loss of a feeding corridor) **to moderate adverse** (for the potential loss of roosting sites)).

Invertebrates – Two sites that were identified as being of District importance for invertebrates would be disturbed during construction and there is the potential for some species/populations to be lost at:

- Attenborough SSSI near footpath junction (approximately 50% of habitat affected); refer to Figure 7.3 for location;
- Barton Pool (52% of habitat affected).

Given that a large amount of semi-natural habitat in the area will remain unaffected and most of the habitat in the working area will be re-instated, the impact is considered to be negligible. The remaining undisturbed areas should provide a source of immigration for species lost during construction. However, it is possible that the population of the ground beetle *Demetrias imperialis*, a Nationally Scarce (B) species, could be lost at Attenborough SSSI.

The *overall impact* was assessed *prior to mitigation* as being **significant adverse and medium-term** at a **District** (Attenborough SSSI and Barton Pool) level. (**Minor adverse**). Elsewhere it is **not significant**.

Operational Impacts

During a flood event, the improved standard of defence will mean that areas remaining within the floodplain will be subject to a very minor increase in water levels. This increase will affect all areas in front of the defence and unprotected areas on the opposite bank (including Attenborough, Holme Pitt and Lockington Marshes SSSIs and various SINC/LWS). It is not considered that this impact will have any adverse impact on the nature conservation interest of these areas as all species and habitats present will already be subject to periodic flooding.

SINC/LWS behind the defences will have an improved standard of protection against flood events with 1% annual probability of occurrence upon completion of this scheme. The habitat is not dependent on regular flooding as it is already protected against events with a 4% annual probability of occurrence. Therefore, there will be no significant impact on their nature conservation interest due to a decrease in flooding from the River Trent.

The *overall impact* was assessed to be **not significant (None)**. No mitigation required.

There may be requirements for vegetation clearance such as annual grass cutting and removal of scrub vegetation in order to maintain the integrity of the flood defence structures and access. Land take impacts for maintenance access are included in construction impacts.

7.5.5 Mitigation Measures and Monitoring

Attenborough SSSI

All vegetation clearance will be undertaken outside of the breeding season (mid-March to September). In addition, in the most sensitive areas, namely those downstream of Attenborough Village through Works Pond, the Delta and Beeston Pond (Reaches 9 and 10), no construction works will be carried out during the bird breeding season. This is to avoid disturbance to breeding birds in the surrounding habitat.

All habitats in temporary construction areas will be re-instated. A detailed method statement for re-instatement and habitat creation will be prepared and agreed with NE prior to the start of construction. The design principles are set out in *Appendix B* and further details of compensatory habitat measures are provided in *Appendix F*. A summary of the mitigation and compensatory habitat proposed is as follows:

- appropriate timing of works;
- pollution control;
- full re-instatement in temporary working areas;
- creation of a minimum of 8.45ha of marginal habitat;
- creation of 1.35ha of wet woodland;
- installation of water control structures and bunds;
- provision of fencing to allow grazing;
- restoration of The Brook;
- installation of otter holts;
- re-profiling of existing small islands.

Compensatory habitat measures will ensure at least no net loss of habitat. An ecological clerk of works will be employed to ensure the measures are implemented.

Woodlands and Trees

The detailed design will ensure that as many trees as possible are retained. The retained trees will be protected in accordance with best practice. Sufficient replanting of lost trees will be undertaken to ensure the ecological value of the site is retained. All species will be native and appropriate to the local area.

Hedgerows

Working widths will be limited, wherever practical, to minimise the impact on hedgerows. The hedgerows in Attenborough adjacent to the new flood defence will be replaced using locally native species.

Breeding Birds

Potential nesting habitat will not be removed during the breeding season, unless a nesting bird survey proves there are no nests that could be disturbed by the works.

The only species for which additional mitigation is proposed is the tree sparrow through Attenborough SSSI. All existing nest-boxes that could be disturbed by the works will be relocated.

Bats

Four trees and the woodland at Barton Pool were identified as potential bat roosts and will be lost. Use by bats was not confirmed during detailed survey and further surveys will be undertaken at least eight weeks prior to site clearance. If bats are found, a licence under the Habitats Regulations will be obtained, which will require detailed mitigation to be agreed with NE. Mitigation measures will include replacement planting and a bat box strategy.

Invertebrates

In general, for most invertebrates, there is little that can be done in terms of mitigation because species are always present as some life-stage on a work site. Undertaking work at a time when some species are adults and can fly is of limited value at a population level. This is because any suitable habitat nearby is likely to be occupied and such immigration may have density dependent impact. It is not thought that working at specific times of year would reduce the impact of the work. The general mitigation/compensatory habitat measures proposed for the SSSI would be valuable for invertebrates.

7.5.6 Residual Impacts

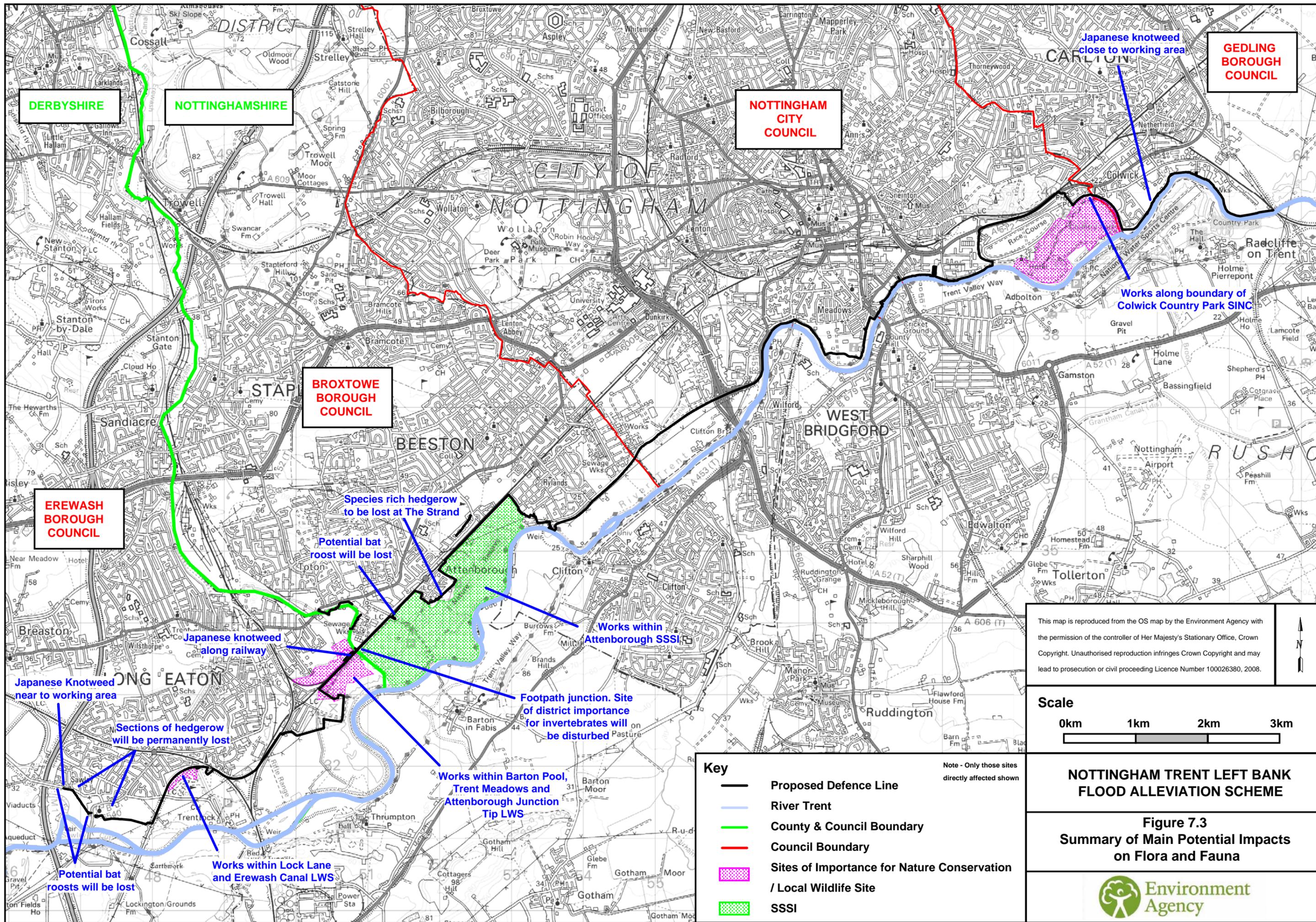
The main residual impact through Attenborough SSSI and six SINC/LWS is the permanent loss of habitat, as shown in Table 7.11 and Table 7.12. This is considered to be a **minor adverse** (SINC/LWS except Barton Pool LWS) to **moderate adverse** (Barton Pool and Attenborough SSSI) effect. Compensatory habitat will be provided in the SSSI and adjacent land to ensure **no significant long-term adverse impact**. Compensatory habitats should have a permanent beneficial impact on the overall SSSI in the long-term once established. Habitat compensation plans are detailed in *Appendix F*. All other semi-natural habitats would be reinstated or compensatory habitat provided to ensure no net loss.

There will also be the residual impact of the barrier effect of the wall on immigration and emigration, primarily of terrestrial faunal species. The design of the wall and the use of road raising/flood gates will help to minimise this impact.

With mitigation, there should be **no significant residual impact** on protected species.

In addition, a number of biodiversity enhancements are proposed; refer to *Section 9* and *Appendix F*.

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7.6 Noise and Vibration

This section describes and assesses the noise and vibration impacts arising from the construction and operation of the scheme and associated traffic movements.

7.6.1 Relevant Legislation and Policy

Noise can be deemed a statutory nuisance under Part III of the Environmental Protection Act 1990, and Section 80 enables local authorities to invoke an abatement notice on contractors. In addition, a Section 60 notice under the Control of Pollution Act 1974, empowers the local authority to specify certain matters. The key legislation is summarised below:

The *Environmental Protection Act (1990)* (Part III as amended by the *Noise and Statutory Nuisance Act 1993*) makes statutory nuisances, including noise, from a premises that is prejudicial to health or a nuisance, subject to control by the local authority.

The *Control of Pollution Act 1974*, specifically Sections 60 and 61, specifies requirements to control noise from construction sites. This includes the erection, construction, alteration, repair or maintenance of buildings, structures or roads and demolition works. The act is regulated by local authorities, who can give a notice specifying hours of work, plant or machinery to be used and the level of noise to be emitted where work is being or is going to be conducted on a construction site.

PPG 24 *Planning and Noise (1994)* provides guidance to planning authorities on the use of their powers to minimise the adverse impact of noise, including vibration.

British Standard 5228:1997, *Noise Control on Construction and Open Sites* gives advice on noise control. It contains tables of indicative noise levels from various types of mobile plant and suggests a method to calculate noise impact.

British Standard BS 6472:1992, *Guide to evaluation of human exposure to vibration in buildings* gives base curves of vibration for minimal adverse comment, and vibration dose values at which complaints are probable.

7.6.2 Methodology

Due to the nature of the project, the main noise emissions will occur during construction of the flood defences. The noise generated by construction activities is inherently variable and hard to assess in specific terms. It is possible to achieve an appreciation of the likely impacts through an understanding of the typical noise emissions by construction plant. This assessment of impacts is based on a qualitative assessment of potential noise emissions, using the guidelines provided in BS 5228: Part 1:1997 '*Noise and Vibration Control on Construction and Open Sites. Part 1, Code of practice for basic information and procedures for noise vibration control*'.

The outline construction method statement for the whole scheme (*Section 3*) describes the works as comprising plant associated with general earthmoving, concreting and piling activities. BS 5228 indicates that the typical earthmoving plant generate LAeq sound levels (i.e. noise averaged out over a whole day) in the range of 72 to 92 dbA at 10m. Sound levels by and large depreciate by

approximately 6 dbA for every doubling of the distance from the source in an open field (Various, 1994). Variable influences on noise propagation and attenuation, such as the presence of fences and embankments, hard or soft ground, meteorological conditions, local topography, are not considered in this assessment.

Table 7.13 illustrates the depreciation of the highest sound levels against distance.

Table 7.13 Depreciation in Plant Noise Emissions with Increasing Distance from Source

Distance from source, (m) (+/-30m ⁶)	Earth moving activities/plant (dbA)	Hammer driven sheet piling (dbA)
10	92	100
20	86	94
40	80	88
80	74	82
160	68	76
320	62	70

Using the depreciation guide in Table 7.13, the following precautionary impact magnitude thresholds were devised for the flood defence construction:

High	=	less than 50m from works or exceeds DoE guidance (DoE, 1976)
Medium	=	50 to 99m
Low	=	100 to 149m
Very low	=	150 to 199m
No change	=	200m and greater

The sensitivity of the receptor to noise is classified as:

High	=	Property residents or users (including businesses, schools etc.)
Medium	=	Visitors or passers-by (non urban areas)
Low	=	Visitors or passers-by (urban areas)

7.6.3 Environmental Baseline

The baseline for noise and vibration is described for each scheme in detail in *Appendices A to D*.

No data was acquired on the existing background or ambient noise levels. Therefore, a standard benchmark was sought to provide a threshold above which an adverse effect is deemed likely to arise. DoE Advisory Leaflet 72 (DoE, 1976) gives advice on the maximum levels of construction site noise at residential locations during daytime hours (7am to 7pm). Advisory Leaflet 72 states that noise levels at the outside façade of the nearest occupied room should not exceed:

- 75 dbA in urban areas near to main roads in heavy industrial areas;

⁶ Variation required to accommodate the position of the noise source (e.g. plant) within working, either side of the flood defence.

- 70 dbA in rural, suburban, urban areas away from main road traffic and industrial noise.

The defence route runs through semi-rural parts of the Erewash and Broxtowe Boroughs, where the ambient noise levels are generally dominated by road traffic and farming activities. Noise levels rise adjacent to the major roads which carry larger volumes of traffic, and through the industrial estates in Meadows and Colwick.

The number of buildings within 200m of the defence is illustrated in Table 7.14.

Table 7.14 Human Receptors within 200m of the Proposed Defences

Distance from proposed flood defence (m)	Building Type (No. of buildings)	
	Residential	Other
Sawley and Trent Meadows		
<50	43	1
50 – 100	109	8
100 - 150	201	20
150 - 200	248	10
Total	601	39
Erewash		
<50	25	5
50 – 100	27	12
100 – 150	48	4
150 – 200	60	1
Total	160	22
Attenborough		
<50	190	7
50 – 100	162	8
100 – 150	98	9
150 – 200	89	10
Total	539	34
Rylands		
<50	98	1
50 – 100	154	3
100 – 150	124	4
150 – 200	119	2
Total	495	10
Meadows and Colwick Country Park		
<50	107	19
50 – 100	246	35
100 – 150	320	45
150 – 200	199	67
Total	872	166
Colwick		
<50	13	10
50 – 100	70	11
100 - 150	84	17
150 - 200	71	47
Total	238	85

In addition to human receptors, there are a number of protected species and other fauna that were identified along the route of the defence. Details of the impacts on protected species from noise are given in *Section 7.5*.

7.6.4 Impact Assessment

The impact assessment for noise and vibration is described for each scheme area in detail in *Appendices A to D*.

Construction Impacts

Impacts from Construction Site Noise

The typical plant that will be used on site is likely to consist of dumper trucks, lorries, excavators, compactors and rolling plant. The noise levels from piling are discussed in *Impacts from Construction, Vibrations and Piling* below.

Table 7.14 shows that **519** properties (includes Residential, Schools and Offices, Industrial, Leisure and Miscellaneous properties) are situated within 50m of the works and at risk of a high level of noise disturbance which may exceed the guidelines stated in the DoE advisory leaflet. These noise impacts will be short-term and limited to daylight hours. The majority of these properties are within the Attenborough, Rylands and Meadows and Colwick Country Park scheme areas.

There are a further **845** properties within 50 to 100m, **1,174** within 100 to 150m and **1,203** within 150-200m of the working area. These may experience a medium to low level of noise disturbance.

These predictions do not take account of variables, such as the screening of fences and other buildings, and the existing ambient noise influences. Also, the temporary and daytime nature of the works, coupled with advance notification and ongoing liaison of any noisy activities, will reduce the sensitivity of a receptor's subjective response.

The *overall significance* of the *impact* was assessed *prior to mitigation* as being **moderate adverse** (for properties 50-200m from works) to **major adverse** (for properties within 50m of the works) and **short-term**.

Impacts from Construction Traffic Noise

Construction requires the movement of labour, plant and materials, which will generate extra traffic and increase the proportion of heavy vehicles on the public highways. This impact is discussed in more detail in *Section 7.10*.

Impacts from Sheet Piling Noise and Vibrations

Sawley and Trent Meadows

No significant ground shaking activities are to be undertaken.

Attenborough, Erewash and Rylands

A sheet pile cut-off is required for the proposed new flood wall around the periphery of the Attenborough Village and the SSSI. Test piling was undertaken in the Cemex Works Site to determine the best method of installation for the ground conditions and to measure the likely noise and vibration levels; refer to *Appendix B* for details. The tests concluded that the best installation method for the non-sensitive noise reaches (Coneries Pond, the southern half of Church Pond and the Cemex Works and Beeston Pond) would be a leader rig and vibratory hammer; refer to Figure 7.2.

Continuous noise and vibration measurements will be taken as the works progress along The Strand.

Meadows and Colwick Country Park

The flood defence will be founded on intermittent concrete bored piles along Victoria Embankment. The bored piles are constructed by drilling holes into the ground and infilling with concrete and steel reinforcement. With the exception of the noise made by the piling rig, the procedure eliminates the significant vibration and noise levels that are associated with traditional sheet piling.

A sheet pile cut-off is required for the wall along the Arla Depot. Piles will be installed using a combination of high frequency vibratory hammers and impact driving. These reaches are in an industrial estate, away from residential areas, and the impact should not be significant.

Colwick

Piling in Colwick is through an industrial park, away from residential areas, and so will be carried out using high frequency vibratory hammers and impact driving.

The *overall significance* of the *impact* was assessed *prior to mitigation* as being **moderate adverse** (for general disturbance) to **major adverse** (for properties within 50m of the piling works) and **short-term**.

Operational Impacts

No significant operational impacts were identified.

7.6.5 Mitigation Measures and Monitoring

During construction, there will be some disturbance to the local environment by delivery vehicles and plant on the site. This disturbance will be minimised by applying the following five basic principles to control the output of noise and vibration:

- access to the site for delivery of plant and materials will only be permitted at agreed times, using suitable agreed routes;
- the plant will be suitably sized for the works to limit noise and vibration;
- plant will be well maintained to ensure unnecessary vibration or noise from exhaust systems or loose panels is eliminated;

- noise and vibration levels will be discussed with the Environmental Health Officer (EHO);
- training in the form of site inductions and tool box talks will reflect the need to consider noise issues, such as switching off plant that is not in use, keeping engine covers closed and avoiding shouting and slamming of vehicle doors, particularly during out of hours working.

Good communications between the contractor, residents and local Environmental Health Officers will be maintained, to ensure that appropriate mitigation measures are taken and the impacts are minimised. The following actions will, therefore, be undertaken:

1. A Community Liaison Officer will be appointed to the project team.
2. Local residents will be fully informed prior to construction as to the:
 - likely duration;
 - working hours;
 - expected level of disturbance, i.e. dust emissions, noise and vibration;
 - measures taken to reduce the impact.
3. A procedure will be established to record and deal with comments and complaints from local residents.
4. There will be close liaison with LPA's Environmental Protection team regarding the programme, nature of the works and any complaints.

In addition to the specific measures, adequate warning and written notice of construction works will be provided to all affected landowners. Health and Safety issues will be addressed through the contractor's Construction Plan.

Working hours are set out in *Section 3.3*. In sensitive locations, limited working hours and seasonal working may be required, for example, near schools, nature conservation areas or recreational sites.

In addition, a Traffic Management Plan (TMP) will be implemented. This will specify access routes for construction traffic to minimise noise disturbance and avoid sensitive areas.

All properties at risk of vibration damage from the construction activities will be identified in advance and, where necessary, pre- and post-construction building/drainage condition surveys will be undertaken to assess the impact and need for remediation.

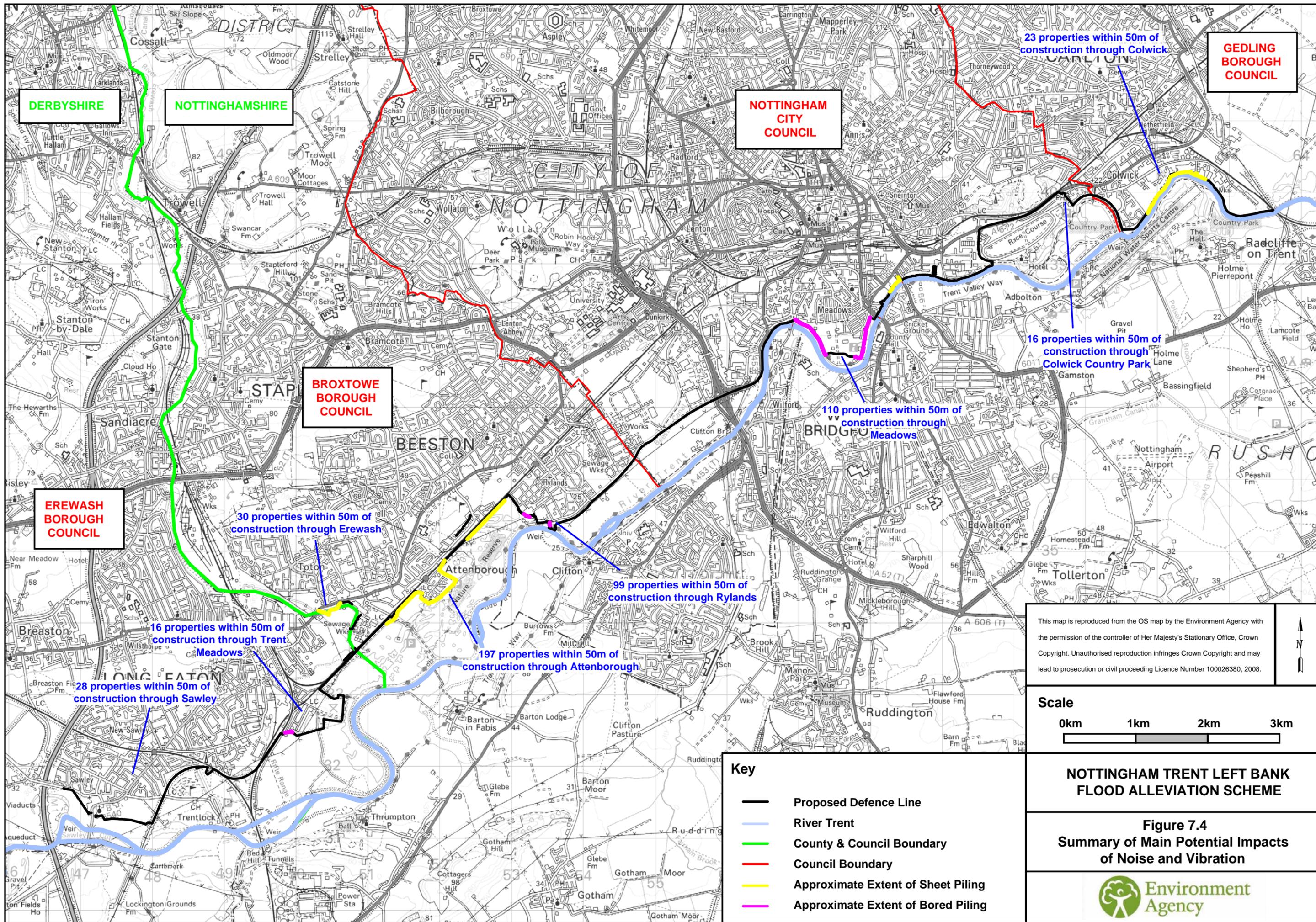
Monitoring of the noise and vibration outputs will be carried out, if required, to ensure compliance with statutory requirements.

The contractor's procedures detail the management of noise and vibration with reference to the CITB Construction Site Safety Notes (GE700), CIRIA (2005) Environmental Good Practice on Site, the Control of Pollution Act 1974 and BS 5228 - Noise Control on Construction and Open Sites.

7.6.6 Residual Impacts

Noise disturbance from general construction is only likely to affect properties within 200m of the scheme. However, the noise disturbance would only be temporary and any effects would be minimised through daytime working hours, the application of best practice and liaison with potential receptors. The majority of the adverse impacts would be of **minor** significance and only for a **short-term** whilst the activities pass within range. However, due to the urban nature of the scheme, a number of properties may experience temporary disturbance of **major significance** due to being less than 50m from piling activities. However, this level of significance would only be experienced for approximately 1-4 weeks at any location.

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**GEDLING
BOROUGH
COUNCIL**

DERBYSHIRE

NOTTINGHAMSHIRE

**NOTTINGHAM
CITY
COUNCIL**

**BROXTOWE
BOROUGH
COUNCIL**

**EREWASH
BOROUGH
COUNCIL**

23 properties within 50m of construction through Colwick

16 properties within 50m of construction through Colwick Country Park

110 properties within 50m of construction through Meadows

99 properties within 50m of construction through Rylands

197 properties within 50m of construction through Attenborough

30 properties within 50m of construction through Erewash

16 properties within 50m of construction through Trent Meadows

28 properties within 50m of construction through Sawley

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- Key**
- Proposed Defence Line
 - River Trent
 - County & Council Boundary
 - Council Boundary
 - Approximate Extent of Sheet Piling
 - Approximate Extent of Bored Piling

**NOTTINGHAM TRENT LEFT BANK
FLOOD ALLEVIATION SCHEME**

**Figure 7.4
Summary of Main Potential Impacts
of Noise and Vibration**



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7.7 Air Quality

This section sets out the assessment of air quality impacts for the construction and operation of the scheme and associated traffic movements.

7.7.1 Relevant Legislation and Policy

Air quality relates to both the gaseous and particulate content in the atmosphere, and is usually defined in terms of relevant legislation, standards and guidance. Air pollutants may include particles, carbon monoxide or dioxide, hydrocarbons, ozone/oxidants, trace metals and acid gases, such as oxides of sulphur and nitrogen. For the purposes of this statement, dust is considered to be any airborne solid matter up to approximately 2mm in size, including PM₁₀. The National Air Quality Strategy [NAQS] for England, Scotland, Wales and Northern Ireland was published in July 2007, and sets health-based standards and objectives for the eight air pollutants of most concern.

Air pollution can result in adverse impacts on the environment, ecosystems and buildings. It may result in human health effects, such as lung related illnesses and exacerbation of existing respiratory problems. There is legislation to control the production and emission of air pollutants from a wide range of processes and, under section 79 of the Environmental Protection Act 1990, Local Authorities are empowered to serve an abatement notice where a 'statutory nuisance' exists. A statutory nuisance includes *'any dust or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance; and any accumulation or deposit which is prejudicial to health or a nuisance.'*

7.7.2 Methodology

Identification of the ambient conditions was undertaken through a desk study of Local Planning Authority air quality websites. No specialist investigations were undertaken.

All plant and equipment will comply with the relevant legislation and standards relating to air emissions. For example, the Road Vehicles (Construction and Use) Regulations 1986, as amended, sets strict exhaust standards for the release of pollutants, such as carbon monoxide, hydrocarbons, nitrogen oxides, carbon dioxide and particulates.

The potential for the generation of dust is considered to be largely related to the hardness of the materials being handled. For example, soft friable materials, such as soil, break easily and produce a greater number of dust particles. Conversely, concrete and the other wall materials, such as bricks, are less likely to break and will generate less dust particles. It is assumed that once generated, dust will be dispersed predominantly by the wind and its deposition is determined to an extent by particle size. The potential for impacts is greatest within 100m of such activities (ODPM, 2000) and in most circumstances 70% of dust emissions deposit within 200m of the source (Various, 1994).

7.7.3 Environmental Baseline

Generally, good air quality is to be expected in the typical semi-rural/suburban setting of the Sawley and Trent Meadows and Attenborough, Erewash and Rylands

scheme areas. The open nature of the areas means that prevailing winds are likely to disperse any emissions and reduce the potential impact on air quality. On this basis, it is likely that the scheme areas have a relatively good air quality.

Erewash Borough Council's Air Quality Management Areas (AQMA) encompass the residential properties close to the eastern carriageway of the M1 at Sandiacre, and at Long Eaton, north and south of the M1 Junction 25 respectively. There are no AQMAs in the Attenborough, Erewash and Rylands scheme area.

The Meadows and Colwick Country Park and Colwick scheme areas have the potential for poor air quality due to city centre congestion and traffic. They are bisected by three major roads which are identified in Nottingham City and Gedling Borough's Local Air Quality Management Plans respectively, for their potential for nitrous oxide (NO_x) pollution.

7.7.4 Impact Assessment

The impact assessment for air quality is described for each scheme area in detail in *Appendices A to D*.

Construction Impacts

Impacts on the local environment from dust generation activities

Dust emissions will arise from the day to day operation of machinery/vehicles over dry ground and from construction activities. These include:

- removal of the existing sections of embankment;
- embankment raising works;
- new embankment;
- excavation of the wall foundations;
- breaking out the existing footpaths.

These activities will be required over the majority of the scheme but are linear in nature. The overall significance of the impact is therefore assessed as being moderate.

*The overall significance of the impact was assessed prior to mitigation as being **moderate adverse** and **short-term**.*

Impact on the local environment from construction plant and vehicle emissions

Construction plant and vehicles have an effect on air quality; petrol and diesel engines emit a wide variety of pollutants, such as carbon monoxide (CO), oxides of nitrogen (NO_x), volatile organic compounds (VOCs) and particulates (PM₁₀).

The lorry movements on site will mainly be associated with the transport of material to and from the storage areas. Operatives will travel to and from the site each day, in a number of private vehicles. In addition, there will be a range of construction plant on the site, such as excavators, bulldozers and generators. The plant will emit exhaust gases but the open environment means that these emissions will mix and disperse.

The *overall significance* of the impact was assessed prior to mitigation as being **minor adverse** and **short-term**.

Operational Impacts

No significant impacts identified.

7.7.5 Mitigation Measures and Monitoring

There are a range of generic measures that can be employed to limit the generation and control the emission of dust and key air pollutants from the works; refer to the CIRIA publication (2005) '*Environmental Good Practice on Site*'. Use will be made of alternative products, systems, or materials where practicable, such as mains electricity in preference to a diesel generator and pre-mixed materials rather than mixing on site. Where this is not possible, the principle will be to reduce the likelihood of the emission of dust and key pollutants and, where emissions arise, to contain or control them. With respect to dust, the latter involves the control of aspects, such as the surface area, moisture content, particle size and exposure of the material to meteorological conditions.

General

- The site layout will be planned to take account of all potentially dust-emitting activities and the location of receptors, and to maximise the effects of distance and screening with local topography and on-site structures.
- There will be good housekeeping on the site.
- Dust suppression with regular applications of fine water spray will be employed, especially during dry and hot weather. Dust suppression will be on stockpiles, unpaved work areas subject to traffic or wind and during loading/unloading of dust-generating materials.
- A supply of water and water sprayers will be available in the event of an emission of dust, with appropriate containment and control of the run-off.
- Meteorological conditions will be observed and, where possible, dust-emitting activities will be temporarily suspended e.g. in high winds.
- A daily log will be maintained to note weather conditions, construction activities and visible dust-generating activities.

Vehicles, Site roadways and Haul routes

- Preference will be given to enclosed containers for the transport of loose dry material or sheeting off lorries, whilst stationary for periods of time on-site and prior to leaving the site.
- Vehicle speeds will be restricted within the site compounds.
- Engineering materials, such as geotextiles, will be laid on unmade site routes.
- All vehicles used on the works will be kept in a well maintained and serviced state, and comply with the MOT emissions standards at all times.
- Deliveries to the site will be controlled to ensure that queuing is minimised in the vicinity of the works.
- Engines will be switched-off when not in use and unnecessary revving of engines will be discouraged.

- Car sharing by site employees will be encouraged.

Plant and Equipment

- Plant and equipment will be located as far away as possible from the nearest receptors.
- Plant and equipment will be maintained and serviced in accordance with the manufacturer's specifications.
- Dust extraction, wet cutting techniques or vacuum extraction will be used on equipment, where appropriate.

Stockpiles, Materials Handling and Storage

- Handling of materials will be minimised, wherever possible.
- The size, location and surface area of stockpiles exposed to the wind will be controlled using methods, such as sheeting and locating them close to natural screens and barriers.
- The speed of discharge and fall height of materials, such as loading and transferring of soil, will be minimised.
- All skips and containers will be covered, as appropriate.
- Stockpiles will be kept to the minimum practicable height with gentle slopes.
- The works will be programmed to minimise the storage time of materials on-site.
- On-site mixing activities will be avoided but, where required, the maximum possible quantity will be mixed in enclosed or shielded areas.

Excavations

- Temporary and completed earthworks will be covered, sealed or re-vegetated, as soon as possible.
- Earthworks will be kept damp and the works will be programmed, where possible, to avoid very hot dry weather.

Public Relations

In addition to the technical mitigation measures that may be applied. The following public relations actions will be undertaken:

1. Ensure local residents are fully informed as to the:
 - nature and reason for the works;
 - likely duration;
 - working hours;
 - expected level of disturbance, i.e. emission of dust;
 - measures to be taken to reduce the impact.
2. Establish a procedure for recording and dealing with comments from local residents.

7.7.6 Residual Impacts

A quantitative assessment of the effects of the mitigation measures and, therefore, identification of the residual impacts is not possible due to the variability of influencing factors.

A qualitative assessment of the residual impacts indicates that, with the application of good practice on site and effective public relations, the impact of dust generation and vehicle exhaust emissions from the construction works will be of **minor** (where major earthworks or sensitive sites) to **none** and **short-term**.

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7.8 Landscape and Visual Amenity

This section presents the outcome of the Landscape and Visual Impact Assessment (LVIA). The assessment provides a description of the existing visual amenity and landscape character, and reports on the likely effects of the scheme on the character and existing views from surrounding areas. Its objective is to identify potentially significant adverse impacts at the pre-consent stage and propose measures to mitigate or ameliorate such impacts.

7.8.1 Relevant Legislation and Policy

Reference was made to the '*Landscape Character of Derbyshire*', which was published by Derbyshire County Council in 2003. The left bank of the River Trent, between Sawley and the boundary with Nottinghamshire, is located in the 'Trent Valley Riverside Meadows' landscape character type. This forms part of the national 'Trent Valley Washlands Landscape Character Area', as set out in the Countryside Agency's (now Natural England) publication, '*The Landscape Character Map of England*' (1999). The '*Nottinghamshire Landscape Guidelines*' (1997) generally refer to the rural areas of Nottinghamshire and are, therefore, not appropriate for the proposed development.

The local planning policy relevant to the scheme is detailed in *Annex 1*.

7.8.2 Methodology

Data Collection

The assessment commenced with a desk-based study of the area, followed by several site visits during 2008. The study included a review of planning policy documentation, Ordnance Survey (OS) Maps and comprehensive photographs, including up-to-date aerial photography. The aim was to record and understand the different landscape characters and existing designations (such as Conservation Areas) together with potential visual receptors. Visual receptors are the people who may be able to view a proposed development, and can include the recreational users of an area, residents, tourists and employees of nearby businesses.

Assessment of Effects

The predicted landscape and visual effects, as a result of the proposed scheme, were assessed with reference to the existing environment's sensitivity to change, and the predicted magnitude of change; refer to *Annex 3* for methodology. The assessment of significance in brackets moderates the LVIA to the standard determination of Impact Assessment; refer to Table 6.1.

7.8.3 Baseline Conditions

The baseline for landscape and visual amenity is described for each scheme in detail in *Appendices A to D*.

The River Trent and its floodplain provide a significant non-urbanised corridor through the city of Nottingham. These open areas provide an important ecological and recreational resource. Scheme areas of high landscape value include:

- The village of old Sawley, which is designated as a Conservation Area by Erewash Borough Council.
- Trent Meadows – Barton Pool is classified as a LWS.
- The open areas of Attenborough, which are dominated by the Attenborough Site of Special Scientific Interest (SSSI); a wetland habitat that has developed as a result of aggregate mining. The SSSI consists of a patchwork of lakes and islands.
- The village of Attenborough, the Village Green and part of the SSSI around the village is designated as a Conservation Area.
- Victoria Embankment, which runs parallel with the River Trent, between Wilford Bridge and Trent Bridge, is a substantial area of open space within the Meadows area. Victoria Embankment and its associated Memorial Gardens are designated as a 'Registered Park and Garden' by English Heritage.
- Colwick Country Park is a Site of Interest for Nature Conservation (SINC) and is home to a variety of habitats. The lakes in the Country Park were created following gravel extraction and now provide an attractive public amenity.

7.8.4 Impact Assessment

The impact assessment for landscape and visual amenity is described for each scheme in detail in *Appendices A to D*.

Construction Impacts

During the construction period, machinery, stored materials and construction compounds will be intrusive new elements in the landscape. They will be evident in existing views for localised visual receptors. It is considered that these will be short-term visual impacts and, as such, they are not considered in detail in this assessment.

The proposed works can be categorised as three distinct forms that will result in different levels of effect. The forms are:

- The raising and re-profiling of the existing defences, both embankments and walls. This will result in a **slight (minor)/moderate adverse** landscape and visual impacts, which will not be significant.
- The construction of new defences to replace existing walls and embankments, which will incorporate improved maintenance and inspection access. These works will generally result in **moderate adverse** landscape and visual impacts, which will not be significant.
- Where new flood defences are proposed in areas where none presently exist, this will generally result in **moderate/substantial adverse** landscape and visual impacts, which will be significant.

The areas where works are considered to have a significant level of effect on existing views and the local landscape character are listed in Table 7.15.

Table 7.15 Areas of Works that will result in a Significant Level of Landscape and Visual Effects

Appendix	Area of Works	Proposed Works
A	Trent Meadows – Newbery Avenue to Owen Avenue	The levelling of the existing flood embankment between Newbery Avenue and Owen Avenue, and its replacement with a wall will have a significant adverse effect on gardens of six residential properties. Full reinstatement of affected areas, will mitigate the impacts.
A	Trent Meadows – Barton Pool Reserve Local Wildlife Site (LWS)	The new wall on top of the new embankment will have a significant adverse landscape and visual impact on Barton Pool; there will be a substantial loss of vegetation, and the embankment will encroach into part of the Pool. However the significant visual change could help improve the views of the pond for those passing the site, as existing views into the Pool are limited, due to existing dense vegetation.
B	Attenborough – residential properties	The proposed wall between Ferndale Close and Works Pond will have a significant adverse impact for the residents of Ferndale Close.
B	Attenborough – residential properties	The new flood wall will form part of the boundary for eight properties in Attenborough Village (where properties back on to the SSSI). For No. 5 Adenburgh Drive and Ireton House this will have a moderate/substantial adverse impact on the landscape character and visual amenity of the gardens. Full reinstatement of affected areas, will mitigate the impacts.
B	Attenborough – St. Mary’s Church	The new flood wall will be offset from the boundary of St. Mary’s Church; there will be a greater adverse impact on views from the churchyard than from the footpath in the SSSI. Views from the SSSI will be mitigated by ground re-profiling on the wet-side of the defence, whilst existing mature vegetation will help screen views from the churchyard.
B	Attenborough – The Strand	The new flood wall will replace an existing hedgerow along the boundary between The Strand and the Village Green. To mitigate the landscape and visual impact from The Strand road re-profiling, tree and hedgerow replacement planting and the reinstatement of the grass verge is proposed. To mitigate the impact of the wall from the Village Green side integrated seating and planting are proposed. There will be a significant adverse residual impact.
B	Rylands – Beeston Marina and Mobile Home Complex and allotments	For the proposed wall and embankment adjacent to and through the Beeston Marina and Mobile Home Complex and allotments in Rylands there will be a significant adverse visual impact for the local residents and allotment users.
C	Meadows – Embankment across Wilford Grove Recreation Ground	The new embankment across Wilford Grove Recreation Ground will result in a significant adverse residual impact on the visual amenity, with views across the open space restricted. The new footpath along the crest of the embankment will mitigate for the loss of unrestricted views.
C	Meadows – War Memorial	The flood protection across the front of the War Memorial will have a significant beneficial residual impact, through positive improvements to the public realm.

Operational Impacts

A number of flood gates are proposed throughout the scheme that must be closed in advance of a flood. When closed, they will have a **moderate adverse** visual impact due to their robust construction. When open, the visual impact of the flood gates will be mitigated with suitable cladding to the visible side; the cladding will be appropriate to the setting.

It is considered that the operational impacts are **short-term** impacts.

7.8.5 Mitigation and Reinstatement Measures and Monitoring

Recurring landscape and visual impacts are listed with potential mitigation measures in Table 7.16.

Table 7.16 Recurring Landscape and Visual Impacts with Potential Mitigation and Reinstatement Measures

Impacts Associated with Proposed Works	Potential Mitigation and Reinstatement Measures
Visual appearance of new walls.	<ul style="list-style-type: none"> • Clad in materials that are characteristic to the area. • Planting to screen new flood wall where appropriate. • Ground level re-profiling to reduce relative height of walls. • Where possible store and re-use natural stone from demolished walls to clad new walls.
Visual appearance of raised walls.	<ul style="list-style-type: none"> • Ensure new sections of raised wall blend into the existing structure.
Visual appearance of new embankments.	<ul style="list-style-type: none"> • Embankments to be seeded with grass. • Tree, scrub and hedgerow planting to screen views of proposed embankment (note planting is not allowed on the embankment itself due to operational reasons). • Where appropriate, introduce footpath on crest of embankment. • Where possible, introduce varying slope gradients and profile.
Visual appearance of raised embankments.	<ul style="list-style-type: none"> • Ensure they blend into their landscape setting through landform design and reinstatement grass seeding. • Where it does not compromise operational requirements, appropriate planting may be utilised to reduce the visual impact.
Raised road and footpath levels.	<ul style="list-style-type: none"> • Grade ramps so that a smooth road surface is achieved. • Ensure all existing access points are maintained.
Foreshortening of views	<ul style="list-style-type: none"> • New footpath, on embankment crest to maintain views across the open space.

Impacts Associated with Proposed Works	Potential Mitigation and Reinstatement Measures
Impacts on existing mature trees.	<ul style="list-style-type: none"> • Selecting alignments, access routes and compound areas to avoid areas of mature trees as far as reasonably possible. • Reinstatement tree planting to replace trees to be felled to allow construction. • Only suitable, qualified arboriculturists to undertake work on trees.
Impacts on residential properties (gardens and wall boundaries)	<ul style="list-style-type: none"> • All areas of residential properties to be reinstated in agreement with the individual property owners. • Standard of garden reinstatement to return the affected the gardens to at least the same quality. • Reinstatement to be agreed in advance of works starting. All gardens to be fully surveyed in advance by a landscape architect to record its qualities and consider mitigation.
Impacts on road users	<ul style="list-style-type: none"> • Narrowing of road, where raised, to act as a traffic calming measure. • Revision to road layout at Victoria Embankment/ Bunbury Street junction to discourage vehicular access to an already restricted section of road.
Temporary impacts of construction activities and site compounds.	<ul style="list-style-type: none"> • Where possible, locate the compounds and storage areas away from sensitive residential receptors and adjacent to suitable vehicle access points. • Reinstatement all areas affected by the works to their former land use and to at least the same condition.

7.8.6 Residual Impacts

Overall the scheme will result in **moderate adverse** impacts that will not be significant. The exception to this is within the Attenborough Village Conservation Area (Attenborough scheme area, *Appendix B*); at the Victoria Embankment (Meadows scheme area, *Appendix C*) and works that affect individual residential properties. In these areas the proposed scheme will have a **significant impact** on the local landscape character, visual amenity and on the character of individual gardens.

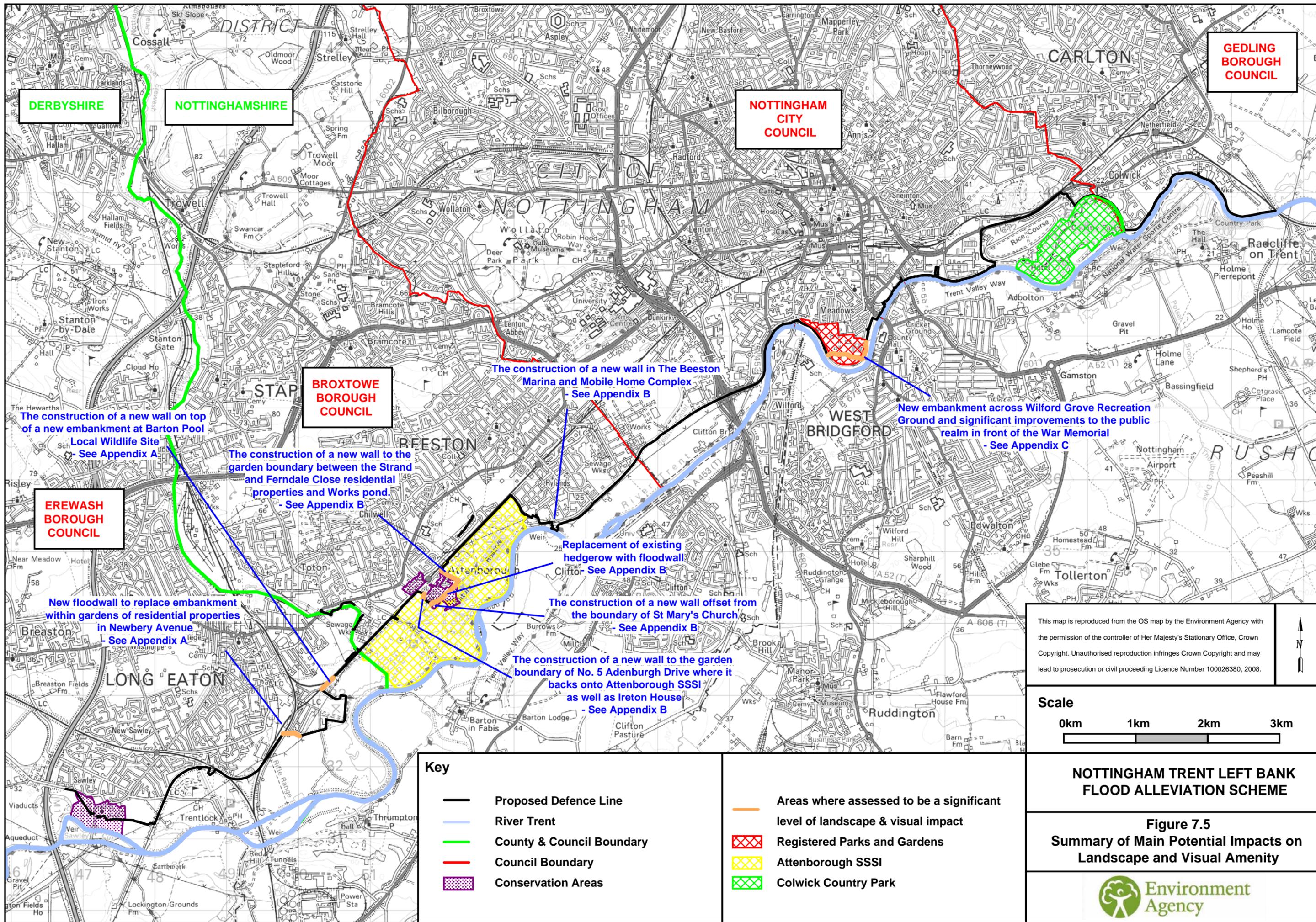
For part of the defences along Victoria Embankment there will be a **significant beneficial** impact on the landscape character and visual amenity, through proposed improvements to the public realm in front of the War Memorial.

Any adverse impacts associated with the construction of the flood alleviation scheme will be mitigated through sensitive alignment and cladding design and, where possible, the full reinstatement of the landscape to its former or an enhanced condition. To ensure the successful establishment of any reinstatement landscape scheme, an establishment and maintenance regime must be implemented.

Where the proposed works affect residential properties, there will be a significant impact on the landscape character of individual gardens. This impact must be

mitigated through sensitive construction methods and cladding design and, where possible, the reinstatement of all paved and vegetation areas. Any potential adverse impacts will also be mitigated through the reinstatement of a suitable garden boundary. All reinstatement proposals must be agreed in advance with the individual owners.

The residual impacts of the proposed scheme, along with visual representations of the proposed flood defences for each scheme area, are given in the relevant appendix.



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The construction of a new wall on top of a new embankment at Barton Pool Local Wildlife Site - See Appendix A

The construction of a new wall to the garden boundary between the Strand and Ferndale Close residential properties and Works pond - See Appendix B

New floodwall to replace embankment within gardens of residential properties in Newbery Avenue - See Appendix A

The construction of a new wall in The Beeston Marina and Mobile Home Complex - See Appendix B

Replacement of existing hedgerow with floodwall in Clifton - See Appendix B

The construction of a new wall offset from the boundary of St Mary's Church - See Appendix B

The construction of a new wall to the garden boundary of No. 5 Adenburgh Drive where it backs onto Attenborough SSSI as well as Ireton House - See Appendix B

New embankment across Wilford Grove Recreation Ground and significant improvements to the public realm in front of the War Memorial - See Appendix C

Key

- Proposed Defence Line
- River Trent
- County & Council Boundary
- Council Boundary
- Conservation Areas

- Areas where assessed to be a significant level of landscape & visual impact
- Registered Parks and Gardens
- Attenborough SSSI
- Colwick Country Park

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NOTTINGHAM TRENT LEFT BANK FLOOD ALLEVIATION SCHEME

Figure 7.5
Summary of Main Potential Impacts on Landscape and Visual Amenity

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7.9 Water

This section considers the impacts of the scheme on water resources and water quality. It aims to identify the baseline conditions of surface and ground waters in the study area, to identify waterbodies at risk of water quality impacts as a result of the scheme, to identify the potential significance of these impacts and to set out measures to mitigate them.

7.9.1 Relevant Legislation and Policy

The EU *Water Framework Directive 2000*, implemented by the *Water Environment (Water Framework Directive) (England and Wales) Regulations 2003*, seeks to: enhance waterways and wetlands throughout Europe; use water in a sustainable way; reduce water pollution; and lessen the effects of floods and droughts. The Environment Agency is responsible for managing and maintaining those watercourses which are referred to as ‘main rivers’. The remaining ‘ordinary watercourses’ are managed and maintained by the Local Planning Authority and landowners.

Under the *Water Resources Act 1991* and the *Land Drainage Bylaws 1981*, any works in, on, under or over a ‘main river’ or within the byelaw width of 8m of a ‘main river’ bank require formal consent from the Environment Agency. Any works in, on, under, over or within the byelaw width of 5m of an ‘ordinary watercourse’ require consent, from the Local Authority or Internal Drainage Board, under the *Land Drainage Act 1991*. Consents under these Acts are also required for the erection of obstructions and culverts in these watercourses.

The Environment Agency also holds legislative powers, through the *Water Resources Act 1991*, to control abstractions from or discharges to controlled surface and ground waters.

The storage of oil and fuel needs to comply with the Environment Agency’s *Pollution Prevention Guidelines* (PPGs), and CIRIA guidelines on the construction of bunds. The contractor will conform to the best practice in the *Control of Pollution (Oil Storage) Regulations 2001*, which apply to any company storing more than 200 litres of oil.

Planning Policy Statement 25: *Development and Flood Risk* explains how flood risk should be considered at all stages of the planning and development process, in order to reduce future damage to property and loss of life.

7.9.2 Methodology

Data on surface waters in the study area was obtained through consultation with internal Environment Agency specialists, walkover surveys and a review of data contained in the Envirocheck[®] Report.

The following baseline conditions are considered:

- surface waterbodies;
- river flow regime;
- sediment regime;

- water quality;
- licensed discharges and water abstractions;
- surface water users;
- flood risk.

The sensitivity of a waterbody is based on factors such as its size and importance; refer to Table 7.17. The magnitude of the impact is based on the length of time the construction activity will be present and the type of pollution that might occur.

The assessment addresses only surface waters including rivers, static waterbodies and the catchment. The impacts on groundwater in the form of aquifers are assessed in *Section 7.12*.

The flood risk and the effects on areas upstream and downstream of the scheme were considered using the results from hydraulic modelling; refer to *Section 8*.

Table 7.17 Sensitivity of Water Receptors and Magnitude of Effect

		DESCRIPTION
SENSITIVITY	High	Water feature designated under international / national conservation legislation. Main river with excellent or good (Grade A / Grade B) water quality. Groundwater overlaid with permeable rock / soil. River supporting salmonid / cyprinid fisheries. Water feature of significant recreational / amenity value.
	Medium	Main river with moderate or poor (Grades C / D / E) water quality. Ordinary watercourse. Groundwater feature overlaid with less permeable rock. Water feature of moderate recreational / amenity value.
	Low	Drainage channel / ditch with poor water quality. Groundwater overlaid with non permeable rock / soil. Water feature with no recreational / amenity value.
MAGNITUDE	High	Direct impact upon watercourse / water feature. Impact affects widespread area and large section of water feature. Prolonged disturbance / pollution of water feature. Irreversible impact.
	Medium	Indirect impact. Mobilisation of sediment. Impact affecting small area. Short-term disturbance / pollution incident.
	Low	No direct impact. Minor indirect impact. Impact affects very localised area only. Duration of impact / pollution incident very short.

7.9.3 Environmental Baseline

The baseline for water is described for each scheme area in detail in *Appendices A to D*.

The River Trent and its floodplain have been significantly modified in the past. As a result, their ecological interest is reduced but they still remain a significant ecological resource.

There are a number of tributaries of the River Trent through Nottingham. The largest is the River Erewash, which forms the boundary between Derbyshire and Nottinghamshire.

Lakes formed by gravel extraction are a characteristic landscape feature and many now provide an important ecological and recreational resource, particularly at Attenborough SSSI and Colwick Country Park.

There are several active canals along the left bank. These include the Erewash Canal at Sawley, and the Nottingham and Beeston Canal at Rylands and Meadows. The River Trent is fully navigable between Sawley and Beeston Lock, and again downstream of Meadow Lane Lock at Trent Bridge.

Table 7.18 shows where the works are within 15m of main rivers or other watercourses and waterbodies.

There are a number of surface water outfalls and combined sewer overflows through all scheme areas. There is an ordinary watercourse in the Meadows and Colwick Country Park scheme area, Tinkers Leen, which discharges to the River Trent downstream of Meadow Lane Lock. When water levels in the River Trent are high, a manually controlled actuated penstock is closed at the watercourse outfall.

Table 7.18 Main Waterbodies and Watercourses Next to Works

Reach	Main River	Other Waterbody	Other Watercourse
Sawley and Trent Meadows	River Erewash River Trent	Barton Pool Gravel pits	Erewash Canal New Sawley Brook Golden Brook
Attenborough, Erewash and Rylands	River Erewash River Trent	Attenborough lakes including: Coneries Pond Church Pond Tween Pond Main Pond Works Pond Beeston Pond	The Brook Chilwell Brook Siemens Stream Nottingham and Beeston Canal
Meadows and Colwick Country Park	River Trent	Colwick Country Park lakes	Nottingham and Beeston Canal Tinkers Leen
Colwick	River Trent	Colwick Country Park lakes	Holmes Dyke

The Environment Agency routinely measures the chemical and biological water quality of rivers using a General Quality Assessment (GQA) system. The system provides a nationally consistent mechanism to assess the general state of the water environment over time. The system uses four water quality criteria, namely Chemistry, Biology, Nutrients and Aesthetics. With reference to Table 7.19, rivers can be classified into one of six grades.

The chemical GQA describes the quality of rivers in terms of the measurements that detect the most common types of pollution. This includes discharges of organic waste from sewage treatment works, agriculture or industry.

The biological GQA is a broader measure of water quality and is based on the groups of macroinvertebrates that are found on the river bed. This provides an indication of the health of river stretches. The presence of taxa sensitive to pollution suggests better water quality than sites where only pollution-tolerant taxa are found. Table 7.20 shows the water quality of rivers in the study area.

Table 7.19 Chemical and Biological GQA Water Quality Grades

Water Quality	GQA Chemistry Grade	GQA Biology Grade
Very Good	A	A
Good	B	B
Fairly Good	C	C
Fair	D	D
Poor	E	E
Bad	F	F

Table 7.20 Water Quality Grades for Watercourses

Watercourse Stretch	Reach	GQA Chemistry Grade	GQA Biology Grade
Erewash Canal – Trent Lock	<ul style="list-style-type: none"> Sawley and Trent Meadows 	B 2003 - 05	<i>not sampled</i>
River Erewash – River Trent confluence	<ul style="list-style-type: none"> Sawley and Trent Meadows 	B 2003 - 05	C 2003 – 05
River Erewash A6005 road bridge	<ul style="list-style-type: none"> Attenborough, Erewash and Rylands 	B 2006	C 2006
Confluence of Rivers Erewash and Trent	<ul style="list-style-type: none"> Attenborough, Erewash and Rylands 	C 2006	B 2006
Nottingham and Beeston Canal	<ul style="list-style-type: none"> Attenborough, Erewash and Rylands 	B 2006	<i>not sampled</i>
River Trent confluence with River Soar to Nottingham STW	<ul style="list-style-type: none"> Meadows and Colwick Country Park Colwick 	B 2006	C 2004

7.9.4 Impact assessment

A summary of the main potential impacts on water is shown on Figure 7.6. The impact assessment for water is described for each scheme area in detail in *Appendices A to D*.

Construction Impacts

Impact on watercourses and waterbodies due to pollution from construction activities

During the replacement of the lock gates on the Erewash and Nottingham and Beeston Canals, there is the potential to disturb silt deposits in the canals during the pumping of water from the temporary cofferdam.

The construction activities including earthworks and concreting, and the movement of construction plant on site, could lead to a short-term deterioration in water quality in local watercourses. This could result from the mobilisation of material through gravel disturbance and runoff.

For all reaches, there is a risk of spillages from poor handling, transportation or storage of materials.

The waterbodies vary in sensitivity from low (drainage channels) to high (main rivers and Attenborough SSSI); refer to Table 7.17. Any pollution impact could also vary from low (very localised) to high (where we are working in-channel, for example at the SSSI). Overall, the likely significance of an unmitigated impact is considered moderate.

The overall *significance* of the *construction impact* was assessed prior to mitigation as being **moderate to major** (for pollution to high sensitivity water bodies) **adverse** and **short-term**.

Operational Impacts

Impact on villages outside the scheme area

The increased flood risk to villages further downstream is discussed in *Section 8*.

The overall *significance* of the *operational impact* was assessed *prior to mitigation* as being **moderate adverse** and **permanent**.

Impacts on local surface water drainage and watercourses

A number of drainage ditches and minor watercourses discharge to the River Trent. The majority are small and they drain highly urban catchments. There is a flap valve or penstock at their outfall to the river to prevent flows backing up. For such watercourses, their peak flood levels will occur before the peak in the River Trent arrives. Consequently, the flood defence works will not generally increase the flood risk from these local drainage ditches or minor watercourses.

The exception is the impact on the River Erewash. This river discharges into the River Trent at the upstream end of the Attenborough, Erewash and Rylands scheme area and historic records show that flooding can occur simultaneously along these two rivers. Therefore, flood defences are proposed along the left bank of the Erewash to prevent the River Trent flowing up the Erewash and flooding the urban areas behind the railway line.

Three further locations have been identified where the impact on surface water is likely to be an issue. These are:

- The Strand;
- Tinkers Leen;
- Holme Dyke

At these locations pumping stations will form part of the scheme to pump surface water over the flood defences into the River Trent.

The *overall significance* of the *operational impact* was assessed as being **not significant**.

Impact on the River Trent and its floodplain

The impact on the River Trent and its floodplain is a maximum increase in flood depth of up to 0.07m throughout Nottingham during a flood event which has a 1% annual probability of occurrence.

The *overall significance* of the *operational impact* was assessed as being **not significant**.

7.9.5 Mitigation Measures and Monitoring

Construction activity is a recognised potential cause of water pollution and, consequently, there is considerable guidance on how it can be avoided. For example the CIRIA publication (2005) 'Environmental Good Practice on Site' outlines a number of generic mitigation measures which can prevent water pollution from construction activities.

The Environment Agency produced Pollution Prevention Guidelines (PPGs) to provide practical advice to ensure minimal risk of polluting a watercourse. Relevant measures outlined in the following PPGs will be taken into account by the contractor during construction. Full details of the following PPGs can be found on the Environment Agency's website.

- PPG 1 General Guide to the Prevention of Pollution
- PPG 5 Works and Maintenance in and near Water
- PPG 6 Working at Construction and Demolition Sites
- PPG 21 Pollution Incident Response Planning.

More specifically, the contractor will minimise the risk of accidental release of construction materials by ensuring good handling practices, as follows:

- plant maintenance will be undertaken within a designated area of the site compounds;
- water runoff from the site compound and other working areas will be controlled;
- refuelling of plant will be undertaken within the site compound;

- drip trays will be installed under plant, wherever possible;
- oils, fuels and chemicals will be securely stored in a bunded area;
- storage sites will be adequately secured from vandals.

Careful handling of materials will appreciably reduce the risk of pollution, but if pollution does occur, pre-planning will limit the impact. The contractor will develop a Pollution Incident Response Plan (PIRP) in accordance with PPG 21, to avoid long term environmental impacts.

The PIRP will contain a contact list, site drainage plan, site oil, chemical and product inventory and an outline of the emergency procedures. To ensure the plan works effectively, construction staff will be trained and copies of it will be distributed to the relevant organisations and individuals.

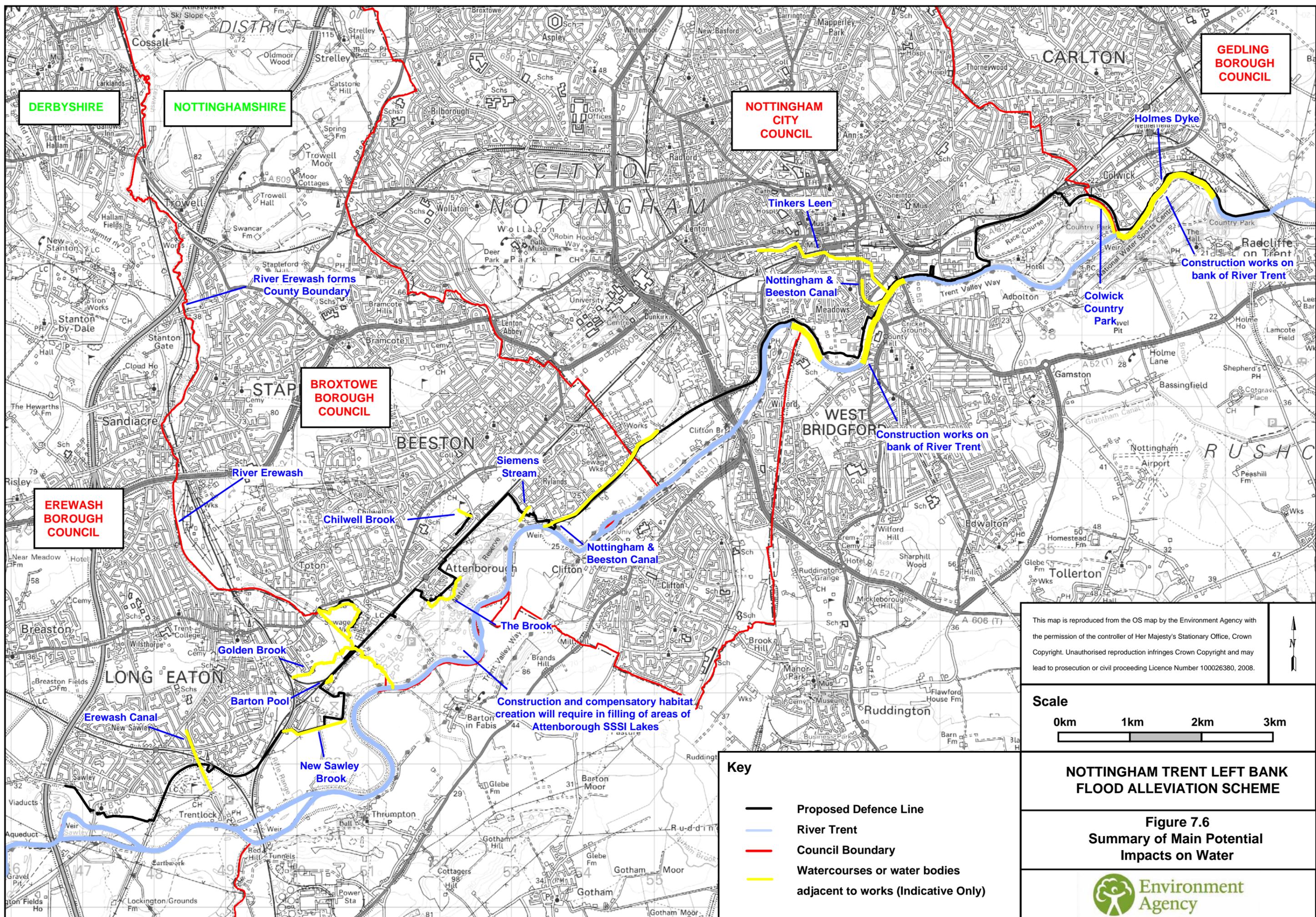
7.9.6 Residual Impacts

During construction, there is the potential to pollute watercourses and waterbodies near the works, either through a pollution incident or by mobilisation of sediment. However, through the adoption of appropriate mitigation measures, the **adverse** residual impacts will be of **no significance**.

The new and raised defences are likely to have a residual impact on the surrounding villages. This is discussed in more detail in *Section 8*.

The new proposed reedbeds in Attenborough SSSI, which will be created as compensation for habitats lost through the construction of the scheme (see *Appendix F*), will filter and improve the quality of the surface water which discharges to Church Pond and Beeston Pond. In addition, a number of enhancement measures are proposed for the scheme area; refer to *Section 9* and *Appendix F*.

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**NOTTINGHAM TRENT LEFT BANK
FLOOD ALLEVIATION SCHEME**

**Figure 7.6
Summary of Main Potential
Impacts on Water**

Key

- Proposed Defence Line
- River Trent
- Council Boundary
- Watercourses or water bodies adjacent to works (Indicative Only)



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7.10 Traffic and Transport

This section examines the impact of the scheme on traffic and transport.

7.10.1 Relevant Legislation and Policy

Key policy is included in the Derby and Derbyshire Joint Transport Plan, and the Greater Nottingham Local Transport Plan; refer to *Section 4*. Legislation and policy in relation to transport noise and vibration is included in *Section 7.6*.

7.10.2 Methodology

A qualitative assessment was undertaken of the likely impacts of the scheme on local traffic and transport in, and within the vicinity of, the study area. A desk study was undertaken to provide information on the site and study area, and it specifically considered the anticipated number and type of traffic movements arising from the scheme, and site access arrangements. It also focused on the impacts on the local transportation networks during construction, the likely increase in traffic and any impact on transport routes.

The impacts on navigation and PRoW/cyclepaths are discussed in *Section 7.3*.

7.10.3 Environmental Baseline

The baseline for traffic and transport is described for each scheme area in detail in *Appendices A to D*.

The River Trent has influenced the development of the transport network throughout Nottingham. There are four river road crossings within the study area:

- Clifton Bridge (A52) (between the Rylands and Meadows scheme area in an area of high ground);
- Harrington Bridge (Sawley);
- Trent Bridge (Meadows);
- Ladybay Bridge (Meadows).

There are also several main commuter routes into the centre of Nottingham, including the B6540 Tamworth Road (Sawley), the A6005 Nottingham Road (Attenborough, Erewash and Rylands) and A612 Daleside Road East (Colwick Country Park and Colwick).

Victoria Embankment, at Meadows, is a privately owned road, which is maintained by Nottingham City Council. The road is periodically closed for recreational amenity.

A main line railway runs parallel to the proposed defence at Trent Meadows and Attenborough and, between Sawley and Trent Meadows, the railway embankment acts as a flood defence.

7.10.4 Impact Assessment

The impact assessment for traffic and transport is described for each scheme area in detail in *Appendices A to D*.

Construction Impacts

Impact of local road raising and construction activities requiring road closures

Road or lane closures will be required on

- Tamworth Road, Trent Lane and Pasture Lane (Sawley and Trent Meadows);
- Barton Lane and Riverside Road (Attenborough, Erewash and Rylands);
- Victoria Embankment and Bunbury Street (Meadows);
- River Road (Colwick).

Road or lane closures at each location will generally be between 2-3 weeks except at Victoria Embankment (6 months).

The full road closure for the raising of Tamworth Road will take approximately 2-3 weeks. The works will affect Harrington Bridge.

The Strand (Attenborough) will be affected by lane and road closures for several months; more details are provided in *Appendix B*. River Road (Colwick) will need to be closed for approximately 2 weeks.

The *overall significance of the impact* was assessed *prior to mitigation* as being **moderate** to **major adverse** (Tamworth Road closure) and **short-term**.

Impact on local roads due to movement of construction plant and machinery

The location of the proposed access points are shown in Figures V4.1 to V4.12, *Annex 4*. In addition, material will be transported along the haul routes adjacent to the defences. The estimated lorry movements are shown in Table 7.21 and these will be finalised during detailed design. In all scheme areas, there will be an increase in heavy vehicle movements in residential areas adjacent to works.

Table 7.21 Estimated Lorry Movements

Reach	Total number of lorry deliveries (Includes delivery and return journeys)
Sawley	220
Trent Meadows	1,910
Erewash	1,120
Attenborough	37,970
Rylands	2,200
Meadows	5,790
Colwick County Park	2,850
Colwick	5,680
Total	57,740

The overall *significance of the impact* was assessed *prior to mitigation* as being **moderate** and **short-term**.

Impact on operation of railway network due to construction works adjacent to railway line

Railway possessions will be needed for construction works within:

- Sawley and Trent Meadows, where the embankments will be raised to tie in with the existing rail embankment.
- Attenborough, Erewash and Rylands, where the flood defence will tie into the parapet of the railway bridge crossing of the River Erewash. This is referred to as Attenborough Junction.

The necessary approvals and consents will be obtained in advance from Network Rail. In addition to the possessions, all works within 5m of Network Rail property will require their approval and supervision of the works.

The railway line is of regional importance but possessions would be few and short term so overall significance is assessed to be moderate adverse.

The overall *significance of the impact* was assessed *prior to mitigation* as being **moderate adverse** and **short-term**.

Operational Impacts

Impact of new and raised defences on local transport infrastructure

The reduced risk of flooding to the local road and railway network behind the new flood defences.

The overall *operational impact* was assessed as being **moderate beneficial** and **permanent**. No mitigation required.

7.10.5 Mitigation Measures and Monitoring

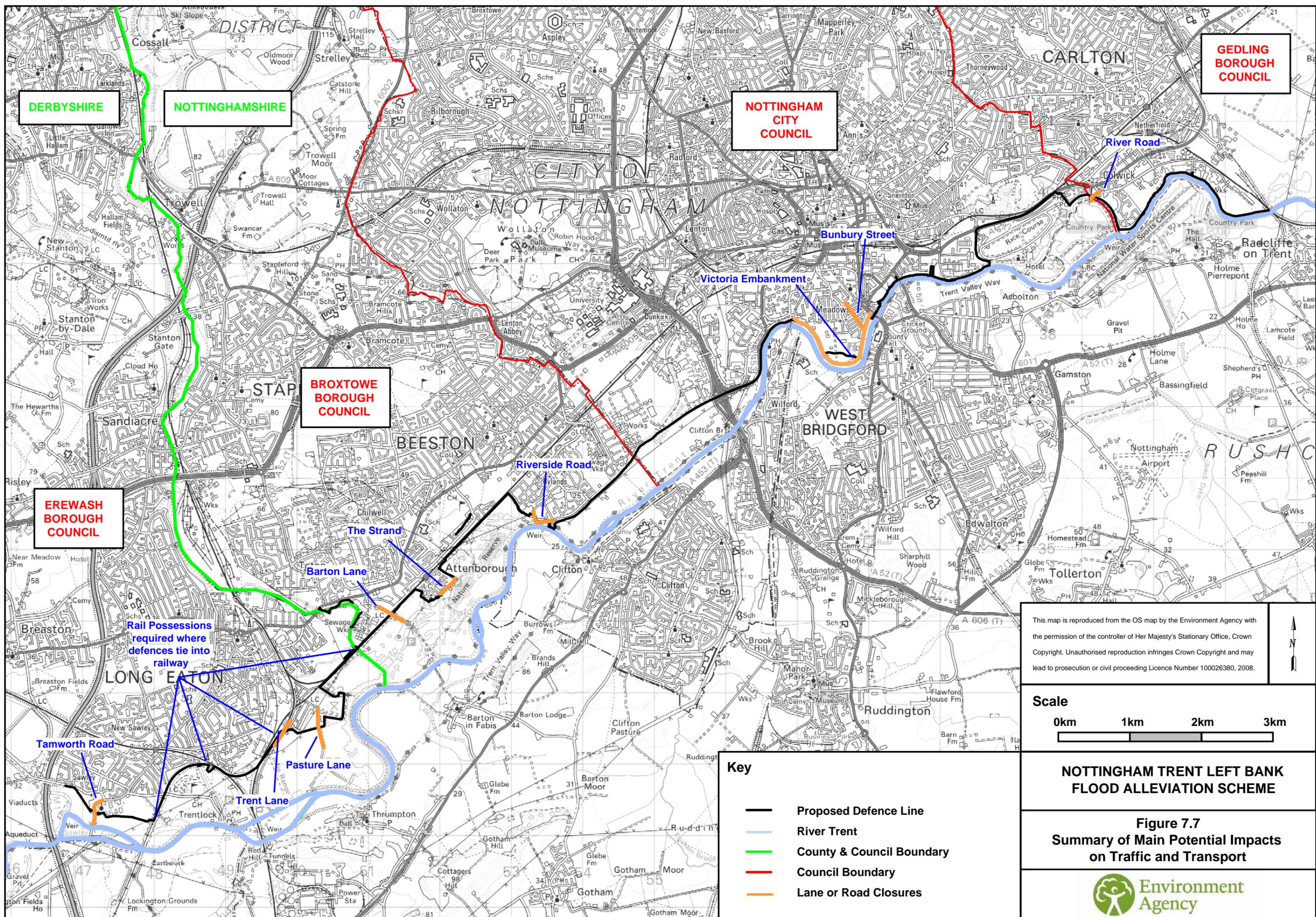
A number of mitigation measures will be implemented to reduce adverse impacts on traffic and transport during the construction phase:

- a traffic management plan will be produced;
- delivery of materials will only be allowed during non-peak periods;
- the contractor will be required to submit a Method Statement for approval, regarding to deliveries and haulage routes;
- site access and the site compounds will have adequate provision for construction staff parking, to prevent potential conflict or highway safety issues over on-street parking. The contractor would be required to submit a Method Statement for approval in regard site access and the site compounds;
- the proposed construction routes were chosen to avoid residential areas and other sensitive locations, wherever possible;
- signage will be used to direct delivery drivers along the permitted routes;

- other signage will be used to warn other road users of site entrances and to apologise for any delays caused by the construction traffic;
- any road closures will be signed on the route in advance and diversion routes clearly marked;
- all routes and signage requirements will be agreed with Derbyshire and Nottinghamshire Highway Authorities;
- repairs to the highway surfaces and kerb lines will be carried out after the works are complete.

7.10.6 Residual Impacts

With the proposed mitigation measures, it is considered that there will remain a **minor** to **major** (closure of Tamworth Road) **adverse** and **short-term** impact on the overall traffic and transport network during the construction period. This results from the need to transport equipment, workers and material to and from the site and the requirement for lane/road closures and diversions.



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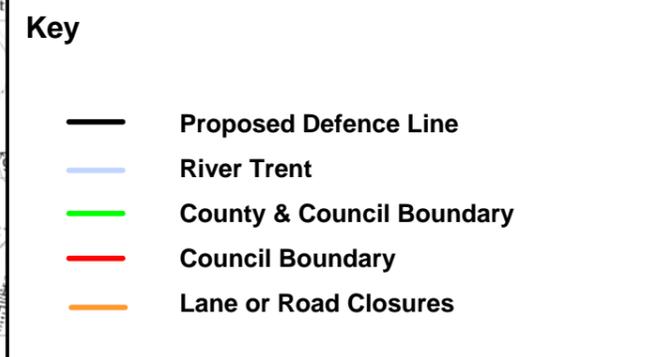
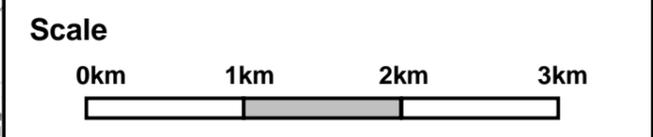
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**NOTTINGHAM TRENT LEFT BANK
FLOOD ALLEVIATION SCHEME**

**Figure 7.7
Summary of Main Potential Impacts
on Traffic and Transport**



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7.11 Cultural Heritage and Archaeology

This section examines the impact of the scheme on Cultural Heritage and Archaeology and for the purposes of this assessment incorporates Listed Buildings, Scheduled Monuments and built Conservation Areas as well as buried archaeology.

7.11.1 Relevant legislation and Policy

The principal legislation on the protection of important archaeological sites is the *Ancient Monuments and Archaeological Areas Act 1979* (as amended). Under the Act, it is an offence to carry out any works that would have the effect of demolishing, destroying, removing, repairing, altering, adding to, flooding or covering up a Scheduled Monument. Although the formal boundaries of a Scheduled Monument are closely drawn around the monument; this Act also applies to a 2m buffer zone. In addition, development proposals should take account of the setting of any Scheduled Monument, as this may be a material consideration in the decision-making process.

Legal protection for Listed Buildings and Conservation Areas is provided under the Planning (Listed Buildings and Conservation Areas) Act 1990. 'Listed Buildings' are classified into three grades:

- Grade I - Buildings of exceptional interest, usually judged to be of national importance.
- Grade II* - (known as Two Star) Particularly important buildings of exceptional interest and of outstanding importance.
- Grade II - Other buildings of special interest which warrant every effort to preserve them.

Guidance on the importance, management and safeguarding of the archaeological resource within the planning process is provided by Planning Policy Statement 6 (PPS 6): 'Planning, Archaeology and the Built Heritage'. Relevant local policy on cultural heritage and archaeology is provided in *Annex 1*.

7.11.2 Methodology

An archaeological desk-based assessment and geotechnical investigation was carried out for the scheme (Allen & Appleton, 2005 and Hill & Howard, 2006). An evaluation by trial trenching was also necessary in order to define the nature and extent of potential archaeological deposits.

An archaeological evaluation of the site was undertaken between August and September 2006 (IFA, 1997). Removal of topsoil and other overburden was undertaken by mechanical excavator using a toothless ditching bucket, under archaeological supervision. The exposed surfaces of the trenches were assessed and inspected for archaeological remains. Where no archaeological features were evident, a test pit was excavated by machine at either end of the trench and the alluvial deposits exposed were recorded. Where archaeological features were present, they were excavated by hand and recorded. Following excavation, all records were checked and ordered to ensure that they constitute a complete Level II archive, and a stratigraphic matrix of all identified deposits was produced.

7.11.3 Environmental Baseline

The baseline for cultural heritage and archaeology is described for each scheme area in detail in *Appendices A to D*.

The scheme area is archaeologically sensitive and a variety of prehistoric, Roman, medieval and post-medieval remains were identified by desk and field study. Additionally, numerous former river channels (palaeochannels) are crossed by the proposed defences.

There are a number of Listed Buildings throughout the entire scheme area. There are also two Scheduled Monuments and Conservation Areas in the Sawley and Attenborough scheme areas.

Although all scheme areas were investigated, archaeological remains were identified in only the Sawley and Trent Meadows, and Attenborough, Erewash and Rylands scheme areas.

Sawley and Trent Meadows

- Trench S1: earthworks representing either ridge and furrow agriculture or meadow drainage, of likely late-medieval or post-medieval date were evident.
- Trench S2: excavated in the grounds of the Harrington Arms PH. It revealed remains of both early and late post-medieval date, including the foundations of a late post-medieval cottage.

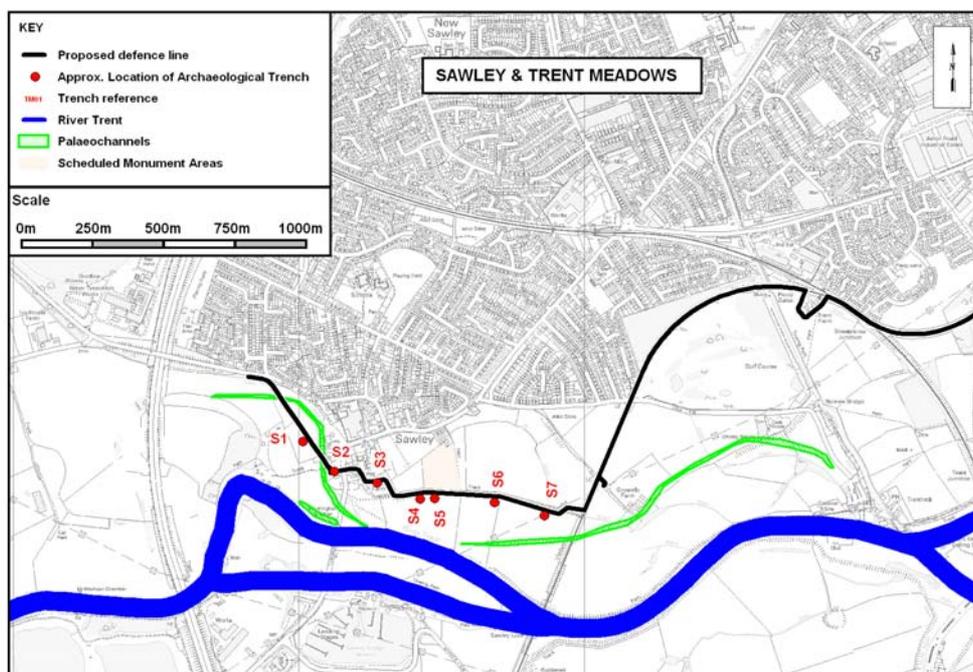


Figure 7.8 Areas of Archaeological interest at Sawley Village (Sawley and Trent Meadows Scheme Area)

Attenborough, Erewash and Rylands

- Trenches A2 and A3: Undated and post-medieval remains were identified in the boundaries of Fishponds Scheduled Monument.
- Trenches A5 to A7: Remains of undated, possible Anglo-Saxon, medieval and post-medieval date were identified, including a possible Anglo-Saxon ditch and a large medieval feature, possibly an infilled fishpond in A5.

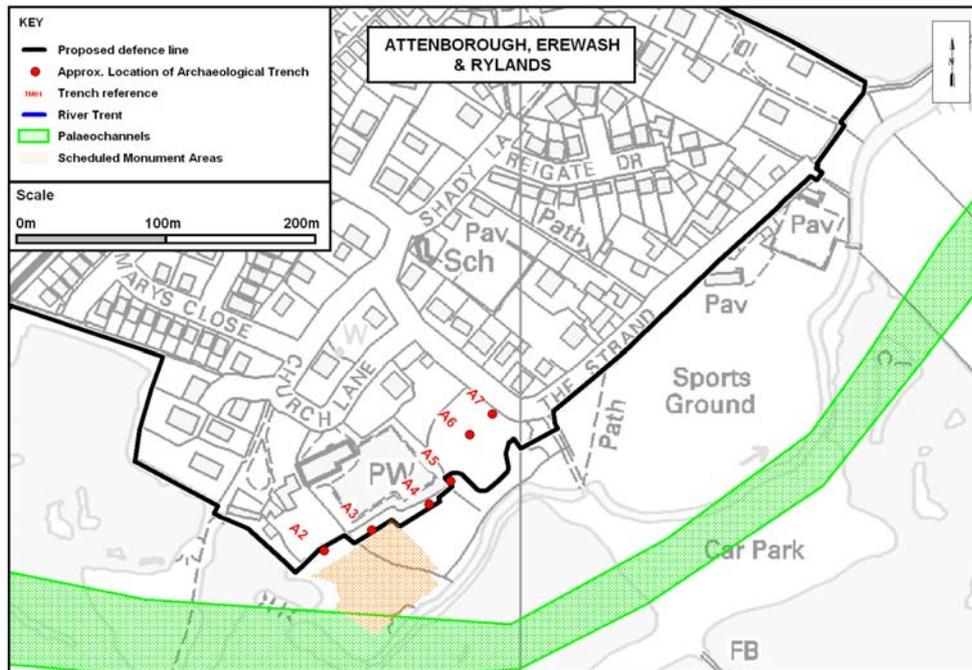


Figure 7.9 Areas of Archaeological interest at Attenborough Village (Attenborough, Erewash and Rylands Scheme Area)

Deposits of natural alluvial strata were exposed in some trenches in all scheme areas. Although possible palaeochannel fills were evident in some, only a single flint core of late-neolithic or Bronze Age date was recovered (Attenborough, Erewash and Rylands).

Substantial dumps of recent material of early to late twentieth century date were encountered at Attenborough, along Victoria Embankment at the Meadows and adjacent to Colwick Country Park. Although natural alluvial alluvium was observed at the base of many of these trenches, the depth of recent deposition makes it likely that any archaeological remains will have been destroyed or are too deeply buried to be disturbed by the proposed works.

A series of undated dump deposits were recorded close to Trent Bridge at Meadows.

7.11.4 Impact assessment

The impact assessment for archaeology and cultural heritage is described for each scheme area in detail in *Appendices A to D*.

Construction Impacts

There are archaeological impacts associated with the construction of new or raised defences. Construction activities that could damage archaeological remains include sheet piling, fencing off the works areas, stripping topsoil and subsoil from the compound areas and temporary haul roads, and excavations.

The extent of the impact of sheet piling is, however, limited to the loss of buried remains in the footprint of the pile (approximately 50mm wide strip) and some deformation of remains around the immediate area of the pile (approximately 200mm either side of the pile). It has been demonstrated that buried waterlogged archaeological deposits are unlikely to be adversely affected by sheet piles. The vibration resulting from some forms of piling can affect built structures of any age. *Section 7.6* outlines the piling method that will be used through sensitive sites. Along Victoria Embankment (Meadows and Colwick Country Park scheme area), the defence will be founded on intermittent concrete bored piles, which will eliminate the significant vibration associated with the traditional sheet piles. However, this has a considerably larger footprint of approximately 300mm in diameter.

There are upstanding earthworks and the buried remains of medieval and post-medieval settlement at Attenborough Village, Erewash and Rylands. The alignment and design of the defences was adjusted to retain the integrity of this site. The use of an embankment means that the earthworks will be undisturbed. The footprint of the embankment will be stripped and any archaeological remains will be excavated, probably of a lower density than the top of the slope. The archaeological work in the footprint of the embankment will contribute to the archaeological knowledge of the area and present an opportunity for some positive engagement with the local community/school. This could include site visits during the excavation, presentation of findings and information boards on recovered finds. It should be noted that this was a previously unknown archaeological site.

The defences will tie into, or run adjacent, to several Listed Structures. The impact on their setting is discussed in *Section 7.8*.

The *overall significance* of the *impact* was assessed *prior to mitigation* as being **minor adverse to moderate adverse** (depending on the historical value of the archaeological remains affected) and **permanent**.

Operational Impacts

There will be a reduction in flood risk to a number of Listed Structures.

The *significance* of the *operational impact* was assessed as being **minor beneficial** and **permanent**. No mitigation required.

7.11.5 Mitigation Measures and Monitoring

A detailed mitigation strategy will be agreed with the County Archaeologists and English Heritage. Specific mitigation measures for the known archaeological sites are given in the appendices.

There are a range of generic mitigations measures, which are outlined in the CIRIA (2005) publication 'Environmental Good Practice on Site'. These will reduce the general disturbances and risks relating to construction activities on the archaeological sites. The measures are as follows:

- prior to starting work, any sensitive areas will be clearly marked and fenced off, or removed off site;
- all construction staff will be made aware of the importance of protecting designated areas and why;
- to avoid direct damage from vehicles or trampling, sites will be securely fenced off;
- sites will be avoided or protected with a layer of imported material or matting.

The reaches where an archaeological watching brief is required are specified in the relevant scheme area appendices. Any finds will be reported to the County Archaeologist and work in that area will be stopped whilst the find is investigated by an archaeologist. Any fossils, antiquities, structures, remains and other objects of geological or archaeological interest or value will be reported to the Coroner in accordance with the Treasures Act 1996.

The design around all Listed Buildings and the Scheduled Monuments in Sawley and Attenborough will be sympathetic to the setting, by use of appropriate cladding.

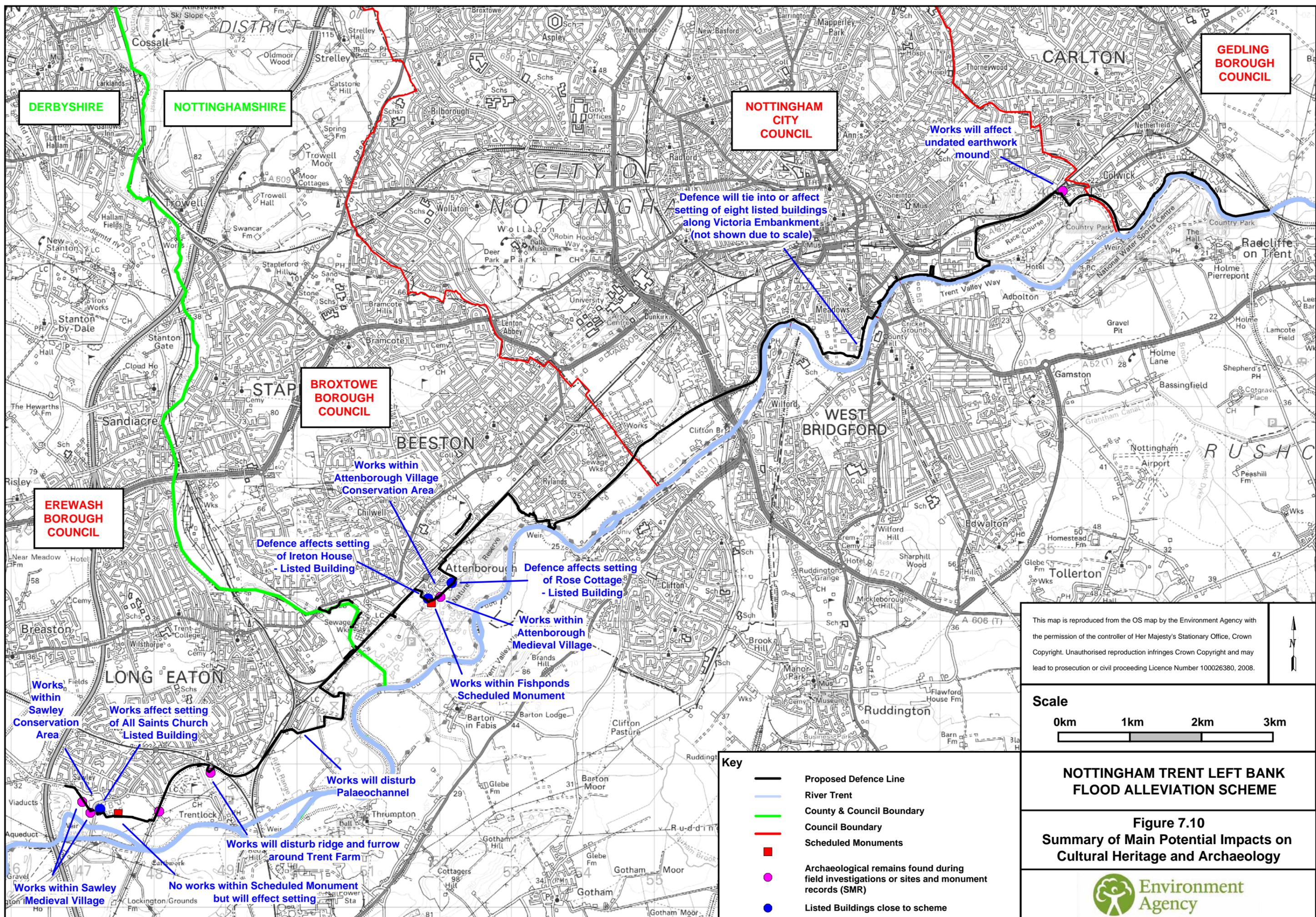
7.11.6 Residual Impacts

Residual impacts are limited to the visual impact of the defences on the historic environment, including Listed Structures and Scheduled Monuments.

The **adverse** residual impacts after mitigation are of **no significance**. The **beneficial** residual impact of an increased number of historic sites being protected from flooding will be **minor** and **permanent**.

In addition, a number of enhancement measures are proposed for the scheme area; refer to *Section 9* and *Appendix F*.

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Key

- Proposed Defence Line
- River Trent
- County & Council Boundary
- Council Boundary
- Scheduled Monuments
- Archaeological remains found during field investigations or sites and monument records (SMR)
- Listed Buildings close to scheme

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FLOOD ALLEVIATION SCHEME**

**Figure 7.10
Summary of Main Potential Impacts on
Cultural Heritage and Archaeology**



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7.12 Soil, Geology and Hydrogeology

The purpose of this section is to assess the potential impacts of the proposed development on the soil geology and hydrogeology of the scheme.

7.12.1 Relevant Legislation and Policy

The *Groundwater Regulations 1998*, *Water Resources Act 1991* and the *Water Environment (Water Framework Directive) (England and Wales) Regulations 2003* focus on the protection of groundwater for domestic or agricultural use. The groundwater regulations contain two lists of substances, including toxic substances such as pesticides, hydrocarbons and heavy metals, and conditions are stipulated for any direct or indirect groundwater discharge.

In line with the *Policy and Practice for the Protection of Groundwater*, the Environment Agency will only permit dewatering to land if mitigation measures, outlined in their PPGs, are employed.

7.12.2 Methodology

Desk study, walkover surveys and intrusive ground investigation were carried out to determine the ground conditions throughout the scheme area. Ground investigations were undertaken in November 2004 and September 2005. This work included cable percussion boreholes, window sampling, trial pits, groundwater monitoring and associated laboratory work. The investigations provided information on the superficial deposits on which the flood defences are to be founded.

7.12.3 Environmental Baseline

The environmental baseline for soil, geology and hydrogeology is described for each scheme area in detail in *Appendices A to D*.

Geology

The solid geology of the Nottingham area comprises deposits of the Mercia Mudstone and Sherwood Sandstone Groups of the Triassic Age. The Triassic deposits are underlain by Coal Measures.

The area is traversed by a number of faults, the majority with an approximate east-west strike, although some have a stronger north-south alignment. The general bedding dip is towards the east.

Overlying the Triassic deposits, are superficial deposits of Pleistocene and Recent Age. These include glacial till on the flanks of the Trent Valley. The deposits of the valley itself are mainly alluvium with terrace gravels giving way to head deposits on some of the side slopes. The alluvium of the broad floodplain of the River Trent is mainly clays, silts, sands and gravels with some organic clay. Deposits of made ground are present, due to urban and industrial development on the left bank of the River Trent.

The ground investigations generally confirmed the underlying geology, which are variable deposits of made ground overlying alluvium with shallow depth to bedrock of either Mercia Mudstone or Sherwood Sandstone.

There is a geological Site of Special Scientific Interest (SSSI) in the Meadows and Colwick Country Park scheme area; Colwick Cutting SSSI.

Soils

The nature of the made ground varies according to location. However, generally made ground is typically present as a mixture of cohesive and granular soils that have been placed as fill to the embankments and development works. Through the Attenborough, Erewash and Rylands scheme area, much of the made ground exists as a mixed soil of clay, silt, sand and ash fill to gravel pits.

When present, the weathered Mercia Mudstone was recovered in boreholes as sandy clay and Sherwood Sandstone as a yellow brown fine to coarse sand.

Soils in relation to agriculture are described in *Section 7.13*.

Hydrogeology

The Sherwood Sandstone is a recognised aquifer and is typically overlain by the Mercia Mudstone, which acts as a barrier.

Seepage through or under the existing defences is not a concern for much of the scheme area due to the thickness of the above hydrogeological layers and land use. The exception is through Attenborough, Erewash and Rylands, where the granular alluvium has a high permeability and a hydraulic connection with the Rivers Trent and Erewash, and the lakes in Attenborough SSSI. Analysis undertaken so far indicates that a cut off is required for the defences in this area to prevent seepage under the proposed flood defences; refer to *Appendix B*. It also concluded that the lake water levels are influenced by surface water runoff and in particular flows from the River Erewash.

Also for the Meadows scheme area, the granular alluvium may have a hydraulic connection with the River Trent. Monitoring of groundwater and river levels is ongoing to verify whether seepage is a concern. The initial findings are that although seepage may occur, no properties are likely to be flooded from water ponding in the low lying areas behind the defences. Further appraisal will be carried out during the detailed design stage.

Contaminated Land

Due to the industrial nature of reaches within Meadows and Colwick, there is a high risk that contaminated land will be present.

The chemical contamination of the soils was assessed by performing a suite of tests on samples obtained from the ground investigation. Comparing the test results to available industry guidelines, such as Soil Guideline Values (SGVs), the contamination is low. Testing for contaminants will continue as part of any future ground investigation, which is carried out for the detailed design.

At Trent Meadows, the proposed works will pass close to former landfill sites, none of which were registered to receive toxic and hazardous waste. In the area of proposed works, the levels of all contaminants are low and do not exceed the guidelines.

7.12.4 Impact assessment

The impact assessment for soil, geology and hydrogeology is described for each scheme area in detail in *Appendices A to D*.

Construction Impacts

Impact of soil compaction in working areas

Compaction by heavy machinery can damage the macrostructure of a soil. The waterlogged nature of some areas makes them particularly prone to compaction and structural damage, because the slippage of machinery on the wet ground has a very damaging effect on the soil structure.

Due to the linear nature of the scheme, only part of most land parcels will be affected and while the significance of the impact will be greatest in nature conservation and recreational sites, the overall significance is considered to be minor.

<p>The <i>overall significance</i> of the <i>impact</i> was assessed <i>prior to mitigation</i> as being minor adverse and medium-term.</p>

Impact of contamination of soil and groundwater by fuels and other hazardous materials

The maximum excavation depth will typically be between 0.5 and 1m below ground and the impacts to the immediate surrounding environment should be minimal. For the reaches where piling is required, this should not unduly disturb or affect the underlying soils.

Wall and embankment construction will include drainage systems for the discharge of surface water.

<p>The <i>overall significance</i> of the <i>impact</i> was assessed <i>prior to mitigation</i> as being minor adverse and short-term.</p>
--

Operational Impacts

Impact of the sheet pile cut-off on groundwater flows

The impact of installing a sheet pile cut-off through the Attenborough, Erewash and Rylands scheme area is outlined below. The impacts on hydrogeology through piling in the other scheme areas are not significant.

The proposed cut off will not be installed over the entire scheme area. In areas where the cut off is present, the rate of seepage would be reduced but groundwater flow would not be stopped. Groundwater would be restricted in areas with a cut off

and flow unimpeded in the remaining areas. Groundwater flows will only be restricted during flood events.

In normal conditions, groundwater flow is towards the River Trent. Surface water inflows, mainly from the River Erewash, control levels in the Attenborough SSSI lakes. The proposed works will have no significant effect on surface water flows and a nominal effect on groundwater flows. Therefore, lake water levels will not be affected by the installation of a cut off.

At locations where the River Trent comes out of bank (typically a flood event with a 20% annual probability of occurrence), groundwater flow is reversed and is from the River Trent to the ponds and towards the defended area.

The *overall significance of the operational impact* was assessed *prior to mitigation* as being **minor adverse** and **permanent**.

7.12.5 Mitigation Measures and Monitoring

The general mitigation measures outlined for the protection of surface waters will inherently protect groundwater quality; refer to *Section 7.9*. However, the work will be undertaken in accordance with the Environment Agency's *Policy and Practice for the Protection of Groundwater*. Mitigation measures would include:

- good site practice when working next to watercourses is to be followed;
- restoration of ground conditions following completion of works. This would involve stripping the topsoil in advance of the works, careful storage during the works and reinstatement on completion;
- reseeded/replanting to ensure that soils are not washed away during floods;
- ongoing monitoring of the groundwater and its interaction with surface water runoff.

If the working area is found to have contaminants present, the procedures outlined in the Environment Agency's 'Guidance on Requirements for Land Contamination' will be followed. Depending on the type, source and quantity of the contamination, one of the following options will be implemented:

- control: deal with the contamination in situ;
- remove source: remove source of contamination;
- remove pathway: typically involves the creation of an impermeable barrier to ensure contamination can no longer enter the site;
- remove sink: remove the area affected by contamination.

To minimise the impact on soils, the following mitigation measures will be implemented:

To Protect Topsoil Structure:

- Strip topsoil from all excavation sites, work areas, haul routes or storage areas prior to commencement of work. Topsoil is to be stripped and stored separately from subsoil.
- Construction activities are to be restricted to those areas delineated with fencing, or other suitable marking, to prevent vehicle incursion. These areas are to be regularly inspected and the markings maintained.

- Topsoil is to be stored in piles no higher than 1.5m when loose-tipped. Vehicles or machines are not to be tracked over the piles.
- Topsoil piles are to be sprayed with herbicide when weather conditions allow.

To Contain and Remove Potentially Polluting Substances:

- Any soil accidentally contaminated during the works by potentially polluting substances, such as fuels, oils or chemicals is to be removed to a licensed tip. Absorbent materials used to contain spills are to be treated in a similar manner.

To Protect Soils from Erosion Prior to Plant Establishment:

- To protect soils at risk of erosion during flood events, a biodegradable surface mat or binding agent will be applied. Non-biodegradable ties, bindings or other materials that could cause a hazard to birds or wildlife will not be used when the exception of the fixing. The exception is the fixing pegs.

To Minimise the Potential Contamination of Soils:

- Site stationary plant and machinery will be on impermeable drip trays at all times. Drip trays will be maintained in such a way as to prevent spillage or overflowing.
- Refuelling of vehicles and machinery will be undertaken off-site or in designated areas away from watercourses.
- Machinery operating in the banks of any watercourse will use biodegradable oil within their hydraulic systems, whenever possible.
- All equipment and materials required to execute a clean up to be available on site.

To Ensure that Removed Topsoil in Construction Areas is Replaced in its Original Location:

- After excavation, topsoil will be removed and stored. It will be returned to its original location to enable the regeneration of flora from the seed source in the topsoil.

To Ensure that Excavated Contaminated Soils are Appropriately Disposed of:

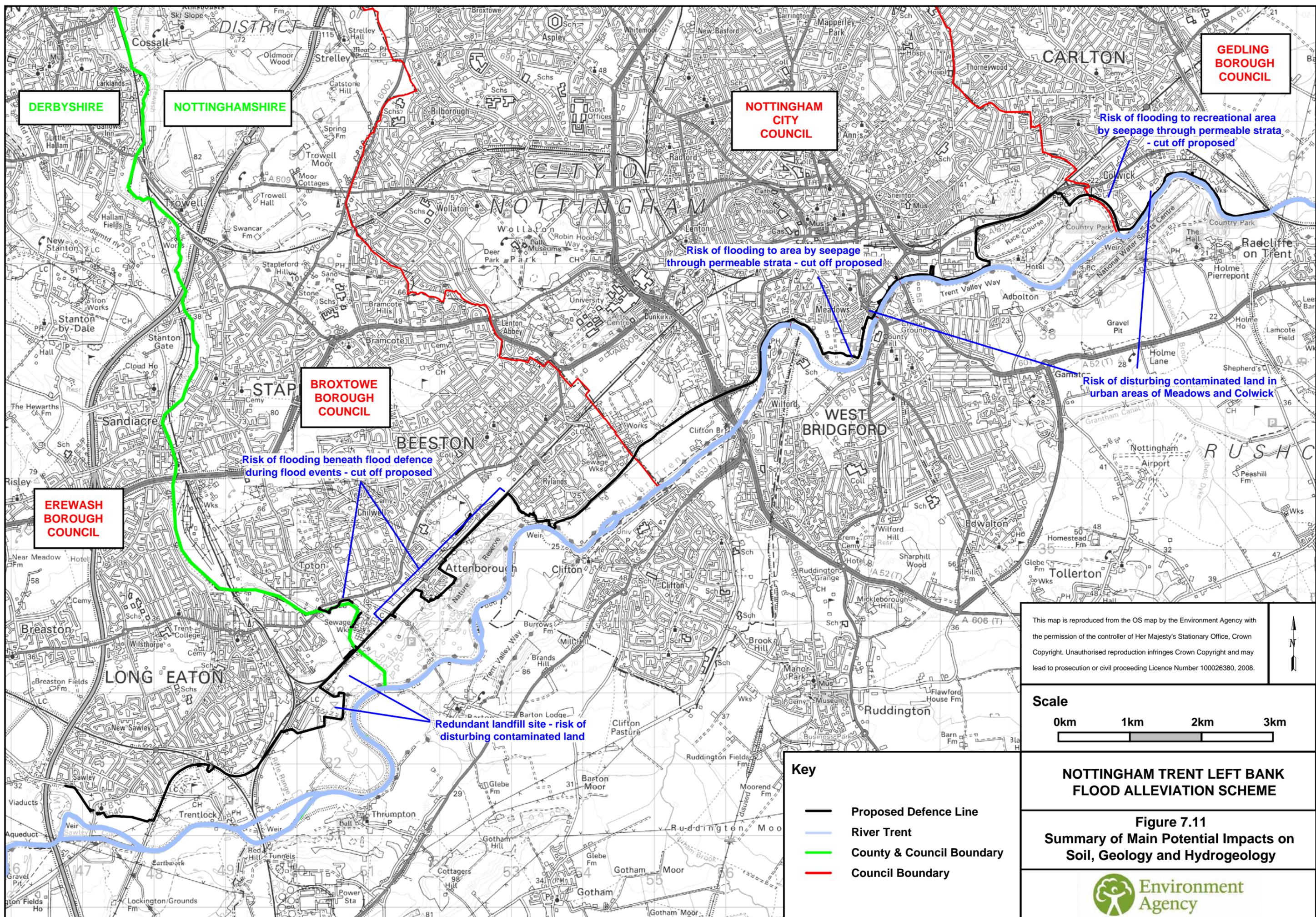
- All contaminated spoils from the works to be disposed of at an appropriately licensed disposal facility.

7.12.6 Residual Impacts

Residual impacts are limited to soil compaction and contamination from the construction works. The **adverse** residual impacts after mitigation are of **no significance**.

The majority of the impacts will occur at the construction and reinstatement stage, rather than long-term post construction. The impact of the cut-off on groundwater levels in Attenborough will be negligible as the cut-off is designed to restrict groundwater flow during a flood event. There will be no impacts during normal conditions.

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- Key**
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 - River Trent
 - County & Council Boundary
 - Council Boundary

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FLOOD ALLEVIATION SCHEME**

**Figure 7.11
Summary of Main Potential Impacts on
Soil, Geology and Hydrogeology**



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7.13 Land Use

This section contains an assessment of the impacts on land use along the proposed defences. Where agricultural land quality and the management of farmland are affected, the objectives are to:

- describe the soil types and classifications present;
- describe the existing and potential agricultural land use in the project area;
- evaluate its sensitivity;
- predict the likely impacts of the proposed project;
- propose mitigation measures to alleviate adverse impacts of the project.

A number of related topics are discussed in *Section 7.12*, namely:

- soils and geology;
- land drainage and hydrogeology;
- waste soils.

7.13.1 Relevant Legislation and Policy

Planning Policy Statement 7 (PPS 7) – Sustainable Development in Rural Areas, sets out the Government's planning policies for rural areas. It seeks to discourage the development of 'greenfield' land, and, where such land must be used, to ensure that it is not used wastefully.

Local planning policy is included in *Annex 1*.

7.13.2 Methodology

The assessment of agricultural impacts involved:

- A study of published information on the MAFF⁷ provisional Agricultural Land Classification (ALC).
- Use of a combination of aerial photographs, and 1:25,000 and 1:10,000 scale OS maps to establish baseline conditions and assess the potential impacts of the proposed defences.

Agricultural land classification grades throughout the study area were sourced from the Defra's provisional agricultural land classifications on the Multi-Agency Geographic Information for the Countryside (MAGIC) website.

Information and views were sought from statutory and non-statutory bodies during the assessment process. In addition, the following sources of information were used:

⁷ In June 2001, the Department for Environment, Food and Rural Affairs (Defra) took over all of the responsibilities of the former Ministry of Agriculture, Fisheries and Food (MAFF). For clarity and ease of reference in this chapter, the term 'Defra' is used collectively to mean MAFF and/or Defra. However, MAFF may be used if it is referring to a publication that was produced before 2001.

- Local and structure plans
- MAGIC website.

Defra developed a method to classify agricultural land by grade according to the extent to which its physical or chemical characteristics impose long-term limitations on its use for food production. This classification system in its provisional form included 5 grades, Grade 1 being land of the best and most versatile quality, and Grade 5 being severely limited. Grade 3 and above are considered the best and most versatile land; refer to Table 7.22.

Table 7.22 Sensitivity of Agricultural Land (provisional, pre-revision system)

Agricultural Land Classification	Definition (Defra)	Sensitivity
Grade 1	Excellent	High
Grade 2	Very good	High
Grade 3	Good	Medium
Grade 4	Poor	Low
Grade 5	Very poor	Low

The approximate criteria to evaluate the magnitude of agricultural changes arising from the development can be determined as follows:

- A high magnitude of change can be defined as a large scale impact which is generally permanent, and the key elements and characteristics of the existing agricultural environment are completely lost. For example, this might mean that an agricultural business becomes unviable.
- A medium magnitude of change can be defined as a moderate scale impact, which can be either permanent or temporary, and where the key elements and characteristics of the existing agricultural environment are partially lost.
- A low magnitude of change can be defined as a small scale impact, either permanent or temporary, and where there is only a minor loss or alteration of the key elements and characteristics of the existing agricultural environment.
- A very low magnitude of change is where no impacts on key elements or characteristics of the baseline landscape are considered likely.

The inclusion of farmland in Government Subsidies land management, such as, Environmental Stewardship schemes, is assessed as a sign of sensitivity.

7.13.3 Environmental Baseline

The baseline for land use is described for each scheme area in detail in *Appendices A to D*.

Agriculture is a major land use in the Sawley and Trent Meadows scheme area. The majority of the agricultural land is provisionally classed as Grade 3 or 4. There are no Environmentally Sensitive Areas, Countryside Stewardship or Environmental Stewardship agreements in place.

The land adjacent to the embankment and flood wall on the southern side of the Nottingham and Beeston Canal in the Rylands scheme area is Grade 4 agricultural land.

The remainder of the land affected by the works is mainly private residential property; refer to *Section 7.3* or managed for nature conservation; refer to *Section 7.5*.

The river frontage between Trent Bridge and Colwick Country Park (Meadows and Colwick Country Park) is designated by Nottingham City Council as a Development Site; refer to *Section 10*.

7.13.4 Impact assessment

The impact assessment for land use is described for each scheme area in detail in *Appendices A to D*.

Construction Impacts

Impacts of land take

The temporary and permanent land take resulting from the proposed works are listed in Table 7.23. A permanent easement of 1-5m will be created, along which the Environment Agency will have the right to carry out maintenance and monitoring activities. Land use along the easement will be restricted to protect the flood defence from damage, but this should not affect normal grazing or recreational practices.

Table 7.23 Existing and Increased Footprints of New and Raised Defences

Reach	Existing Footprint (m ²)	Increased/New Footprint (m ²)	
	Permanent	Temporary	Permanent
Sawley	17,637	76,143	25,356
Trent Meadows	8,998	79,739	16,843
Erewash	No existing flood defences	20,362	4,811
Attenborough	No formal flood defences exist	91,215	30,756
Rylands	4,262	65,390	14,989
Meadows and Colwick Country Park	4,465	66,460	31,210
Colwick	15,533	52,072	18,044
Total	50,895	451,381	142,009

The defence crosses allotments, gardens, recreation areas and some Grade 3 and 4 agricultural land and there is a potential impact on farming operations. The

majority of the impacts will be short-term and last for approximately three months. They are as follows:

- temporary sterilisation of productive land taken up by the working width although overall viability of farms should not be affected;
- possible restriction of access, causing sterilisation of land outside the working width;
- some disruption of access to the land across the construction area;
- temporary loss or severance of field boundaries;
- damage to the soils during the construction process, including compaction, erosion, contamination;
- loss of a parking area for Colwick Country Park.

There will also be reduction in available land in industrial areas of Meadows and Colwick.

It will take at least one full growing season for grassland to re-establish (up to 15 months when vegetation is seeded at a sub-optimal time of year). Topsoil will take time to recover after reinstatement, with possible implications for agricultural productivity. In sensitive areas where grassland is required for recreational purposes turf will be laid, where necessary to speed up establishment time.

Overall, the land use sensitivity is assessed to be medium but due to the linear nature of the scheme less than 25% of each land parcel will typically be affected.

The overall significance of the impact was assessed prior to mitigation as being **minor adverse** and **short-term** to **permanent**.

Construction work may also generate dust that could impact on agricultural land beyond the physical boundaries of the site; this issue is dealt with in *Section 7.7*. Impacts on access rights are dealt with in *Section 7.3*. Particular attention will also be paid to the field drains; this issue is dealt with in *Section 7.9*. *Section 7.12* provides details on the impacts of the proposed works on soils and the underlying strata. See also *Section 7.3*.

Operational Impacts

Impacts on undefended land

The proposed works will reduce the natural floodplain during an extreme event. The consequence of this is an increase in peak river levels affecting land in front of the defences or un-defended land outside the scheme area. *Section 8* describes this impact in more detail. Impacts on Flora and Fauna are assessed in *Section 7.5*.

Impacts on defended land

Land behind the defences will be subject to an improved standard of protection.

The overall significance of the impact was assessed prior to mitigation as **moderate beneficial** and **permanent**. No mitigation required.

7.13.5 Mitigation Measures and Monitoring

Soil degradation from development is inevitable and can arise from a number of activities associated with construction. Disturbance of the soil resource will produce soil profiles of lesser quality than those on undisturbed land. The potential effect of this cannot be entirely mitigated, however, by implementing best practice techniques and careful management, it can be minimised. Refer to *Section 7.12* for details of best practice methods.

Effective pollution prevention will be achieved by following CIRIA guidance for *Environment Good Practice on Site* (CIRIA 2005), and the Environment Agency's PPGs.

The majority of the potential agricultural impacts will occur during the construction stage. These will be minimised by careful planning, detailed consultation with the landowners/occupiers and close attention to detail during construction and reinstatement of the land.

The construction methodology which includes a number of mitigation measures is described in *Section 2*. Specific methods relating to agricultural impacts are:

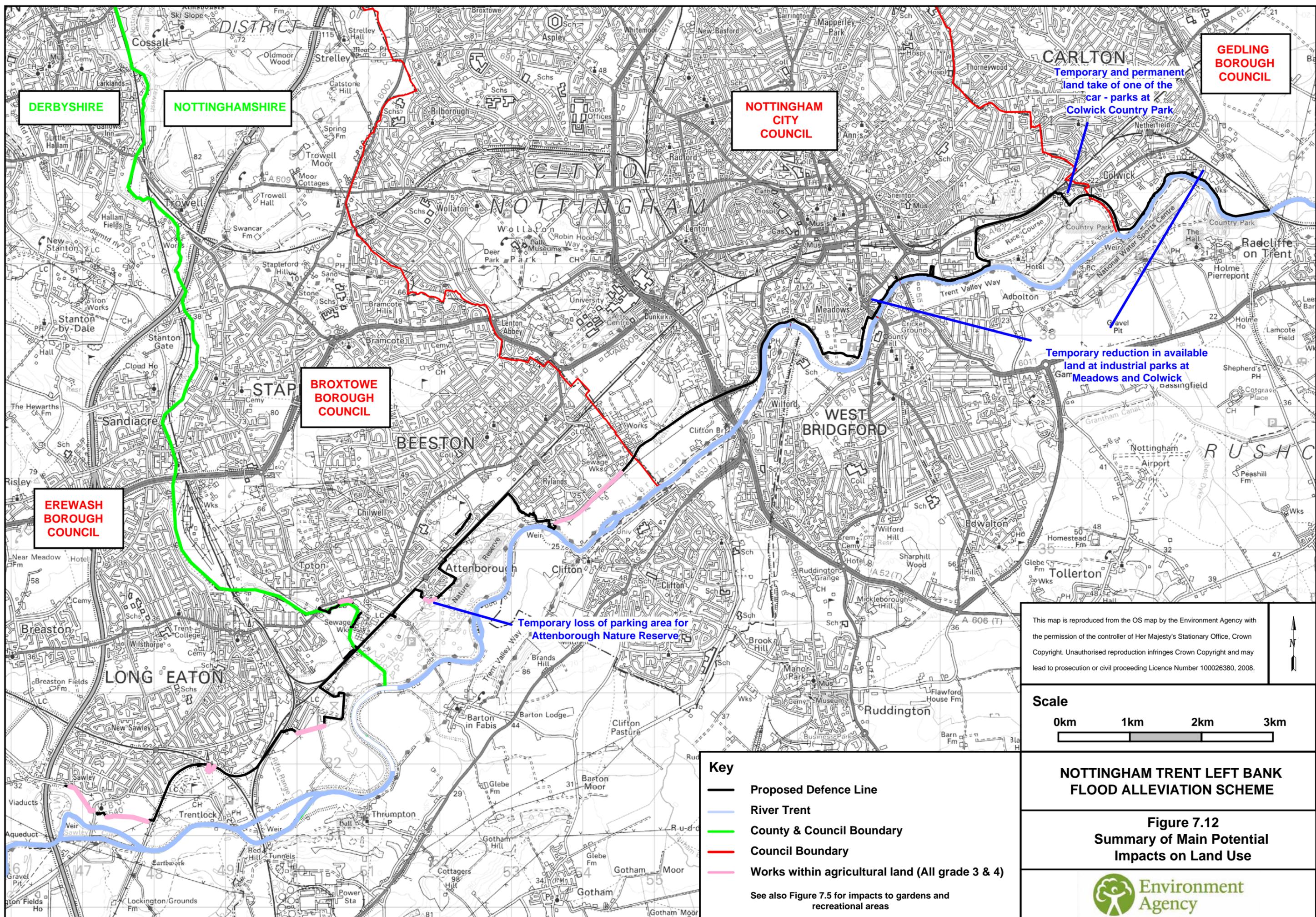
- a detailed record of the field drains will be made. Pre-construction, it will be confirmed that the drainage systems outside the working areas function properly. Details of the post construction drainage schemes will be agreed with the landowners/occupiers;
- precautions will be taken to prevent livestock straying onto the working areas and possibly making contact with livestock in other fields;
- disturbed farm structures, such as fences, hedges, ditches, culverts and water-troughs, will be reinstated as soon as possible after construction.

7.13.6 Residual Impacts

The majority of the potential land use impacts will occur at the construction and reinstatement stages where there will be a **minor adverse** and **short-term** impact. Although the land use along the easement will be restricted to protect the defences, the current agricultural and other land use practices will be able to continue. Impacts on nature conservation sites, including Attenborough SSSI, are assessed in *Section 7.5*.

In addition, a number of enhancement measures are proposed for the scheme area; refer to *Section 9* and *Appendix F*.

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7.14 Cumulative Impacts

7.14.1 Cumulative Construction Impacts

Construction activity causes a range of effects: general disruption to access, noise, vibration, pollution including dust, as well as physical land take. These impacts on people have been assessed across a number of sections, mainly *Section 7.3* (Human Population), *Section 7.6* (Noise and Vibration), *Section 7.7* (Air Quality), and *Section 7.10* (Traffic and Transport).

Construction impacts are generally considered to be highest for works within private gardens, properties within 50m of the works or where recreational sites need to be closed or their current use significantly affected. The significance of individual impacts on people has been assessed from **minor** (general indirect disturbance) to **major** (impacts from piling). However, there is a combined or cumulative impact of all construction impacts to an individual and to the wider community. Where these cumulative impacts occur they will increase the significance (of the impact experience by those affected). The Nottingham Trent Left Bank FAS runs through predominantly suburban and urban communities and so construction impacts will have some effect on a large number of people. The overall construction impact on the communities is therefore assessed as being **moderate**.

Most of the people who will experience significant landscape effects (refer to *Section 7.14.3* below) will also be the people who experience the greatest construction impacts and overall they will experience a larger cumulative impact.

7.14.2 Cumulative Flora and Flora Impacts

The main biodiversity interest along the Nottingham Trent Left Bank FAS is within the Sawley and Trent Meadows and Attenborough scheme areas. Construction will occur sequentially and due to the linear nature of the scheme and with the mitigation prescribed there is not considered to be a significant cumulative impact on the flora and fauna interest of the River Trent floodplain.

7.14.3 Cumulative Landscape Impacts

The Landscape and Visual Impact Assessment (LVIA) shows a series of **moderate adverse** effects that are then classified using the methodology laid down in the *Annex 3* (Evaluation of Significance of Landscape Effects) as not significant.

Of all the identified landscape effects approximately 50% fall into this moderate, adverse category. The areas, and thus, the works covered within the moderate adverse category will be intermittent along the full project length of 27km with high ground and floodable areas breaking up the lengths of flood protection.

Due to this intermittent nature of construction and ability to use landscape mitigation techniques such as planting the cumulative effect of all landscape impacts is considered to have a **slight/moderate adverse** level of effect on the landscape character of the whole River Trent corridor through Nottingham. The works are considered to result in a low magnitude of change, as the overall landscape character of the river corridor will remain the same. The river corridor is a non-designated landscape, which means it has a medium sensitivity to change.

Along the line of the proposed works there are more adverse than beneficial landscape effects to give the overall conclusion that the works will have an **adverse** type of effect but overall it is considered that the cumulative landscape and visual impact is not significant.

The appendices and supporting summary tables consider individual stretches of the scheme in greater detail. This includes the sensitivity of the landscape resource, magnitude of landscape effect and the resulting evaluation of landscape significance.

8 EFFECTS ON THE SURROUNDING VILLAGES

8.1 Background

Computer modelling of the River Trent demonstrates that raising the defences through Nottingham will result in slightly more water passing downstream during extreme flood events. This is because of the resulting reduction in the available floodplain storage.

The computer model has been developed using topographic survey data of the river channel, principal structures and floodplain. The generated water levels have been calibrated against peak levels through Nottingham observed during the 1947 and 2000 flood events. The model has been further calibrated in 2008 against other smaller events in January 1995, October 1998, December 2002 and January 2008. Although the computer model is a very useful tool in flood risk management, the industry standard tolerance band for the water levels predicted by such models is $\pm 0.2\text{m}$.

The existing left bank flood defences through Nottingham typically protect against a flood with a 2% annual probability of occurrence. For flood events greater than this, raised defences through Nottingham will result in more floodwater passing downstream and an increased flood risk to surrounding communities, including those isolated properties through the city not being protected by the scheme (for example, Trent Lock adjacent to the Erewash canal). Flood risk to all these communities during smaller, more frequent events, will remain unchanged.

8.2 Extent of Impact

All communities downstream of Nottingham as far as Bleasby, and those at, Barton in Fabis and Holme Pierrepont, will be adversely affected by the works. There are currently **758** properties at risk of flooding during an event with a 1% annual probability of occurrence. This would increase to **827** following completion of the scheme, a total of 69 additional properties. 48 of the 69 affected properties are located in Burton Joyce with remainder split between Stoke Bardolph, Gunthorpe, Hoveringham and Bleasby. The maximum increase in peak levels for these properties will be 0.07m during an event with a 1% annual probability of occurrence.

The frequency of flooding would also slightly increase for those properties where flooding currently commences in events with greater than a 2% annual probability of occurrence. This effect is negligible as the floodplain is flat and wide.

The adverse impacts will not occur until all the works associated with the Nottingham Trent Left Bank FAS are complete. The scheme is currently programmed for completion in 2013.

8.3 Mitigation Measures

The adverse impact to the surrounding villages will be minimised by maximising floodplain storage through the design of the scheme. For example, the defences through Colwick were set back to Daleside Road and the alignment along The Strand through Attenborough maximises the storage and reduces the surrounding impact.

A separate study was commissioned to investigate the potential to mitigate the adverse impact in each village. Table 8.1 summarises the situation and any proposed works. These works will reduce the impacts on the surrounding villages. They will be carried out independently of the Nottingham Trent Left Bank FAS.

Table 8.1 Summary of Impacts and Proposed Mitigation Measures for Nottingham's Surrounding Villages

Village/ Community	Existing Flood Defences	Increase in 1% flood peak water level as a consequence of scheme	No. of properties with a 1% annual probability of flooding		Increase in Properties Flooded Due to the Left Bank FAS	Proposed Mitigation
			Currently	Post-Scheme		
Thrumpton	No	0.01m	0	0	0	The FAS will have no adverse effects on the properties in Thrumpton. Further topographic surveys are planned to determine whether local ground raising and/or flood prevention measures to individual properties is feasible.
Barton in Fabis	Yes	0.04m	97	97	0	A local levy flood defence scheme started in 2008 to increase the height of the existing defences, thereby mitigating the impacts of the proposed works in Nottingham. Construction work on the second phase of the defences is due to begin in March 2009.
Holme Pierrepont	No	0.07m	6	6	0	Further topographic surveys are planned to determine whether local ground raising and/or flood prevention measures to individual properties is feasible.
Radcliffe-on-Trent	Yes	0.06m	0 ⁱ	0	0	The increase in flood levels will not affect residential properties in Radcliffe-on-Trent however; increased flood depths will be experienced through the mobile home park. A local levy funded scheme is currently in the detailed design phase which aims to improve defences to the caravan park.
Stoke Bardolph	No	0.06m	9	11	2	Further topographic surveys are planned to determine whether flood prevention measures to individual properties is feasible.
Burton Joyce	No ⁱⁱ	0.06m	352	400	48	A new pumping station was completed in August 2008 and is being commissioned. A new flood bank is expected to be completed in March 2009. Once complete the scheme will provide flood risk management from a 1% flood event to all 48 properties.
Shelford	Yes	0.05m	0	0	0	No works planned as the existing defences are above the 1% annual probability of occurrence event.
Gunthorpe	No	0.05m	137	142	5	A combination of individual flood protection measures and new flood banks has been proposed. The installation of a variety of individual protection measures was completed to 34 houses in March 2008. Works are also progressing on a new flood bank which is due to be completed in March 2009. Further options to lower flood risk are being studied to examine further ways to reduce flood risk.
Caythorpe	No	0.04m	0	0	0	A threshold survey showed that no properties within the village are at risk from a flood with a 1% annual probability of occurrence either before or after the Left Bank FAS.

			No. of properties with a 1% annual probability of flooding			
Hoveringham	No	0.04m	104	111	7	A pre-feasibility study is ongoing to determine whether a combined approach of new defences, manipulation of flow routes and individual property protection is feasible.
Bleasby and Gibsmere	No	0.02m	53	60	7	In March 2007 individual property protection measures were applied to 17 of the most vulnerable properties in the area. Further study is being undertaken to reduce flood risk to the wider area for submission for local levy funding in 2009/10.

- Notes:
- ⁱ This does not include a mobile home park on the edge of the village
 - ⁱⁱ An existing railway embankment provides a certain degree of protection; although the condition of this embankment is unknown

9 ENVIRONMENTAL ENHANCEMENTS

9.1 Introduction

The Environment Agency has a statutory duty to protect and enhance the local environment wherever possible. During the outline design, a number of environmental enhancement opportunities were identified in each scheme area. The exact scope and design will be confirmed during the detailed design stage, subject to landownership agreement.

9.2 Enhancement Opportunities

The following enhancement measures will be developed during detailed design of the scheme areas. The locations are summarised in Figures V4.1 to V4.12 and in *Appendix F*.

Sawley and Trent Meadows

- habitat creation and restoration in and around Trent Margins pLWS;
- plant new hedging to improve biodiversity and provide screening to a local pumping station;
- installation of otter holts along River Trent;
- move the footpath to the crest of the raised embankment downstream of Harrington Bridge;
- installation of an interpretation board at Trent Meadows pLWS to highlight the biodiversity interest;
- improved recreational facilities in Trent Meadows Picnic Area;
- a new footpath adjacent to the wall through Trent Meadows pLWS;
- local habitat enhancement to LWS Sawley Carr LWS.

Attenborough, Erewash and Rylands

- introduce new and upgrade existing footpaths along the defences;
- health and safety improvements, such as fencing and signage, in Rylands;
- bird and bat boxes in Attenborough SSSI;
- potential to introduce improvements to Attenborough Village.

In addition compensatory habitat and other enhancement will be provided at Attenborough SSSI, The scope and extent of these works is to be agreed with Natural England and Nottinghamshire Wildlife Trust.

Meadows and Colwick Country Park

Enhancements at Victoria Embankment

A number of urban landscape enhancements are possible in the area of Victoria Embankment and will be further discussed with Nottingham City Council. The opportunities include:

- installation of interpretation boards on the archaeological and historic interest of the area;
- installation of public shelters;

- improvement of the cycleways and footpath links;
- landscaping enhancements across playing fields;
- enhancements to the frontage of the War Memorial.

Colwick Country Park

Enhancements to Colwick Country Park have been discussed with Nottingham City Council and include:

- installation of interpretation boards through Colwick Country Park;
- installation of fishing pegs along the River Trent;
- installation of a dipping platform for education;
- fencing to reduce geese grazing;
- vegetation management for amphibians;
- creation of shallows and reedbed planting;
- improvements to the lakes and channels for fish movement;
- installation of a footbridge over the eastern end of the backwater channel;
- enhancing the footpath over River Road to the Marina.

Colwick

Consultation with Gedling Borough Council and Groundwork Nottinghamshire highlighted the potential to extend the Trent Valley Way walkway along the river to connect with existing footpaths and provide a continuous link along the river. At present, the footpath diverts through Colwick Industrial Estate. The scheme design includes for a gravel surface footpath on, or adjacent, to the new flood defences through the industrial estate.

Whilst the Environment Agency can improve or create footpaths it will be the responsibility of the local authority to negotiate with the affected landowners and obtain the necessary legal agreements for the footpath.

Biodiversity

The Environment Agency in consultation with a number of nature conservation organisations have identified a number of potential areas for habitat creation within the Trent floodplain and the wider boroughs. The habitats to be created will be confirmed during the detailed design stage but are likely to target local and national BAP habitats. The use of areas will be subject to land owner agreement, further environmental impact assessment, planning and other consents, as required.

Areas under investigation for potential biodiversity enhancement in addition to those described in the scheme areas above include:

- Holme Pitt SSSI – the creation of wetland habitats.
- Rylands Meadow.
- Toton Fields – footpath improvements and the creation of wetland scrapes.

10 IMPACTS IN COMBINATION WITH OTHER KNOWN PLANS OR PROJECTS

10.1 Introduction

Institute of Environmental Management and Assessment (IEMA) guidelines recommend that an EIA should assess the effects of the development cumulatively with other developments, where there are likely to be significant effects (IEMA 2004).

The cumulative impacts of constructing all four scheme areas are assessed in *Sections 7 and 8*. This section considers other major developments in the scheme area.

10.2 Other Developments

Severn Trent Pipeline

Severn Trent Water began to install 12km of water mains in August 2006. Part of the route runs through the Sawley and Trent Meadows scheme area. The installation of the pipeline will be complete by the time the proposed works are due to commence in Sawley and Trent Meadows. A significant cumulative impact from construction activities for the two projects is, therefore, unlikely. However, the pipeline has influenced the sites that were considered for habitat enhancements; refer to *Appendix F*.

Widening Works to A453 Road

The Highways Agency proposes to undertake widening works to the A453. A 10km section, from Junction 24 of the M1 to the Crusader Roundabout in Clifton, is to be upgraded from single to dual carriageway. The construction phase of the project is scheduled to commence in spring 2010 and be completed in the winter of 2012 and 2013, depending on funding. A mandatory EIA will be produced.

The A453 is the main route into south Nottingham from the M1 and there are likely to be traffic management systems in place. This may increase the number of vehicles taking an alternative route into Nottingham via the Sawley and Trent Meadows, and Attenborough, Erewash and Rylands scheme areas. There is the potential for cumulative impacts on transport, especially when the B6540 at Sawley is closed for road raising works.

If the start date of the works at Sawley and Trent Meadows is delayed there could be a **minor adverse cumulative impact** on local traffic and transport as a result of this widening project and the construction works at Sawley and Trent Meadows. However, there will be no impacts if the works to raise the B6540 are completed in 2009 as is the current outline program.

Works to River Erewash

The River Erewash currently discharges into the lakes at Attenborough SSSI. Research undertaken by Cemex has shown that pollution from the River Erewash is the primary cause of poor water quality in the lakes. Cemex have commenced a scheme to improve the lake's water quality by diverting the majority of the flow

from the River Erewash directly into the River Trent. This will be achieved by the formation of a low embankment through the lakes, which will include a gap of 6m to maintain the barge navigation route through the lakes that Cemex requires for its gravel works.

Construction work is due to commence on the channelling of the River Erewash in early 2009 and although the works are some distance from the main flood defence works, it is in close proximity to the proposed environmental enhancement for the scheme within South Coneries pond which will be commenced in late 2008. The two schemes are being co-ordinated together and there are no significant cumulative impacts predicted from the FAS and works to the River Erewash.

Nottingham Regeneration Scheme

The majority of the river frontage between Trent Bridge and Ladybay Bridge in Meadows and Colwick Country Park scheme area is to be developed within the next ten years as part of a Nottingham Regeneration programme. To ensure best use of public money and compliance with planning guidance, this scheme only addresses flood protection through this reach for those areas which are not being considered for regeneration. It will be the responsibility of a developer to ensure a development is adequately protected, in compliance with Planning Policy Statement 25 'Development and Flood Risk'. The first phase of development at Park Yacht Club Area is the only part that is currently under construction. It will be completed before construction starts on the proposed Nottingham Left Bank FAS in the Meadows and there should be no cumulative construction impacts.

Barton in Fabis Flood Alleviation Scheme

The existing flood defence embankment surrounding the village of Barton in Fabis on the right bank of the River Trent does not currently protect against flooding with a 1% annual probability of occurrence. The Barton in Fabis FAS is proposing to raise the level of the existing embankment and construct a short extension to the south of the village.

The first phase of works commenced in spring 2008 and an Environmental Report was produced. The second phase of works is due to commence in March 2009. As Barton in Fabis is on the right bank of the River Trent there will be no cumulative impacts as a result of this project and the construction works at Attenborough, Erewash and Rylands.

Meadow Lane Lock

British Waterways are working with Nottingham City Council to redevelop the Meadow Lane Lock area (Reach 3.1 Meadows and Colwick Country Park) to include a new walkway and tourist amenities. Infrastructure works to improve access around the canal towpath and lock area are programmed to commence in January 2009 and be completed before works commence in the Meadows scheme area.

Trent Valley Way

This is an ongoing project to develop a continuous walkway along the banks of the River Trent. Discussions and consultation with Gedling Borough Council and Nottinghamshire County Council will progress through detailed design to try and assist in the delivery of this project.

10.3 Conclusion

There will be no significant cumulative impacts with other known developments in the study area. However, if the construction works for Sawley and Trent Meadows are delayed, the TMP will need to incorporate any diversions or increase in traffic associated with the widening of the A453.

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11 RISKS AND UNCERTAINTIES

Where appropriate, the ES has identified where the significance of impacts cannot be predicted with certainty (e.g. due to uncertainty in baseline information or details of construction methods). The following is a summary of the main uncertainties identified within the ES and any associated risks to the implementation of the scheme.

Provision of the proposed environmental enhancements and compensatory habitat is subject to consultation with landowners and interested parties. However, the Environment Agency has developed relationships with key stakeholders including Natural England, Nottingham City Council, Derbyshire Wildlife Trust and Nottinghamshire Wildlife Trust to ensure that these can be delivered.

Concerns have been raised by landowners in Colwick Industrial Estate regarding working areas and the location of site compounds to ensure that disruption to commercial operations is minimised and security maintained. There will be a need for further discussions in order to obtain their agreement on temporary land use during the works. This will be ongoing during construction planning.

There is also some uncertainty over the exact compensatory habitat measures proposed in Attenborough SSSI. There are risks in trying to create this new habitat from, for example, planting failures and the quantity of material needed to reduce the depth of water to allow for planting. We can manage these risks. For example, if the planting fails we will re-plant the areas and extend our maintenance programme. Part of this risk management has included the identification of the following additional areas for habitat creations:

- Creating 0.2ha of reedbed in Main Pond.
- Creating an additional 1.3ha reedbed to that proposed in South Coneries Pond and the outfall of the River Erewash.
- 0.3ha of wet woodland could be created to the south-eastern corner of Tween Pond in close proximity to the proposed bunds.

This provides a buffer to ensure that we deliver a minimum of 9.8ha of habitat

The full potential impact on the trees is currently uncertain. The assessment of trees to be removed in the ES assumes the tree loss to be total within the working area but in practice some of these may be retained. However, a number of trees lie close to the working areas and only through the detailed design development and contractor involvement will it be confirmed which can be retained. Hence, there is also uncertainty on where replacement and supplementary planting will be required. Whilst the design and working method along Victoria Embankment has been developed in consultation with a qualified arboriculturist to minimise the impact on the avenue of trees, there remains a risk to tree health due to the proximity of the defence to the trees. Tree health will, therefore, be monitored for several years. We will replant trees to ensure that there is no net loss of trees.

Although pollution risks from construction can be generically assessed and managed through best practice procedures, they cannot be avoided or precisely quantified. This is therefore, an area of uncertainty in the ES.

A number of consents, in particular planning permission, are needed before the works can proceed. The award of consents, and the development of detailed design could affect scheme programme, sequence and final completion of the project but we will work with our contractor to ensure that construction impacts, particularly to residents, are minimised.

12 SUMMARY AND CONCLUSIONS

The Nottingham Trent Left Bank FAS will raise existing defences and, where required, construct new defences to protect approximately 16,000 homes and businesses against a flood with a 1% annual probability of occurrence. The scheme will also provide the same level of flood protection to critical infrastructure, such as Toton and Lilac Grove sewage treatment works, and the main railway line through Nottingham. The benefits of the scheme will therefore extend beyond the boundaries identified as having a 1% annual probability of flooding.

The 27km long scheme, from the M1 in Sawley to the railway at Radcliffe-on-Trent, straddles four local planning authorities and therefore the scheme has been split into the following areas:

- Sawley & Trent Meadows - Erewash Borough Council
- Attenborough, Rylands & Erewash - Broxtowe Borough Council
- Meadows & Colwick Country Park - Nottingham City Council
- Colwick - Gedling Borough Council

The proposed development in Broxtowe BC requires planning permission and a planning application has been made at the same time that this ES is published. Some of the proposed development within Erewash BC requires planning permission and this was obtained in 2007. The local planning authorities have confirmed that the remaining parts of the scheme constitute ‘permitted development’.

A large number of external parties have been consulted about the scheme through the Fluvial Trent Strategy and the Scoping Report in 2005; the Scheme Alignment Leaflet in 2006; and the original ES in April 2007. We have also held various public and private meetings with affected parties. The main area of public concern relates to the alignment of the flood defences along The Strand in Attenborough. We have considered the options for this location and conclude that the alternatives will be contrary to PPS9 and PPS25. There will be an impact on the Conservation Area of the village and we are proposing to mitigate this impact by replanting and re-profiling The Strand.

We plan to commence construction of the scheme in 2009 and the works will be completed in 2012. However, this programme is indicative only and is dependent on planning permission. Therefore, the programme may change during the detailed planning of the scheme.

The overriding human impact of the scheme is the permanent beneficial reduction in flood risk to over 16,000 properties and some critical infrastructure. This will have a positive impact on people’s health in the event of a flood. However the new defences will slightly increase surrounding flood levels and have a modest effect on some surrounding villages. The increase in flood levels for these properties range from a maximum of 7cm (2.5 inches) to a minimum of 2cm during a flood event with a 1% annual probability of occurring. There will also be 69 extra properties that will now have a 1% annual probability of flooding. 48 of the 69 affected properties are located in Burton Joyce with remainder split between Stoke Bardolph, Gunthorpe, Hoveringham and Bleasby. Separate studies have been

undertaken in the locations affected by increased flood risk and works have started to reduce flood risk in Barton in Fabis and Burton Joyce. These schemes will provide protection from a flood event with a 1% annual probability of occurrence including all 48 properties in Burton Joyce. This work is expected to be complete in 2009. Measures to protect individual properties in Gunthorpe, Bleasby and Gibsmere were undertaken in 2008. In addition further work is proposed in Hoveringham, Gunthorpe and Radcliffe on Trent. In Stoke Bardolph work is on-going to determine whether individual property protection measures can be used. All of this work will reduce the impact of the Nottingham Trent Left Bank FAS on the surrounding flood levels.

The majority of adverse impacts from the scheme will occur during this construction period and will therefore be temporary and short-term. This will include significant disturbance to the local human population during the construction period. This is a result of noise and vibration, increased traffic, road closures and reduced access to footpaths and recreational areas. This will include the full closure of Tamworth road for a short period, the closure of three canals and loss of the use of the Village Green at Attenborough. The impacts will be greatest in the businesses and 62 residential properties where construction is within their property boundary, and the additional 436 properties/businesses which are within 50m of the proposed works. These include several sensitive sites such as schools and churches. Various mitigation measures will be implemented to reduce and manage these adverse impacts. These will include timing the works to avoid major events, the appointment of a public liaison officer, minimising working areas, clear signage of necessary diversions and careful programming of the works.

New structures will be introduced in some locations and existing defences raised. Consequently this will have a landscape and visual impact. The main areas subject to an adverse landscape and visual amenity impact are:

- The wall in the gardens at Newbery Avenue in Trent Meadows.
- A new defence through Barton Pool, Trent Meadows.
- Sections of the wall around Attenborough village including along The Strand.
- The wall and the embankment at Beeston Marina and Mobile Home Complex and the allotments, Rylands.
- The embankment at Wilford Grove Recreation Ground, Meadows.

The impacts will be minimised through sensitive detailed design and by the use of appropriate cladding and planting. Wherever the works impact on private properties the gardens will be fully reinstated. Proposed improvements to the public open space in front of the War Memorial, Meadows will have a significant beneficial impact.

The main impacts on flora and fauna will result from the land take in Attenborough SSSI and six LWS/SINCs. 1.68 ha will be permanently lost within the SSSI and 0.9ha in the LWS/SINCs. The habitats will be reinstated and improved where possible including the 0.28ha temporary working area at Barton Pool LWS. We have also agreed with Natural England and Nottinghamshire Wildlife Trust to provide 9.8ha of compensatory habitat. This habitat, combined with further enhancement measures to be delivered by the project, will ensure that there is no loss of nature conservation interest.

There are no significant residual impacts on air quality, water, land use and cultural heritage and archaeology. The impacts and the corresponding mitigation measures are summarised in more detail in Table 12.1 and set out in the EAP in *Section 13*. One of the Environment Agency's Framework Contractors will be used to construct the works. All such contractors have worked on a number of the Environment Agency's projects and are experienced in the construction of flood defences. They will follow the mitigation measures proposed in this ES. Therefore, overall construction impacts are considered to be moderate adverse and short-term.

In line with our statutory duty to protect and enhance the local environment, several environmental enhancement opportunities have been identified in each area. The exact scope will be confirmed during detailed design and ongoing consultation with landowners/mangers and local communities. We aim to:

- upgrade existing footpaths and create new footpaths along the crest of the flood embankments;
- provide additional seating in Trent Meadows Picnic Area;
- create habitat at Sawley Carr LWS and Holme Pitt SSSI;
- install information boards at areas of biodiversity or archaeological interest;
- create new footpaths through Attenborough SSSI;
- introduce amenity improvements to the Attenborough Village;
- improve footpaths, cycleway links, lighting and public shelters along Victoria Embankment;
- improve Colwick Country Park by installing fishing pegs, creating shallows and reedbeds, or habitat improvement for fisheries and amphibians;
- extend the Trent Valley Way through Colwick Industrial Estate.

The project will bring significant reduction to the flood risk in Nottingham. The impacts of the project have been assessed, which are mainly due to construction activities, and the mitigation and enhancements proposed will reduce the adverse impacts associated with the scheme. Opportunities will be taken, as far as is possible within the framework of the scheme, to enhance the natural environment and the amenity for local people.

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Table 12.1 Summary of Environmental Impacts

Receptor/ Environmental Resource		Description of Effect	Magnitude and Significance of Impact before Mitigation	Mitigation Measures	Residual Impact
CONSTRUCTION IMPACTS					
Human Population	Local properties	Disturbance as a result of construction activities within property or in close proximity.	Moderate adverse and short-term.	<ul style="list-style-type: none"> • Liaise with residents • Minimise working areas in private properties. • Full reinstatement of gardens. • Access maintained to all property. 	Minor to moderate adverse and short-term.
	Local businesses	Disturbance as a result of construction activities within property or in close proximity.	Moderate adverse and short-term.	<ul style="list-style-type: none"> • Liaise with local businesses. • Minimise working areas. • Access maintained to businesses. 	Minor to moderate adverse and short-term.
	Local farming and commerce	Loss of agricultural land and disturbance to adjacent farmland.	Minor adverse and short-term.	<ul style="list-style-type: none"> • Liaise with affected landowners. • Time works to ensure minimal effect on commercial use of land. • Ensure access to farms and land is maintained. 	Minor adverse and short term.
	Canal moorings	Closure of canal and disturbance to moorings.	Major adverse and short-term.	<ul style="list-style-type: none"> • Provide alternative canal moorings where appropriate. • Widely publicised notification of closure. • Carrying out works to the lock gates during low-season (October to January) with a break in works over the Christmas holidays to minimise impact on canal users. 	Moderate adverse and short-term.

Receptor/ Environmental Resource		Description of Effect	Magnitude and Significance of Impact before Mitigation	Mitigation Measures	Residual Impact
Human Population	Sensitive sites	Disturbance to sensitive sites such as schools, churches, allotments, and playgrounds.	Minor to moderate adverse and short-term.	<ul style="list-style-type: none"> • Advanced liaison over timing and nature of works. • Time works to avoid important local events. • Maintain access to schools and clubs. • Provide alternative recreation facilities for school use. • Provide safe access to playgrounds near working areas. • No works during the remembrance services at Victoria Embankment. 	Minor adverse and short-term.
	Local recreational resources	Closure of footpaths, bridleways and cyclepaths.	Minor to moderate adverse and short-term.	<ul style="list-style-type: none"> • Re-instate footpaths/cycleways to the existing or improved standard. • Formal closure and temporary diversion of footpaths and bridleways with clear signage provided. 	Minor adverse and short-term, except where a permanent diversion of a PRow is required.

Receptor/ Environmental Resource		Description of Effect	Magnitude and Significance of Impact before Mitigation	Mitigation Measures	Residual Impact
Human Population		Reduced available land and disturbance to recreational areas such as fishing, golf, sailing clubs, Nature Reserves, Country Parks, canals cricket, football and bowls facilities.	Moderate to major adverse and short-term.	<ul style="list-style-type: none"> • Advance liaison and publicity over nature and timing of works to all affected parties. • Ensure access is maintained to all recreational areas and clubs. • Alternative facilities provided for the football/cricket clubs which use the Attenborough Village Green. Fence off working area to allow continued use of unaffected areas of the Village Green. • Minimise the working area in Chilwell Manor Golf Course and carry out works during winter months to minimise impact on golfers. • Maintain pedestrian access to “The Nottingham Princess”. • Maintain pedestrian and cycle access wherever possible through recreational areas. • Sequential working along Victoria Embankment to minimise length of disruption and land take in each area. • Ensure no access restrictions during the Great Nottinghamshire Bike Ride and Robin Hood Marathon. • Provide alternative canal moorings where appropriate. • Widely publicised notification of closure. • Carrying out works to the lock gates during low-season (October to January) with a break in works over the Christmas holidays to minimise impact on canal users 	Minor to moderate adverse and short-term.
OPERATIONAL IMPACTS					
	Local population (16,000 properties)	Reduction in flood risk.	Major beneficial and permanent.	No mitigation required.	Major beneficial and permanent.

Receptor/ Environmental Resource		Description of Effect	Magnitude and Significance of Impact before Mitigation	Mitigation Measures	Residual Impact
	Village communities outside of scheme area	Increased flood risk.	Moderate adverse and permanent.	Maximise floodplain through scheme's design. Separate study by the Environment Agency to mitigate adverse impacts.	Moderate adverse and permanent.
	Critical infrastructure	Reduction in flood risk	Major beneficial and permanent.	No mitigation required.	Major beneficial and permanent.
CONSTRUCTION IMPACTS					
Flora & Fauna	Attenborough SSSI	Construction of new wall including: <ul style="list-style-type: none"> • Permanent and temporary land take. • Pollution. • Disturbance. 	Moderate adverse and short-term to permanent.	Detailed mitigation method statement to be agreed with NE, NWT and landowner. To include: <ul style="list-style-type: none"> • Re-instating areas with locally harvested seed or allowing natural re-generation. • Reprofiling banks to create marginal areas. • Compensation habitat creation; refer to <i>Appendix F</i>. • Clearance of vegetation in working areas outside breeding season and no works in most sensitive areas within the breeding season. • Provision of Ecological Clerk of Works. • See also <i>Birds</i>. 	Minor to moderate adverse in short to medium-term. None in the long term.
		Potential impacts on hydrology.	None.	<ul style="list-style-type: none"> • Installation of sheet piles only along part of SSSI. 	None.
		Construction and restoration of new compensatory habitats.	Moderate adverse and short-term.	<ul style="list-style-type: none"> • Detailed mitigation method statement to be agreed with NE, NWT and landowner. 	Moderate adverse in short-term. None in medium-term. Moderate beneficial in long term once compensatory habitat has established.

	Receptor/ Environmental Resource	Description of Effect	Magnitude and Significance of Impact before Mitigation	Mitigation Measures	Residual Impact
	SINCs/LWS (Lock Lane, Barton Pool, Erewash Canal, Trent Meadow, Attenborough Junction Tip, Colwick Country Park)	Construction of new wall or embankment: <ul style="list-style-type: none"> • Permanent and temporary land take • Pollution • Disturbance. 	Moderate adverse and short-term to permanent.	Detailed mitigation method statement to be agreed with County Ecologist and/or Wildlife Trusts and landowner. Likely to include: <ul style="list-style-type: none"> • Re-instatement using locally harvested seed or allowing natural re-generation of grassland. • Replanting of woodland. • Compensatory habitat creation. • Pollution control and good working practice. 	Minor to moderate adverse in medium term. None in the long term with compensatory habitat measures.
Flora & Fauna	Trees: Woodland and standard trees	Site clearance.	Minor adverse and to permanent.	<ul style="list-style-type: none"> • Detailed design to retain as many trees as possible. • Working width to be reduced where practical to retain trees. • Retained trees to be fenced off. • BS5837 to be followed. • Replacement and supplementary planting. 	Minor adverse impact in the long-term while planted trees establish. No permanent impact.
	Hedgerows	Site clearance.	Minor adverse and permanent.	<ul style="list-style-type: none"> • Working width to be reduced where practical to reduce length of hedgerows affected. • Hedges reinstated where possible with mix of locally native species. 	Minor adverse impact in the long-term while planted hedgerows establish. No significant permanent impact.
	Breeding birds	Site clearance and construction.	Minor to moderate adverse and short-term.	<ul style="list-style-type: none"> • Vegetation clearance to be undertaken outside of the breeding bird season or checked for nesting birds. • All vegetation in the temporary working areas to be reinstated. • Tree sparrow nest boxes to be moved and supplemented. 	None.
	Wintering birds	Site clearance and construction.	Minor adverse and short-term.	<ul style="list-style-type: none"> • All vegetation in the temporary working areas to be reinstated. 	Minor adverse impact in short-term.

Receptor/ Environmental Resource		Description of Effect	Magnitude and Significance of Impact before Mitigation	Mitigation Measures	Residual Impact
	Bats	Site clearance and construction.	Minor to moderate adverse and long-term to permanent.	<ul style="list-style-type: none"> • Further survey prior to construction phase. • If bats confirmed, licence to be obtained and mitigation strategy agreed with NE. • Compensatory habitat and enhancement to include replacement planting and erection of bat boxes. 	Minor adverse impact in short-term. No significant impact in long-term with compensatory habitat measures.
	Invertebrates	Site clearance at Barton Pool.	Minor adverse and medium-term.	<ul style="list-style-type: none"> • Re-instatement of temporary working areas. • Compensatory habitat would also benefit invertebrates. 	Minor adverse in the short to medium-term. None in the long-term.
OPERATIONAL IMPACTS					
Flora & Fauna	SSSIs and SINC/LWS	Increase in flood risk of sites on right bank or in front of defences.	No significant impact.	None required.	None.
		Decrease in flood risk of sites behind defences.	No significant impact.	None required.	None.
		Maintenance of an easement/access adjacent to the defence.	<i>Impacts are incorporated into construction impacts above.</i>		

Receptor/ Environmental Resource	Description of Effect	Magnitude and Significance of Impact before Mitigation	Mitigation Measures	Residual Impact	
CONSTRUCTION IMPACTS					
Noise & Vibration	All local environmental receptors e.g. human population and flora & fauna	Construction site noise and traffic noise.	Moderate to major adverse and short-term.	<ul style="list-style-type: none"> • Liaison with residents and local businesses. • Temporary fixed plant to be positioned as far as practically possible away from residential properties and screened. • Training in the form of site inductions and tool box talks will reflect the need for consideration of noise issues such as switching off plant that is not in use, keeping engine covers closed, reporting defects and avoiding shouting and slamming of vehicle doors especially during out of hours working. 	Minor to moderate adverse and short-term.
		Sheet piling noise and vibrations.	Moderate to major adverse and short-term.	<ul style="list-style-type: none"> • Use of concrete bored or silent piles in sensitive locations where practical. • Regular monitoring of vibration frequencies and noise levels. • Liaison with residents and local businesses. • Pre-works condition survey of all properties near sheet piling where required. • The vibration of the hammer will be regulated by the operator to ensure that a careful balance between work output and noise/ vibration is reached. • Piling plant will be well maintained to ensure unnecessary vibration or noise from exhaust systems or loose panels is eliminated. • Liaison with the EHO. 	Moderate to major adverse and short-term.
OPERATIONAL IMPACTS					
	<i>No significant impacts have been identified</i>				

Receptor/ Environmental Resource		Description of Effect	Magnitude and Significance of Impact before Mitigation	Mitigation Measures	Residual Impact
CONSTRUCTION IMPACTS					
Air Quality	Local environment including human health, agriculture and nature conservation	Dust generating activities.	Moderate adverse and short-term.	<ul style="list-style-type: none"> Adhere to the CIRIA's Guidelines 'Environmental Good Practice on Site' (2005). 	Minor adverse in short-term.
		Construction plant and vehicle emissions.	Minor adverse and short-term.	As above plus: <ul style="list-style-type: none"> Use of alternative products, systems, or materials where practicable, such as mains electricity in preference to a diesel generator and pre-mixed materials rather than mixing on site. 	None.
OPERATIONAL IMPACTS					
Air Quality	<i>No significant impacts identified</i>				
CONSTRUCTION IMPACTS					
Visual Effects	Visual appearance of new flood walls	The introduction of new small-scale elements within the existing landscape.	Major adverse and permanent.	<ul style="list-style-type: none"> Cladding in materials that are characteristic to the area. Where no cladding is proposed ensure a good concrete finish. Planting to screen new flood walls where appropriate. At The Strand: road re-profiling; revised road layout; integrated seating (on Village Green side); reinstatement of grass verge and a hedgerow on the landward side. 	Moderate to major adverse and permanent.

Receptor/ Environmental Resource	Description of Effect	Magnitude and Significance of Impact before Mitigation	Mitigation Measures	Residual Impact
Visual impact of raised flood walls	An increase in the height of existing flood walls and associated structures such as access ramps.	Minor to moderate adverse and permanent.	<ul style="list-style-type: none"> • Ensure new sections of raised flood walls blend into the existing structure. 	Minor adverse and permanent.
Visual impact of new flood embankments	The introduction of a new landform element within the existing landscape.	Minor to moderate adverse and permanent.	<ul style="list-style-type: none"> • Tree, scrub and hedgerow planting to screen views of proposed embankment. • Where possible introduce varying slope gradients and profile. 	Minor to moderate adverse and permanent.
Visual impact of raised embankments	An increase in the height and overall footprint of existing embankments.	Minor/moderate adverse and permanent.	<ul style="list-style-type: none"> • Ensure raised embankments blend into their landscape setting through landform design and reinstatement grass seeding. Where it does not compromise operational requirements appropriate planting may be utilised to reduce the visual impact. 	Minor to negligible adverse and permanent.
Foreshortening of views	Slight foreshortening of views over existing defences to be raised and/or over new defences.	Moderate to major adverse and permanent.	<ul style="list-style-type: none"> • Raising of road to reduce visual impact of the wall for users of The Strand. 	Moderate adverse and permanent.

	Receptor/ Environmental Resource	Description of Effect	Magnitude and Significance of Impact before Mitigation	Mitigation Measures	Residual Impact
Landscape Effects	Raised road and footpath levels	Increased road and footpath levels that must be graded into the surrounding pavement surfaces.	Minor to moderate adverse and permanent.	<ul style="list-style-type: none"> • Grade ramps so that a smooth road surface is achieved. • Ensure all existing access points are maintained. 	Minor to negligible adverse and permanent.
	Impacts on existing mature trees	Removal of existing trees to accommodate works.	Minor adverse and permanent.	<ul style="list-style-type: none"> • Retain and protect as many trees as possible. 	Minor adverse and permanent.
	Impacts on residential properties (e.g. gardens, boundary walls)	The replacement of existing garden boundaries, planting and garden features with proposed flood defence structures.	Moderate to major adverse and permanent.	<ul style="list-style-type: none"> • All affected areas of residential properties to be reinstated in agreement with the individual property owners. • Access maintained with either flood gates or ramps where appropriate. 	Moderate adverse and permanent.
	Temporary impacts of construction activities and site compounds	Disturbance as a result of temporary construction activities.	Moderate to major adverse and short-term.	<ul style="list-style-type: none"> • Where possible locate construction compounds and storage areas away from sensitive residential receptors and adjacent to suitable vehicle access points. • Reinstatement all areas affected by the works to their former land use. 	Negligible.

Receptor/ Environmental Resource		Description of Effect	Magnitude and Significance of Impact before Mitigation	Mitigation Measures	Residual Impact
OPERATIONAL IMPACTS					
Landscape & Visual Effects	Use of flood gates	Closure of flood gates in advance of a flood. This is a short-term temporary impact.	Moderate adverse and short-term.	<ul style="list-style-type: none"> Where in a Conservation Area proposed material for flood gates to be discussed with the Conservation Officer. 	Minor adverse and short-term.
	CONSTRUCTION IMPACTS				
Water	Watercourses and waterbodies	Pollution risk from water quality construction activities.	Moderate to major adverse and short-term.	<ul style="list-style-type: none"> Adhere to Environment Agency's PPGs. 	None.
OPERATIONAL IMPACTS					
Water	Surface water	Impact on surface water drainage behind the new and raised defences.	Not significant.	<ul style="list-style-type: none"> Pumping and drainage facilities have been included into the design where surface water drainage issues expected. 	None.
	Surrounding villages	Increased flood risk.	Moderate adverse and permanent.	See <i>Section 8</i> .	Moderate adverse and permanent.
	River Trent and floodplain	Increased flood depth.	No significant impact.	No mitigation required.	None.

Receptor/ Environmental Resource	Description of Effect	Magnitude and Significance of Impact before Mitigation	Mitigation Measures	Residual Impact	
CONSTRUCTION IMPACTS					
Traffic & Transport	Local roads	Movement of construction plant and machinery.	Moderate adverse and short-term.	Develop a Traffic Management Plan including: <ul style="list-style-type: none"> • Time the deliveries of materials to the main site compounds for between 9am and 4.30pm. • Minimise lorry movements through residential areas during school holidays. • Maintain access to all properties and businesses. • Use storage compounds near to construction works to minimise traffic movements through residential areas. 	Minor adverse and short-term.
		Road and lane closures.	Moderate to major adverse and short-term.	<ul style="list-style-type: none"> • Develop a Traffic Management Plan • Sign and publicise all closures in advance. • Major road working would (if effective) be carried out at night to reduce traffic disruption or timed in school holidays. 	Minor to major adverse and short-term.
	Railway network	Rail possessions.	Moderate adverse and short-term.	<ul style="list-style-type: none"> • Timing agreed with Network Rail and all consents in place. 	Minor adverse and short-term.

Receptor/ Environmental Resource		Description of Effect	Magnitude and Significance of Impact before Mitigation	Mitigation Measures	Residual Impact
OPERATIONAL IMPACTS					
Traffic & Transport	Local transport infrastructure	Reduced risk of flooding.	Moderate beneficial and permanent.	No mitigation required.	Moderate beneficial and permanent.
CONSTRUCTION IMPACTS					
Cultural Heritage & Archaeology	Listed Buildings, Scheduled Monuments, Conservation Areas, buried archaeology	Disturbance during construction activities including sheet piling.	Minor to moderate adverse and permanent.	<ul style="list-style-type: none"> • A detailed mitigation strategy agreed with archaeological officers and English Heritage. • Adhere to CIRIA's Guidelines 'Environmental Good Practice on Site' (2005). • All consents in place. • No sheet piling proposed in sensitive archaeological areas. 	None.
		Impact on setting.	Minor to moderate adverse and permanent.	<ul style="list-style-type: none"> • Detailed design to be sympathetic to the setting, e.g. use of appropriate cladding. 	None.

Receptor/ Environmental Resource	Description of Effect	Magnitude and Significance of Impact before Mitigation	Mitigation Measures	Residual Impact	
OPERATIONAL IMPACTS					
Cultural Heritage and Archaeology	Historic environment including Listed Buildings	Reduction in flood risk.	Minor beneficial and permanent.	No mitigation required.	Minor beneficial and permanent.
CONSTRUCTION IMPACTS					
Soil, Geology and Hydrogeology	Soils and Groundwater	Compaction of soils.	Minor adverse and medium-term.	<ul style="list-style-type: none"> • Stripping the topsoil in advance of the works. • Careful storage during the works. • Reinstatement on completion including rotavating to relieve compaction. • Adhere to the CIRIA's Guidelines 'Environmental Good Practice on Site' (2005). • Follow Environment Agency's 'Policy and Practice for the Protection of Groundwater.' • Follow Environment Agency's 'Guidance on Requirements for Land Contamination.' 	None.
		Contamination by fuels or other hazardous material.	Minor adverse and short-term.		None.

Receptor/ Environmental Resource		Description of Effect	Magnitude and Significance of Impact before Mitigation	Mitigation Measures	Residual Impact
OPERATIONAL IMPACTS					
Soil, Geology & Hydrogeology	Groundwater	Impact of sheet pile cut-off on groundwater flows.	Minor adverse and permanent.	<ul style="list-style-type: none"> Design to reduce but not stop groundwater flows. 	None.
CONSTRUCTION IMPACTS					
Land Use	Land within working areas including agriculture, business and recreational	Land-take.	Minor adverse and short-term to permanent.	<ul style="list-style-type: none"> Liaison with landowners/local industry/business to minimise impacts on their works areas or recreational resource. Full reinstatement of areas. Disturbed structures such as fences, hedges, ditches and water-troughs, will be reinstated as soon as possible after construction. A detailed record of the field drains will be made. Details of the post construction drainage schemes will be agreed with the landowners/occupiers. The working areas will be fenced with stock-proof fencing and access will be agreed with the farmers to ensure parcels of land are not isolated. See also <i>Sections 7.3 (Human Population) & 7.12 (Soils, Geology & Hydrogeology)</i>. 	<p>Minor adverse in short-term.</p> <p>None in medium-term.</p>

Receptor/ Environmental Resource		Description of Effect	Magnitude and Significance of Impact before Mitigation	Mitigation Measures	Residual Impact
OPERATIONAL IMPACTS					
Land Use	Land use	Reduction in flood risk to areas behind defences.	Major beneficial and permanent.	No mitigation required.	Major beneficial and permanent.
	Land use	Increased flood risk to undefended areas	Refer to <i>Section 8</i> and <i>Section 7.4</i> (Flora and Fauna)		

13 ENVIRONMENTAL ACTION PLAN

13.1 Introduction

The Environmental Action Plan (EAP) is a tool the Environment Agency can use to manage the environmental impacts set out in which this Environmental Statement (ES). The objectives, actions and targets set out in the EAP will be monitored throughout the detailed design, construction and post-construction stages of the project to ensure that the mitigation/compensation measures outlined in the Environmental Statement (ES) are carried out. It also details the roles and responsibilities of those involved in the proposal and refers to all temporary and permanent works.

This version of the EAP has been prepared at the end of outline design and has been included in the ES. The objective of the EAP is to identify actions during the detailed design stage. The document will be updated throughout the development of the project through detailed design and construction. At the construction stage, an EAP will be produced for each scheme area so site specific issues can be identified and monitored.

13.1.1 General Environmental Guidelines

Site practices shall conform to the EAP and any requirements arising from subsequent consultations will be agreed by the Environment Agency.

Designs shall include suitable provision to mitigate adverse environmental impacts during temporary works, permanent operation and maintenance.

The personnel involved in administering the EAP are as follows:

- Environment Agency Project Manager (EAPM)
- Environment Agency Project Environmental Co-ordinator
- Environment Agency Archaeological Officer
- Environmental Clerk of Works (ECW) (for EIA, Landscape, Ecology and Archaeology functions)
- Public Liaison Officer
- Consultant Design Manager (Consultant)
- Supervising Engineer (SE)
- Contractor

13.1.2 Contractual Status

In every project, the EAP forms part of works information for the contract documentation and is incorporated within the specification and/or as Works Information. The ECW (EIA) will have agreed that the EAP is satisfactorily integrated and will advise the SE on the number of copies to be provided.

13.1.3 Incorporation of Environmental Matters into the Engineering Contract

The ES, incorporating the EAP, shall be considered as part of the documentation for the scheme. The EAP (only) will be included as an appendix to the tender

documents. The actions outlined in this document must be adhered to in the contract specification

13.1.4 Provision of Copies of the EAP

The EAPM, Consultant, SE and Contractor will be issued with a full copy of the ES that includes the EAP. The EAP (only) is also to be included in the Operation and Maintenance Manual for handover to the asset operator.

13.1.5 New Environmentally Significant Changes

Any potential change in design, work processes or implementation must be communicated to the ECW (EIA) immediately who will assess significance and decide whether consultation and/or an ES or EAP Addendum is required.

13.1.6 Communicating the EAP

Prior to the commencement of construction works, the ECW/ SE will explain the EAP to the implementation team. Monitoring and programme arrangements will also be advised.

13.1.7 Environmental Incident Reporting System

The Framework Contractor has defined a Pollution Incident Response Plan for the occurrence of a failure of an environmental constraint target or the occurrence of an environmental impact that was not identified in the ES. Failures must be reported by the Contractor to the ECW/ SE who, if necessary, will complete the Environmental Incident Report Form and give advice on appropriate measures to limit impact. This procedure does not preclude the requirement to report relevant incidents in accordance with the requirements of the National Incident Reporting System (NIRS) on the Environment Agency Hotline on 0800 80 70 60.

13.1.8 EAP Drawings

The Environmental Constraints are currently included for each scheme area in the Appendices of the ES. Separate environmental constraints plans will be prepared during the detailed design stage and issued with future updates of this EAP.

NOTE: the 'Monitoring & Observation' and 'Further Action' columns of the following tables will be completed once pre-construction surveys and site audits have been undertaken.

13.1.9 Environmental Management Plan

The Framework Contractor will define an Environmental Management Plan for use on all construction sites. This document will detail standard procedures and guidelines to be followed with respect to protecting air and water quality, the management of waste and traffic, the protection of wildlife and general good practise for site operations. This document will be augmented with any general or site specific information from the ES and EAP.

The Environment Management Plan will be regularly audited during constructed using the Environment Agency's Environmental Audit Coversheet by the NEAS Officer. Technical assistance will be obtained from the Environment Agency's functional staff as appropriate.

13.2 Generic Clauses

The Agency is committed to the environmental principles of stewardship and sustainability and has corporate goals to maintain and enhance the environment. The Contractor shall plan and order all activities to assist the Agency to achieve these goals. Particular areas for action are the avoidance of pollution of any land or water (either surface or underground), the preservation of flora and fauna and the avoidance of disruption of noise, vibrations or dust during the course of the works. The Contractor must be aware of and comply with the recommendations of the Environment Agency Pollution Prevention Guidelines. In particular, attention is drawn to:

- PPG 1 General guide to the prevention of pollution.
- PPG 5 Works and maintenance in or near water.
- PPG 6 Working at construction and demolition sites.
- PPG 21 Pollution incident response planning.

This must not be considered a definitive list; copies of these and other Guidelines can be found on www.environment-agency.gov.uk/business/444251/444731/ppg/.

Further specific environmental protection measures that are required are as follows:

The Environment Agency has policies governing the procurement and use of 35 generic commodities, including materials such as timber and aggregates, block stone and rip rap. Adherence to the terms and spirit of these policies is required.

The Environment Agency operates a waste minimisation and recycling policy. Adherence to the terms and spirit of this policy is required. With regards to construction, attention is drawn to the following:

- When overpumping, use a maximum 10mm mesh to screen the pump intake to prevent the ingress of fish and arrange the discharge to prevent scour to the bed or banks of the watercourse.
- Allocate sufficient resources and time for a fish rescue operation on any water body that is being dewatered. The Area Fisheries Office can provide advice and a list of contractors that can undertake this work.
- Do not use non-biodegradable membranes or those with non-biodegradable ties and bindings within a watercourse.

A Site Waste Management Plan (SWMP) has been completed during the outline design of the works and includes details on responsibility for the waste, a description of the works, materials resource efficiency, waste management and waste controls and handling. Waste issues will continue to be considered during the detailed design stage and be fed into the specifications for the works.

13.2.1 Machinery and fuel

- Maintain all machinery used on site according to manufacturers' instructions; ensure silencing equipment is fitted in accordance with the manufacturers' specification, and ensure there is no excessive exhaust smoke caused by incorrect fuel mixtures, worn oil seals, valve guides or piston rings. Switch engines off during periods of prolonged inactivity.
- Stationary site plant and machinery, such as pumps, compressors, generators etc on impermeable drip trays at all times while on site and maintain the trays in such a way as to prevent drainage of any spillage into a watercourse, and cover the ground surface with an absorbent material such as sand or woodchips.
- Remove any soil accidentally contaminated during the works by potentially polluting substances such as fuels, oils, chemicals etc to a licensed tip. Treat absorbent materials used to contain spills in a similar manner.
- Keep sufficient spill kits on site at all times so that one can be deployed to any part of the construction site 15 minutes. They must contain absorbent materials, booms for containing spills on water and the means of attaching them to the banks, empty containers for catching leaking fluids and appropriate personal protective equipment.
- Operate a pro-active dust-suppression regime by damping down or otherwise treating work areas and haul roads when weather conditions and site activities suggest that excessive dust could be generated.

13.2.2 Protected species and nesting birds

- The Wildlife and Countryside Act 1981 (as amended) makes it an offence to knowingly disturb a nesting bird or damage or destroy a nest. All tree and shrub clearance works must be carried out between 1 October and 28 February or be preceded with a bird survey by a surveyor approved by the Environmental Project Coordinator. If nesting birds are present, the clearance works near the nest will not proceed until the surveyor has confirmed that the nest is empty.
- All other protected species that are present on site must be accorded the levels of protection required by legislation. Note that protection is often provided in law to habitats as well as animals. Of particular note are kingfishers, water voles, great crested newts, otters and bats.

13.2.3 Archaeology

- In the event that ground breaking operations uncover remains that could be of archaeological interest, cease all work within the vicinity of the find and inform the EAPM and Environmental Project Coordinator as soon as practically possible. Work will not re-commence within the vicinity of the find until agreement to do so has been reached with the Archaeological Officer.

13.3 EAP Clauses

Table 13.1 Environmental Action Plan for Nottingham Trent Left Bank FAS

Ref. No.	Objective	Action	Target	Responsibility	Reference to further information	Date to be completed by	Monitoring & Observation	Further Action Required (Y/N)
A PRIOR TO CONSTRUCTION								
1 Human Beings								
A1.1	To communicate information about the proposed works	Meet with all directly affected landowners and tenants during detailed design. This will include allotment holders.	Requirements fed into detailed design and construction programme as appropriate.	Environmental Project Coordinator/ Public Liaison Officer		By end of detailed design		
		Liaise with any directly affected landowners, including recreation groups, churches, schools, Nature Reserves etc over nature and timing of works.	Requirements fed into detailed design and construction programme as appropriate.	Environmental Project Coordinator/ Public Liaison Officer		By end of detailed design		
		Provide information about the proposed works to local residents and interested parties as identified in the Communication Plan by means of newsletter/drop-in sessions etc.	Information provided according to Communication Plan.	Environmental Project Coordinator/ Public Liaison Officer		Prior to construction		
		Adequate warning and written notice will be given to all residents and landowners significantly affected by works as identified in the Communications Plan.	No valid complaints.	Public Liaison Officer		Prior to any site clearance		
		Agree and publicise alternative access arrangements for the Strand during construction.	No valid complaints	Environmental Project Coordinator/ Public Liaison Officer		Prior to construction		
A1.2	Gain property owner's agreement about works and reinstatement	Provide property owner with programme and drawings. Provide samples of materials and negotiate and confirm final appearance and finishes before work commences.	Programme and drawings supplied to property owner. No valid dispute.	Consultant		By start of construction		
		Complete structural inspection of all properties and boundary walls considered at risk within 200m. Provide copies to landowners.	Agree clear noise and vibration limits during construction with EHO.	Contractor		Prior to construction		

Ref. No.	Objective	Action	Target	Responsibility	Reference to further information	Date to be completed by	Monitoring & Observation	Further Action Required (Y/N)
A PRIOR TO CONSTRUCTION								
A1.3	To preserve existing boundary lines across areas where ground-forming operations are taking place	Ensure boundaries are measured from fixed points outside work area. Supply property owners with plan before works commence. Confirm boundary treatment in writing with all landowners before commencement of works.	Boundary reinstatement approved by Environmental Project Coordinator and EAPM. No valid complaint.	Contractor		By start of construction		
A1.4	Establish a baseline in order that buildings can be left in as good or better a condition than before works began	Carry out a pre-start photographic survey on buildings which are within the zone of influence of the works. Ensure that relevant buildings are agreed with EAPM and Environmental Project Coordinator. A copy of the photographic survey is to be given to the property owner before works commence.	Photographic survey completed on buildings agreed with the EAPM and Environmental Project Coordinator. Copy given to property owner.	Contractor		Prior to site clearance		
A1.5	Establish a baseline in order that public and private spaces are left in as good or better condition than before works began	Carry out a pre-start photographic survey on public and private spaces that are within the zone of influence of the works. Undertake regular photographic survey throughout construction. Relevant areas to be agreed with the EAPM and Environmental Project Coordinator before works commence, and will include structures, hard landscaping, planting and trees. A copy of the photographic survey is to be given to the property owner or relevant authority (in the case of public space) before works commence.	Photographic survey completed, copy given to property owner.	Contractor		Prior to site clearance		
A1.6	To preserve valued views/privacy	Specifically discuss issues of privacy and views with affected property owners. Issue property owner with drawings and programme, and explain the ramifications in detail. Confirm arrangements in writing before works commence.	Programme and drawings supplied to property owner subject to normal project approvals. No valid complaint.	Consultant/ Public Liaison Officer		By start of construction		

Ref. No.	Objective	Action	Target	Responsibility	Reference to further information	Date to be completed by	Monitoring & Observation	Further Action Required (Y/N)
A PRIOR TO CONSTRUCTION								
A1.7	To minimise disruption to public events	Confirm with LPAs timing of any public events, e.g. Riverside festival, Remembrance Services, Great Nottinghamshire Bike Ride, Robin Hood marathon, so works can be programmed accordingly.	Events incorporated into construction programme and TMP.	Consultant		By end of detailed design		
A1.8	Minimise disruption to recreation	Agree footpath diversions and temporary Rights of Way closures with the Nottinghamshire and Derbyshire County Council Rights of Way Officers and LPA.	Formal Rights of Way closures obtained. Signage installed and approved by EAPM.	Consultant/ Contractor		Prior to construction		
		Ensure construction design allows the maintenance of access to all recreation groups, including Attenborough Sailing Club, Attenborough Village Green and Bowls Club.	No valid complaints.	ECW/ Contractor		Prior to construction		
		Liaise with Attenborough Village Green about timing and nature of works. Provide alternative pitches where possible.	No valid complaints.	EAPM/ Public Liaison Officer		Prior to construction		
		Liaise with Chilwell Manor Golf Club regarding timing and nature of works. Works to be timed in winter to reduce disturbance.	No valid complaints.	Public Liaison Officer		Prior to construction		
A1.9	To ensure minimal disturbance to fishing activities	Liaison with local fishing groups regarding the programme of the works. Agree with Environmental Project Coordinator and owners of fishing rights any temporary closures or alternative accesses. Provide and install clear signage.	Temporary closures or alternative access provided. Signage installed and installed by EAPM. No valid complaints.	Public Liaison Officer/ Contractor		Prior to construction		
A1.10	To ensure minimal disturbance to navigation	Notices to canal and river users to ensure that all vessels and craft are aware of the closures and any other works and potential hazards.	No valid complaints.	ECW/ Public Liaison Officer		Prior to construction		
		Ensure closures are timed in the off-peak season (October to January) with a break in works over Christmas period.	Minimised disruption to canal navigation.	Contractor		Prior to construction		
		Provide alternative canal moorings as required.	No valid complaints.	EAPM		Prior to construction		

Ref. No.	Objective	Action	Target	Responsibility	Reference to further information	Date to be completed by	Monitoring & Observation	Further Action Required (Y/N)
A PRIOR TO CONSTRUCTION								
A1.11	To warn members of the public of potential hazards related to Environment Agency structures or works identified through the EIA process	Specify appropriate signage warning of hazards such as deep water, strong currents, steep slopes etc. and advising against inappropriate activities such as diving, swimming etc. Signs to conform to Environment Agency codes of practice and to be affixed in clearly visible locations adjacent to the area of hazard.	Hazards clearly signed. Signage approved by EAPM.	Contractor		Prior to construction		
A1.12	To ensure public safety with respect to construction works	Working areas to be restricted by use of Heras fencing 1.5m outside working area. All working areas shall be maintained secure from public access.	No accidents to the public or valid complaints regarding site security.	Contractor		Prior to construction		
2 FLORA AND FAUNA								
A2.1	To ensure breeding birds (protected) identified if present	To complete all vegetation clearance outside of breeding season unless otherwise checked by an ecologist for nesting birds (only acceptable in minor areas). No construction work in or adjacent to Works Pond, the Delta and Beeston Pond during breeding bird season (Attenborough SSSI).	No disturbance to breeding birds.	ECW/ Contractor	ES			
		Relocate tree sparrow nest boxes in Attenborough SSSI and supplement where required.	No disturbance to breeding birds.	ECW/ Contractor	ES	Prior to site clearance		
A2.2	To complete further protected species surveys as identified in the ES	Complete bat surveys in Sawley, Barton Pool and Attenborough to confirm requirement for Natural England bat licence. If required ensure Natural England licence obtained prior to site clearance.	Surveys completed during appropriate season and submitted to the Environmental Project Coordinator for approval.	ECW (ecologist)	ES	Survey season May-September		

Ref. No.	Objective	Action	Target	Responsibility	Reference to further information	Date to be completed by	Monitoring & Observation	Further Action Required (Y/N)
A PRIOR TO CONSTRUCTION								
		Complete pre-construction protected species surveys for otters and water vole in all areas prior to site clearance.	Surveys completed during appropriate season and submitted to the Environmental Project Coordinator for approval.	ECW (ecologist)	ES			
		Prepare bat box strategy and erect bat boxes in advance of site clearance if permission obtained.	Provide alternative bat boxes.	ECW (ecologist)/ Contractor	ES			
A2.3	To prevent spread of invasive species	Pre-construction surveys to confirm extent of invasive species and mitigation strategy completed.	All invasive species identified and further spread prevented.	ECW/ Contractor				
A2.4	To minimise impact on sites protected by national and local nature conservation designations	Submit details of proposed works in SSSI and SINCs/LWS, to the LPA and the local Wildlife Trust for approval. Include a description of the works, a programme and method statements. Do not commence work until the Environmental Project Coordinator has confirmed agreement in writing. Will need to include local sources of seed and planting materials and a programme for harvesting.	No unapproved works undertaken in designated areas. Written consent from the Environmental Project Coordinator to commence work.	Consultant/ Environmental Project Coordinator	ES			
A2.5	To ensure establishment of tree and hedge cover and character to at least the same or better standard as existing	Agree planting specifications with LPAs.	LPA approval.	Consultant				
3. NOISE & VIBRATION								
A3.1	To minimise impacts of noise and vibration	Complete structural inspection of all properties and boundary walls considered at risk within 200m of piling operations.	Identify vibration limits during piling operations	Contractor				
		To prepare site induction and tool box talks on ways to limit noise & vibration.	No valid complaint on noise & vibration levels.	Contractor				

Ref. No.	Objective	Action	Target	Responsibility	Reference to further information	Date to be completed by	Monitoring & Observation	Further Action Required (Y/N)
A PRIOR TO CONSTRUCTION								
6 WATER								
A6.1	To protect properties from surface water flooding behind flood defences	Provide sufficient drainage behind flood defences to avoid surface water flooding of properties. Make adequate arrangements for discharge or storage of surface water during periods of flood when flap valves may be closed.	No increase in surface water flooding.	Consultant	Design matter			
7 TRAFFIC AND TRANSPORTATION								
A7.1	To ensure minimal impacts upon localised traffic	Complete TMP and liaise with affected landowners/users.	No valid complaints.	Contractor ECW				
		Ensure that the car parking facilities in the design are sufficient to provide parking for recreational or operational users so that on road parking and the subsequent increase in congestion is avoided. Determine the arrangement and number of spaces with regard to: <ul style="list-style-type: none"> LPA guidance. Safety of pedestrians and cyclists. Safety of adjacent roads and road users. Number of anticipated users. 	Parking arrangements agreed with LPA and EAPM.	Contractor				
A7.2	To prevent deterioration of roads due to works traffic	Carry out a pre-start photographic survey of the public roads that are to be used for heavy goods vehicles. Give one copy of the photographs to the appropriate LPA Highways Officer before works commence.	Photographic survey completed and copies submitted to Highways Officer and Environmental Project Coordinator.	Contractor				
A7.3	To ensure minimal impacts on rail network	Obtain all Network Rail consents.	All consents received.	Contractor				

Ref. No.	Objective	Action	Target	Responsibility	Reference to further information	Date to be completed by	Monitoring & Observation	Further Action Required (Y/N)
A PRIOR TO CONSTRUCTION								
8. CULTURAL HERITAGE, ARCHAEOLOGY AND MATERIAL ASSETS								
A8.1	To avoid damage to features of archaeological interest	<p>Agree mitigation strategy with the County Archaeological Officers and English Heritage. Items to include:</p> <ul style="list-style-type: none"> Known sensitive areas to be 'marked' and site operatives to be made aware of importance of features / designated areas. Organise a watching brief for excavation works in areas of potential interest. Monitoring of piling operations in vicinity of Listed Buildings. A programme of geo-archaeological assessment. 	No significant impact on archaeological features.	EA Archaeologist	ES			
9. LAND USE								
A9.1	To minimise impacts of temporary land use change	<ul style="list-style-type: none"> Contractor to liaise with current land users and inform them of temporary change in land use. Liaison to continue with LPA to agree suitable remediation following works. 	No valid complaints.	Contractor/ECW	ES			
10. NATURAL RESOURCES								
A10.1	To ensure that structures are designed to be recyclable at end of life	Where feasible, materials used will be reusable or recyclable at end of life.	100% recyclable or reusable materials on decommissioning.	Consultant				
A10.2	To quantify energy needs and seek ways of local generation	Establish energy requirements over the lifetime of the project. Investigate methods of local generation such as solar or wind power.	Options of alternative energy sources supplied to EAPM. Alternative energy source harnessed as agreed with EAPM.	Consultant/Contractor				

Ref. No.	Objective	Action	Target	Responsibility	Reference to further information	Date to be completed by	Monitoring & Observation	Further Action Required (Y/N)
B DURING CONSTRUCTION								
1 HUMAN BEINGS								
B1.1	To preserve privacy and security during the works	If fences, vegetation or other barriers that contribute to security or privacy are removed as part of the works, provide temporary secure fences until such time as permanent replacement barriers are provided. Agree measures with landowners.	Fence erected and approved by Environmental Project Coordinator and EAPM.	Contractor/ Public Liaison Officer		Prior to works		
		Where the works area adjoins a private residential property, provide fencing to a minimum height of 1.8m in order to maintain privacy for the period of works.	Fence erected and approved by Environmental Project Coordinator and EAPM.	Contractor		Prior to works		
B1.2	To protect buildings from damage caused by heavy equipment	Fence an exclusion zone at a minimum distance from the building. Fences shall be a minimum 0.9 metres high and of such a type that prevents vehicle incursion or spillage of tipped or stored materials into the protected area, and fixed so that they cannot be accidentally moved.	Fences in place and approved by the Environmental Project Coordinator and EAPM.	Contractor		Prior to works		
		Any machinery that is operating near any buildings shall have a ground bearing pressure no more than the standards previously agreed with the EAPM and Environmental Project Coordinator.	No damage to buildings through subsidence or excess weight loading.	Contractor				
B1.3	To ensure that public and private spaces are left in as good or better condition than before works began	Carry out reinstatement work to such a standard that the condition of buildings, hard landscaping, planting etc. is as good as or better than pre-start conditions. Use pre-start photographic records as a benchmark.	Reinstatement completed and approved by Environmental Project Coordinator and EAPM. No valid complaint.	Contractor				

Ref. No.	Objective	Action	Target	Responsibility	Reference to further information	Date to be completed by	Monitoring & Observation	Further Action Required (Y/N)
B DURING CONSTRUCTION								
B1.4	To maintain services and essential accesses during works	Consult with Fire, Ambulance and Police to agree access arrangements to affected properties. Agree access arrangements with property owners and service providers for post and refuse collection etc. if required.	Access agreed with all parties. No loss of service.	Consultant				
		Provide affected property owners, residents and businesses with alternative service diversion and access plans (including those for deliveries), and programme. Confirm arrangements in writing to affected parties before works commence.	Arrangements confirmed in writing to affected parties. No loss of service.	Consultant				
B1.5	To provide adequate access to the works for emergency services	Agree with representatives of Fire, Ambulance and Police services that proposed access provision to the works area is adequate.	Access provision agreed with all emergency services.	Contractor				
B1.6	To protect recreational rights during and after the works	Provide and install appropriate signage for footpath and cycleway diversions.	Safe alternative route provided with signage installed and approved by EAPM.	ECW				
		Provide a surface medium, such as sand, wood chippings, stone dust etc. suitable for horses on diverted bridleways where they cross areas of hardcore such as haul roads.	Suitable surface provided and approved by Environmental Project Coordinator and EAPM. No valid complaint.	Contractor				
B1.7	To inform affected persons and interested parties of progress and intended works	Prepare progress reports on a monthly basis and circulate to directly affected persons as detailed in the Communication Plan. Progress reports will summarise work carried out over the past month and report on work planned for the next month. Provide details of works that could give rise to exceptional nuisance, such as above average noise, dust or vehicle movements. Provide a contact name and telephone number.	Progress reports prepared, approved by EAPM and circulated. Contact details provided.	Public Liaison Officer				

Ref. No.	Objective	Action	Target	Responsibility	Reference to further information	Date to be completed by	Monitoring & Observation	Further Action Required (Y/N)
B DURING CONSTRUCTION								
B1.8	To ensure that environmental incidents are reported and appropriate action is taken to ameliorate or mitigate adverse impacts	Incidents that involve risks of pollution, fish kills or release of hazardous substances must be reported immediately to the Environment Agency 24 Hour Emergency Hotline on 0800 80 70 60.	All incidents correctly reported and signed off.	ECW				
		The ECW will report all incidents that may have environmental impacts using <i>Environmental Incidents Reporting Form</i> . The form must be submitted to the EAPM and the Environmental Project Coordinator within 48 hours of the occurrence, and the actions to be taken will be agreed with them. Only once the remedial actions have been completed will the EAPM and Environmental Project Coordinator sign off the incident.	All incidents correctly reported and signed off.	ECW/ Contractor				
B1.9	To ensure that complaints from members of the public or interest groups are acknowledged and responded to	Inform the EAPM within 48 hours of receiving any complaints about the works or staff employed on the works. The EAPM will appoint a responsible person to investigate the validity of the complaint. Ensure a response is made to the complainant within ten days of the original complaint.	All complaints responded to within timescale.	EAPM				
2. FLORA AND FAUNA								
B2.1	To protect designated sites from disturbance during the works	Implement agreed working mitigation method statement.	No valid complaints.	Contractor				

Ref. No.	Objective	Action	Target	Responsibility	Reference to further information	Date to be completed by	Monitoring & Observation	Further Action Required (Y/N)
B DURING CONSTRUCTION								
B2.2	To protect protected species	To undertake all mitigation as agreed with Natural England for bats and any other protected species confirmed present during pre-construction survey.	No residual impact to bats or any other protected species.	Contractor	Results of pre-construction surveys.			
B2.3	To identify trees which are to be felled, worked on or retained	Carry out a joint inspection with the Environmental Project Coordinator, EAPM and Contractor of all trees in the works area. Identify and annotate on drawings trees that are to be retained, trees that will require surgery, and trees that are to be felled. Spray-mark those that are to be felled.	Tree works agreed with EAPM and Environmental Project Coordinator, marked on drawings and adhered to.	Contractor		Prior to site clearance		
B2.4	To protect trees	Retained trees to be fenced off. Maintain protective fences in such a way as to ensure the integrity of the protection at all times Remove all protective fencing and fixings from site following completion of the works.	Trees fenced and approved by EAPM and Environmental Project Coordinator. No incursions. All fencing maintained and removed.	Contractor		Prior to site clearance		
		Arboricultural watching brief of works along Victoria Embankment.	No damage to retained trees.	ECW Contractor				
B2.5	To ensure establishment of tree and hedge cover and character to at least the same or better standard than existing	Follow Environment Agency guidance on replacement policy and planting specification for trees and hedges.	Environment Agency guidance followed. No net loss of trees.	Contractor				
B2.6	To ensure tree works are carried out in conformance with best practice guidelines	All tree works will be carried out in conformance with BS 5837.	Conformance with BS 5837.	Contractor				

Ref. No.	Objective	Action	Target	Responsibility	Reference to further information	Date to be completed by	Monitoring & Observation	Further Action Required (Y/N)
B DURING CONSTRUCTION								
B2.7	To control the spread of invasive weeds in accordance with the Wildlife and Countryside Act 1981 (as amended)	Spray, uproot and dispose of to a licensed tip, any Japanese knotweed (<i>Fallopia japonica</i>) or giant hogweed (<i>Heracleum mantegazzianum</i>) growing on the site. Eradication of giant hogweed requires full awareness of the health and safety risks. Prepare a method statement for the control and spread of Himalayan (or Indian) balsam (<i>Impatiens glandulifera</i> Royle) with Environmental Project Coordinator.	Japanese knotweed, giant hogweed and Himalayan balsam controlled in the works area.	Contractor				
		Do not translocate soil from areas colonised by Japanese knotweed (<i>Fallopia japonica</i>) to any other part of the site or remove it from the site except to a licensed tip.	No translocation of Japanese knotweed infested soil.	Contractor				
		Thoroughly clean any plant or machinery that has been used in areas infested with invasive weeds before removing it from the site.	Plant and machinery cleaned of soil and vegetable matter before leaving the site.	Contractor				
B2.8	To ensure the continued survival of new plants	Protect new plants from animal predation, either by fencing or by means of individual plant protection depending on the animals. If sheep, cattle, horses or deer are present, fencing or individual tree crates will be required.	No animal predation of new plants.	Contractor				
B2.9	To maintain planting areas before planting	Maintain areas that have been subject to earthworks and are scheduled for planting during a later season weed-free. Depending on the timing, they may be sown with a F1 hybrid fast germinating sterile annual ryegrass.	Planting areas maintained weed free.	Contractor				
3. NOISE AND VIBRATION								
B3.1	To protect local residents from out of hours noise or disturbance	Negotiate the hours of operation on the work area and haul roads with the EHO of the LPA. Out of hours work will not be carried out without prior agreement of the EHO.	Hours agreed with EHO. No operations outside of agreed hours.	Contractor				

Ref. No.	Objective	Action	Target	Responsibility	Reference to further information	Date to be completed by	Monitoring & Observation	Further Action Required (Y/N)
B DURING CONSTRUCTION								
		Carry out noise monitoring at least twice weekly in sensitive locations. Appoint a suitably qualified surveyor to carry out monitoring over 1-hour periods during any 2 working days in a given week adjacent to sensitive properties in locations previously agreed with the Environmental Project Coordinator. Noise levels must not exceed levels agreed with the LPA EHO.	Noise monitoring carried out and results submitted to Environmental Project Coordinator. No noise above standards agreed with EHO.	Contractor				
B3.2	To avoid disturbance to school pupils sitting examinations	Do not schedule or carry out work that is likely to cause excessive noise adjacent to schools during examinations.	No valid complaint.	Contractor				
5 LANDSCAPE AND VISUAL AMENITY								
B5.1	To maintain an acceptable site appearance during construction	Fence the working area during the construction period. The fence will: <ul style="list-style-type: none"> Clearly delineate the work area boundary. Delineate landscape protection zones. Deter unauthorised access. Be fixed to the ground sufficiently to prevent accidental movement. Be regularly maintained. 	Site securely fenced and maintained to the satisfaction of the Environmental Project Coordinator and EAPM.	Contractor				
		Place materials stored in the work area in such a way as to prevent spillage through or over the boundary fence.	No spillage over the site boundary.	Contractor				
		Maintain the work site in a tidy and orderly manner throughout the contract period.	No valid complaint.	Contractor				
		Store waste materials in a dedicated area of the compound in a suitable container. Spilled debris will be regularly cleared.	No valid complaint.	Contractor				

Ref. No.	Objective	Action	Target	Responsibility	Reference to further information	Date to be completed by	Monitoring & Observation	Further Action Required (Y/N)
B DURING CONSTRUCTION								
B5.2	To ensure that protected trees are retained	Do not fell, top, trim or prune trees that have been identified in the ES as being of importance. Avoid soil compaction	No protected trees felled, pruned or topped.	Contractor	ES			
B5.3	To minimise impact of contour changes when reprofiling channels, constructing training embankment or carrying out compensatory excavations	Carry out final grading of all recontoured areas to the satisfaction of the Environmental Project Coordinator to ensure the new levels marry into existing ones in as natural manner as possible.	Regrading approved by Environmental Project Coordinator.	Contractor				
6. WATER								
B6.1	To protect features of SSSI	Continue lake and ground water monitoring at Attenborough SSSI.	No impact on conservation status of SSSI.	Consultant				
7. TRAFFIC AND TRANSPORTATION								
B7.1	To repair and restore access roads	Repair and restore access roads used during the contract to a standard at least as good as the pre-start condition.	No valid complaint.	Contractor				
B7.2	To prevent the spread of debris on roads	Use a wheel-wash for vehicles exiting the works area.	Wheel wash in use.	Contractor				
		Sweep or otherwise clean the roads of debris arising from the works or vehicles entering or leaving the works.	No valid complaint.	Contractor				
8. CULTURAL HERITAGE AND ARCHAEOLOGY								
B8.1	Preserve archaeological features	Implement Archaeological Mitigation strategy.	Fully record any archaeological remains.	Archaeological Consultant				

Ref. No.	Objective	Action	Target	Responsibility	Reference to further information	Date to be completed by	Monitoring & Observation	Further Action Required (Y/N)
B DURING CONSTRUCTION								
B8.2	To ensure archaeological finds are preserved, investigated and recorded or excavated	In the event that ground breaking operations uncover remains that could be of archaeological interest, the following actions will be taken: <ul style="list-style-type: none"> All work will cease within the vicinity of the find. The EAPM and SE will be informed as soon as practically possible. The County Archaeological Officer will be informed of the find within 24 hours. Work will not re-commence within the vicinity of the find until agreement to do so has been reached with the Environment Agency Archaeologist.	All finds reported. Works halted in vicinity of finds. Agreement reached with Environment Agency Archaeologist for recommencement of works.	Contractor				
9 LAND USE.								
B9.1	To ensure safe crossing points for all legitimate users (such as agricultural machinery or stock) are provided on flood defence structures	Provide safe crossing points to flood banks, walls and channels to suit the landowner's requirements. Agree with the landowner the number and positioning of crossing points before work commences.	No valid complaint.	Contractor				
B9.2	To maintain the integrity of existing animal enclosures and to protect stock from hazards associated with the works	Maintain existing stock-proof fencing within the works area if feasible, or replace with a suitable alternative in a location agreed with the landowner.	No valid complaint.	Contractor				
		Suitably fence transport routes and works areas within agricultural holdings where stock is present or likely to be present in order to exclude the stock.	No valid complaint.	Contractor				

Ref. No.	Objective	Action	Target	Responsibility	Reference to further information	Date to be completed by	Monitoring & Observation	Further Action Required (Y/N)
B DURING CONSTRUCTION								
10. NATURAL RESOURCES								
B10.1	To reduce the export of waste soils or plant materials from site	Use surplus soils and vegetative materials on site for land-forming and habitat creation if flood plain protection measures allow.	No export of soils.	Contractor				
B10.2	All natural stone building materials that arise from demolition on site shall be reclaimed where possible	Natural stone blocks shall be cleaned and safely stored for reuse.	Maximise recycling, minimise the use of non-sustainable building materials.	Contractor				
B10.3	To reduce waste	Demolition works will be carried out in such a way as to facilitate the reuse and recycling of materials. Reuse will be the primary aim; if reuse is not feasible then recycling will be the secondary aim. Only those materials not suitable for practical reuse or recycling will be disposed of to a licensed tip in conformance with current waste management and duty of care legislation.	Conformance with waste legislation. Recycle or reuse suitable materials.	Contractor				
B10.4	Reduce energy use associated with materials importation	Give primary consideration to locally manufactured or sourced materials. If these are not available, consider rail importation for all or part of the transportation. Only if neither of these are feasible will long-distance road transportation be used.	No major increase in traffic flows, no unnecessary depletion of fossil fuels.	Contractor				

Ref. No.	Objective	Action	Target	Responsibility	Reference to further information	Date to be completed by	Monitoring & Observation	Further Action Required (Y/N)
C POST CONSTRUCTION								
1 HUMAN BEINGS								
C1.1	To ensure that maintenance of structures and planting is carried out	Carry out maintenance on structures and planting for the specified period.	Structures and planting maintained to specification.	Contractor				
C1.2	To ensure health and safety measures have been implemented	Carry out a health and safety inspection to ensure that the designed measures have been completed and are effective.	No undue health and safety hazards.	Consultant				
C1.3	To ensure that responsibility for structures and planting belonging to others is formally handed over	Carry out a formal inspection and hand-over of structures and planting belonging to others following completion and at the end of the agreed maintenance period.	Owner accepts responsibility. Hand-over documented.	Contractor				
C1.4	Ensure suitable remediation undertaken	Carry out remediation of areas damaged during construction in agreement with land owners and LPA.	No valid complaints.	Contractor				
5 LANDSCAPE AND VISUAL AMENITY								
C5.1	To ensure that all temporary works are removed	Remove all temporary works, including protective fencing etc., and restore the ground to its previous condition or better before completion of the contract, using the pre-start photographic record as a baseline.	All temporary works removed. Ground restored to at least as good a condition as pre-start and approved by Environmental Project Coordinator and EAPM.	Contractor				

Ref. No.	Objective	Action	Target	Responsibility	Reference to further information	Date to be completed by	Monitoring & Observation	Further Action Required (Y/N)
C POST CONSTRUCTION								
9. LAND USE								
C9.1	To minimise impact of works and site compound	<ul style="list-style-type: none"> All temporary fencing is to be removed. Site is to be reinstated to at least as good as previous condition. After excavations, topsoil previously stripped and stored to be returned to where it was removed. 	No valid complaints.	Contractor				
10. NATURAL RESOURCES								
C10.1	To monitor the effectiveness of mitigation and enhancement works, and to learn from previous experience	A photographic survey of all mitigation and enhancement works will be carried out each year for a five-year period. On the fifth year a report will be prepared on the effectiveness of the measures and their successfulness.	Photographic surveys completed. Report completed.	Environmental Project Coordinator				

14 ABBREVIATIONS

ALC	Agricultural Land Classification
AMS	Agency Management System
AQMA	Air Quality Management Area
B&V	Black & Veatch
BAP	Biodiversity Action Plan
BBC	Broxtowe Borough Council
BS	British Standard
BSBI	Botanical Society of the British Isles
BTO	British Trust for Ornithology
CFMP	Catchment Flood Management Plan
CIRIA	Construction Industry Research and Information Association
CITB	Construction Industry Training Board
CO	Carbon monoxide
CRoW	Countryside and Rights of Way
cSINC	Site of Importance for Nature Conservation (candidate)
CSO	Combined sewer outfall
dB	decibels
Defra	Department for Environment Food and Rural Affairs
DETR	Department of the Environment, Transport and the Regions
DoE	Department of the Environment
DSA	Driving Standards Agency
DTI	Department of Trade and Industry
DWT	Derbyshire Wildlife Trust
EAP	Environmental Action Plan
EcIA	Ecological Impact Assessment
ECW	Environmental Clerk of Works
EEC	European Economic Community
EHO	Environmental Health Officer
EIA	Environmental Impact Assessment
EN	English Nature
ES	Environmental Statement
EU	European Union
FAS	Flood Alleviation Scheme
FTS	Fluvial River Trent Flood Risk Management Strategy
GCN	Great Crested Newt
GDP	Gross Domestic Product
GLVIA	Guidelines for Landscape and Visual Impact Assessment
GQA	General Quality Assessment
ha	hectare
HIA	Health Impact Assessment
IEEM	Institute of Ecology and Environmental Management
IEMA	Institute of Environmental Management and Assessment
JNCC	Joint Nature Conservation Committee
km	kilometre
LAeq	equivalent average sound level measured using the A-weighting
LBAP	Local Biodiversity Action Plan

LDD	Local Development Document
LDF	Local Development Frameworks
LNR	Local Nature Reserve
LPA	Local Planning Authority
LTP2	Local Transport Plan 2
LVIA	Landscape and Visual Impact Assessment
LWS	Local Wildlife Site
m	metre
MAFF	Ministry of Agriculture, Fisheries and Food
MAGIC	Multi-Agency Geographic Information for the Countryside
mAOD	Metres Above Ordnance Datum
N/A	Not applicable
NAQS	National Air Quality System
NE	Natural England
NEAS	National Environmental Assessment Service
NIRS	National Incident Reporting System
NNR	National Nature Reserve
NO _x	Oxides of Nitrogen
NPA	Nicholas Pearson Associates
NVC	National Vegetation Classification
NWT	Nottinghamshire Wildlife Trust
ODPM	Office of the Deputy Prime Minister
OS	Ordnance Survey
PAR	Project Appraisal Report
PH	Public House
PIRP	Pollution Incident Response Plan
PM ₁₀	Particulates
PPG	Pollution Prevention Guidelines
PPG24	Planning Policy Guidance 24 : Planning and Notice
PPS25	Planning Policy Statement 25: Development and Flood Risk
PRoW	Public Right of Way
pSAC	possible Special Area of Conservation
pSPA	possible Special Protection Area
PV	Present Value
RBMP	River Basin Management Plan
RDB	Red Data Book
RSPB	Royal Society for the Protection of Birds
RSS	Regional Spatial Strategy
SAC	Special Area of Conservation
cSAC	candidate Special Area of Conservation
SGV	Soil Guideline Value
SI	Statutory Instrument
SINC	Site of Importance for Nature Conservation
SMR	Sites and Monuments Record
SN	Smooth Newt
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
STW	Sewage Treatment Works
SWMP	Site Waste Management Plan

TMP Traffic Management Plan
TPO Tree Preservation Order
VOCs Volatile Organic Compounds
WeBS Wetland Bird Survey

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15 GLOSSARY

Alluvium	Detrital material, commonly composed of sands and gravels, transported and deposited by a river.
Amenity	A feature that increases attractiveness or value, especially of a property or a geographic location.
Aquifer	A water bearing bed of strata, either by virtue of its porosity or because it is pervious.
Archaeology	The systematic study of past human life and culture by the recovery and examination of remaining material evidence, such as graves, buildings, tools and pottery.
Audit	The process used to compare impacts predicted in an environmental impact assessment with those that actually occur.
Avoidance	This implies the need for some level of redesign of the project. Avoidance is usually best achieved by the consideration of alternatives.
Baseline Studies or Survey	Collection of information about the environment which is likely to be affected by the project.
Biodiversity	Biodiversity is the living component of the natural world and embraces all plant and animal species and communities associated with terrestrial, aquatic and marine habitats. It also includes genetic variation within species.
Biodiversity Action Plan (BAP)	The UK Biodiversity Action Plan is a result of the Rio Convention held in 1994 for dealing with biodiversity conservation. From this councils are required to construct their own species and habitat action plans to maintain and enhance their local environment.
Compensation	When the potential for avoiding and reducing impacts has been exhausted then consideration may need to be given to compensating for the residual impacts to make the proposal environmentally acceptable.
Conservation	The maintenance of environmental quality and resources in a given area.
Conservation Areas	An area considered of special architectural or historic interest, the character or appearance of which it is desirable to preserve or enhance. Designated under the Planning (Listed Buildings and Conservation Areas) Act 1990.
Considerate Contractors Scheme	A national initiative, set up by the construction industry, to improve its image. The three main areas that the Scheme's Code covers are: the environment, the workforce and the general public.
Constraints Mapping	A plan showing environmental engineering and topographic constraints for a given area.
The Countryside and Rights of Way Act 2000 (CRoW) Act	A new statutory right of access to open country and registered common land, modernised the rights of way system, gave greater protection to Sites of Special Scientific Interest (SSSIs), provided better management arrangements for Areas of Outstanding Natural Beauty (AONBs) and strengthened wildlife enforcement legislation.
Cyprinid	Soft-finned mainly freshwater fish typically having toothless jaws and cycloid scale (include carp, tench, barbel, rudd, roach).
dB(A)	Decibel, the sound pressure level of a signal which has been passed through an 'A' filter whereby both low and high frequency components are attenuated. Represents the audible frequency.
Defra	Defra is the Department for Environment, Food and Rural Affairs which deals with aspects of the environment, rural matters, farming and food production. It is a focal point for all rural policy, relating to people, the economy and the environment and has roles in both European Union and global policy making.
Demountable defence	A retractable barrier that is erected when a flood event is predicted.
Development consent	The decision of the competent authority or authorities that entitles the developer to proceed with a project. It can be either a licence or a consent to abstract or impound water.
Development Site	An area currently under, or being considered for development; this usually involves the building of residential or industrial properties.
Dewatering	A method used for artificially lowering groundwater levels via pump extraction.
Dry side	The side of a flood defence facing away from the river.
Easement	A right of way beside a defence to provide access for maintenance purposes.

Ecology	The study of the detrimental effects of modern civilization on the environment, with a view toward prevention or reversal through conservation.
English Heritage	A national body funded by the government to promote and give advice on building conservation matters. (Historic Buildings and Monuments Commission for England).
English Nature (EN)	A national body funded by the government to promote and give advice on the conservation of England's wildlife and natural features. Now known as Natural England (NE).
Enhancement	In addition to reducing the adverse impacts of a project, many proposals provide the opportunity for environmental improvement.
Environment Act 1995	The Environment Act 1995 is an Act of Parliament which created a number of new agencies and set new standards for environmental management. It set up the Environment Agency, the Scottish Environment Protection Agency and the National Park authorities. It also required the Secretary of State to prepare a national air quality strategy and a national waste strategy, with power to impose obligations on producers. It also gave powers to protect important hedgerows.
Environment Agency	A public body established by the Environment Act 1995. Generally speaking, the Environment Agency is empowered under the Water Resources Act 1991 to manage flood risk arising from designated main rivers and the sea. The Environment Agency is also responsible for flood forecasting and flood warning dissemination, and for exercising a general supervision over matters relating to flood defence in England and Wales.
Environmental	When environmental issues are referred to, this term is used to encompass landscape/natural beauty, flora, fauna, geological or geo-morphological features, buildings, sites and objects of archaeological, architectural or historic interest.
Environmental Action Plan (EAP)	A stand alone report or section within an environmental impact assessment document (e.g. an Environmental Report or Environmental Statement) which ensures that constraints, objectives and targets are translated into contract documents and practice on the ground from the Environmental Statement or Environmental Report.
Environmental Assessment	A tool for integrating environmental considerations into decision making by ensuring that significant environmental effects of the decision are taken into account.
Environmental Impact Assessment (EIA)	EIA applied at the project level is a process intended to ensure that environmental impacts of schemes are identified prior to the work being carried out so that proposals can be modified or managed in such a way that adverse impacts are avoided or minimised. It is also referred to in some of the literature as Environmental Assessment (EA) or Impact Assessment (IA).
Environmental Statement (ES)	The document produced when environmental impact assessment is formally required under the EIA Regulations.
Environmental Stewardship	A government scheme which provides funding to farmers and other land managers in England who deliver effective environmental management on their land.
Erosion	Wearing away of coastal shoreline or fluvial riverbanks by the action of moving water.
Fauna	Animals, considered as a group.
Flapped Outfall	A piped outfall (usually for a watercourse or sewer) with a hinged, non return cover to allow the water to pass in a single direction only.
Flood Cell	A discrete area at risk from flooding when the defences protecting it fail or breach.
Floodplain	An area of land over which river or sea water flows or is stored in times of flood.
Flora	Plants considered as a group, especially the plants of a particular country, region, or time.
Fluvial	Of, or occurring, in a non-tidal river.
Formal defence	Structures such as flood walls which are present primarily to serve as protection against flooding
Geomembrane	An impermeable synthetic membrane specifically designed to be used as a construction material.

Geotextile	A permeable textile specifically designed to be used as a construction material.
Groundwater	Water contained in the void spaces in pervious rocks and also within soil.
Habitat	A place where an organism lives; a type of environment inhabited by a particular species and/or communities; often characterised by dominant plant forms, physical characters, or a combination of these.
Habitats Regulations	Two European Directives; the 1979 Wild Birds Directive and the 1992 Habitats Directive have resulted in the designation of a number of Special Protection Areas (SPAs) and Special Areas of Conservation (SACs) which are designed to protect species and habitats which are threatened in a European context. In the UK these designations are subject to national legislative protection under the 1994 Habitats Regulations. These Regulations have created an additional set of assessment procedures to which proposed plans and projects are subject.
Head	An earth mass containing angular fragments produced as a result of solifluxion, the slow downhill movement of soil as a result of the alternate freezing and thawing of the contained water, in periglacial regions.
Health Impact Assessment (HIA)	A combination of procedures, methods and tools by which a policy, programme or project may be judged as to its potential effects on the health of a population, and the distribution of those effects within the population.
Heras	Heras fencing is comprised of 2 x 3m interlocking metal mesh fencing panels held in position by vertical bars located into concrete blocks. This fencing system is designed to be graceful in appearance and aesthetically appealing and, being suitable for use on sloped ground it is particularly appropriate as perimeter fencing.
Hydrogeology	The branch of geology that deals with the occurrence, distribution, and effect of ground water.
Hydrology	The scientific study of the properties, distribution, and effects of water on the earth's surface, in the soil and underlying rocks, and in the atmosphere.
Invasive Species (plants)	Either native species that grow well in disturbed or nutrient enriched conditions, to the detriment of other plant and animal species, or non-native plants that have been introduced to this country by accident or as a consequence of trade or deliberate collection.
LAeq dB(A)	The level of a continuous steady sound that would over a given time period, result in the same acoustic energy being received as that from the actual fluctuating sound experience.
Land Drainage Act (1991)	The Land Drainage Act 1991 places responsibility for maintaining flows in watercourses on landowners. However in certain defined areas, the Local Authority, the Internal Drainage Board or the Environment Agency have permissive powers to carry out works.
Landscape Character	The distinct pattern and arrangement of landscape elements or features that collectively create a sense of place.
Landscape Value	The relative value or importance attached to the landscape – rural or townscape
Land take	The area of land required to construct the flood defence.
Listed Building	A building or other structure of special architectural or historic interest included on a statutory list and assigned a grade (I, II* or II).
Listed Building Consent	Permission required for the alteration or demolition of a Listed Building.
Local Plan	A statutory development plan prepared by a local planning authority setting out detailed policies for environmental protection and development. To be replaced by Local Development Documents.
Local Planning Authority (LPA)	The local authority or council that is empowered by law to exercise planning functions. This is normally the local borough or district council, but in National Parks and some other areas there is a different arrangement.
Local Wildlife Site	Non-statutory nature conservation designation for a site normally of county value. Alternative name is SINC.
Macroinvertebrates	Small animals that can be seen with the naked eye.
Made ground	Ground that has been artificially raised by man's intervention.

Main River	Main rivers are usually larger streams and rivers, but also include smaller watercourses of strategic drainage importance. A main river is defined as a watercourse shown as such on a main river map, and can include any structure or appliance for controlling or regulating the flow of water in, into or out of the main river. The Environment Agency's powers to carry out flood defence works apply to main rivers only. Main rivers are designated by the Department for Environment, Food & Rural Affairs in England and by the Welsh Assembly Government.
Margins	Land along the edge of a lake or open watercourse.
Mitigation Measures	Steps that may be taken to minimise, eliminate or compensate the adverse effects of a development. 'Should only be considered when all options for the avoidance of impacts have been exhausted or have been deemed to be impracticable. This may be achieved by examining alternatives (e.g. alternative equipment may be quieter) or by the addition of mitigation measures to the existing proposal (e.g. bunds, odour abatement technology and tree planting)' (IEMA 2004).
Natural England (NE)	A national body funded by the government to promote and give advice on the conservation of England's wildlife and natural features. Formally known as English Nature (EN).
Nature Conservation	The preservation, management and enhancement of natural plant and animal communities, and occasionally modified vegetation, as representative samples of their kind.
Navigable Waters	Inland waters sufficiently deep and wide for navigation by all, or specified sizes of vessels.
Neolithic	The 'New Stone Age' period, part of the prehistoric era, dating from 4500-2250BC.
Objective	A statement of what is intended, specifying the desired direction of change in trends.
Ordinary Watercourses	Every river, stream, ditch, drain, cut, dyke, sluice, sewer (other than public sewer) and passage through which water flows which does not form part of a main river. On ordinary watercourses, the local authority and, where relevant, Internal Drainage Boards have similar permissive powers as the Environment Agency has on main rivers.
Palaeochannel	Ancient stream or river bed cut into the surrounding rock or soil, which have been reburied by other sediments after the stream changed its course or dried up.
Protected Species	Plant and animal species, including all wild birds, protected under the Conservation (Natural Habitats and Conservation) Regulations 1994, the Wildlife and Countryside Act 1981 and subsequent amendments, or other species protected under legislation specific to them.
Permitted Development	The Town and Country Planning (General Permitted Development) Order 1995 grants rights (known as permitted development rights) to carry out certain limited forms of development without the need to make an application for planning permission.
Proposals Map	An obligatory component of a local plan showing the location of proposals in the plan on an Ordnance Survey base map.
Present Value (PV)	The value of a stream of benefits or costs when discounted back to the present time.
Public Open Space	Land provided in urban or rural areas for public recreation, though not necessarily publicly owned.
Ramsar Site	A Site of Special Scientific Interest which is also listed by the Secretary of State of the Environment to satisfy the requirements of the Convention on Wetlands of International Importance agreed at Ramsar in Iran in 1971.
Receptor	A component of the human or built environment that may be potentially affected by a development. Receptors include human population, animals, plants, soil, water, air, climate, material assets, landscape and cultural heritage.
Regeneration Zone	An area of land designated by the relevant authority for investment and re-development.
Re-instatement	To restore to a previous condition or position.

Registered Park & Garden	A park or garden with historic value, considered to be sufficiently important to be worth including on the national ' <i>Register of Parks and Gardens of special historic interest in England</i> '.
Residual Impact	Any impact remaining after the impacting activity has finished.
Riparian	Owner of property on a river bank.
Salmonid	Any member of the taxonomic family Salmonidae, which includes all species of salmon, trout, whitefish and grayling.
Schedule 1	The Wildlife and Countryside Act 1981, Part 1, has several lists of species, known as schedules. Schedule 1 lists birds which are protected by special penalties.
Scheduled Monument (SM)	An archaeological monument that is included in the Schedule required to be maintained by the Secretary of State under Section 1 of the Ancient Monuments and Archaeological Areas Act 1979. Such monuments are protected by law.
Scoping	Process of identifying the key issues in an environmental impact assessment/strategic environmental assessment.
Screening	For EIA, the process of deciding which developments require an environmental impact assessment to be carried out and at what level of detail.
Semi-natural habitat	Habitat modified by human activity from its original state but with vegetation composed of native species similar in structure to natural types and with native animal communities.
Sheet piling	Typically steel corrugated interlocking sheets that can be used for trench or wider excavation support, a wall foundation or a barrier to the passage of groundwater or for protection or erosion (e.g. a cut-off).
Significant environmental effects	General guidance on how to assess significance is contained in DETR Circular 02/99 and Welsh Office Circular 11/99. Essentially the circulars suggest that there are three main criteria of significance: a) Whether the project is of more than local importance, principally in terms of physical scale; b) Whether the project is situated in or near a particularly sensitive location, for example, a national park or SSSI, and for that reason may have significant effects on the area's environment even though the project is not on a major scale; c) Whether the project is thought likely to give rise to particularly complex or adverse effects.
Sites and Monuments Record (SMR)	The SMR is a computerized database containing information on known archaeological sites, historic landscapes and Listed Buildings.
Site of Interest for Nature Conservation (SINC)	Non-statutory designation for a site normally of county value for nature conservation although some protection is provided through the planning system. Alternative name is Local Wildlife Site.
Site of Special Scientific Interest (SSSI)	An area of land of special interest by reason of its flora, fauna, geology or physiographical features notified under Section 28 of the Wildlife and Countryside Act 1981.
Special Area of Conservation (SAC)	Strictly protected sites designated under the EC Habitats Directive.
Special Protection Area (SPA)	Strictly protected sites classified in accordance with Article 4 of the EC Directive on the conservation of wild birds (79/409/EEC), also known as the Birds Directive, which came into force in April 1979. They are classified for rare and vulnerable birds, listed in Annex I to the Birds Directive, and for regularly occurring migratory species.
Standard of Protection	The expected return period of flooding that a flood defence will protect against.
Strata	A horizontal layer of material, especially one of several parallel layers arranged one on top of another.
Strategic	The undertaking of any process in a holistic manner taking account of all associated impacts, interests of other parties and considering the widest set of possible options for a solution with respect to flooding.
Statutory	Required by law (statute), usually through an Act of Parliament.
Stockpile	An accumulation of goods or materials
Structure Plan	Statutory plan setting out key strategic policies which provide the framework for more detailed policies in local plans.

Subsoil	The layer of soil between the topsoil and bedrock.
Sustainability	'Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.' (WCED, 1987).
Taxa	Major types of macroinvertebrates.
Terrestrial	Of, relating to, or composed of land.
Till/boulder clay	A poorly sorted mixture of sands, clays and boulders produced by the erosion of rocks by moving ice.
Topographic Survey	A survey of the arrangement of the natural and artificial features of an area.
Topography	The physical features or configuration of a land surface.
Tree Preservation Order (TPO)	An order made by a local planning authority (London Boroughs, district or unitary councils and sometimes county councils) which in general makes it an offence to cut down, top, lop, uproot, wilfully damage or wilfully destroy a tree without the planning authority's permission.
Washlands	Used interchangeably with the term 'floodplain'. Sometimes are associated with flood banks which provide some protection of land behind (often a settlement) during flood events whilst allowing the rest of the floodplain to flood. Previously referred to as 'controlled' floodplains.
Working width	Similar to land-take. This is the temporary area required to control the flood defences.
Wildlife and Countryside Act	The Wildlife and Countryside Act 1981 (as amended) is the principle mechanism for the legislative protection of wildlife in Great Britain and covers many subjects including the protection of animals, plants, and certain habitats.

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ANNEX 1
Planning Policy

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Table V1.1 Relevant Local Planning Policy for Human Population

Local Planning Authority	Policy Number	Description	Influence on Nottingham Trent Left Bank FAS.	Overall Impact of FAS on Planning Policy
Erewash ¹		No relevant parties.		
Gedling ²	Policy E3 – Retention of Employment	<i>The expansion, conversion and redevelopment of premises for the specified employment uses within the Town and Country Planning Use Class order 1987 will be permitted at... Colwick Industrial Estate</i>	The scheme runs past a Retention of Employment Area at Colwick Industrial Estates (Reaches 2 and 3, Colwick). The flood defences will not impact on the expansion, conversion and redevelopment of the area and will provide a defined level of flood protection.	Neutral

Local Planning Authority	Policy Number	Description	Influence on Nottingham Trent Left Bank FAS.	Overall Impact of FAS on Planning Policy
	Policy R1 – Protection of Open Space	<p><i>Permission will not be granted for development on land that is used, or was last used, as open space.... Exemptions to this policy will be allowed where one of the following conditions are met:</i></p> <ul style="list-style-type: none"> • <i>the land is an area of surplus and can no longer contribute as an open space (in its present or alternative open space use) to meeting a local or wider need;</i> • <i>the development would enhance or improve the recreational or sporting potential or quality of the site;</i> • <i>the facility is to be replaced at an alternative location in a way that is at least equivalent in terms of its size, usefulness, attractiveness and quality in a location that is at least as accessible to current and potential users;</i> • <i>the proposed development is ancillary to the use of the site as a playing field and would not adversely affect the quantity or quality of pitches and their use;</i> • <i>the land is part of a larger playing field area and is incapable of forming a playing pitch or part of one;</i> • <i>the proposed development is for an outdoor or indoor sports facility of sufficient benefit</i> <p><i>Unless the site is surplus to requirements as an open space, the proposed development shall:</i></p> <ul style="list-style-type: none"> • <i>avoid the erosion of the recreational function and maintain or enhance the character of the open space;</i> • <i>protect and enhance those parts of the rights of way network that might benefit open space;</i> • <i>have regard to the impact on biodiversity and nature conservation</i> 	<p>The scheme runs past a Protection of Open Space area. (Reach 1, Colwick). The scheme has been designed to allow the existing and future use of the area and to not affect the existing landscape character.</p>	Neutral
	T11 – Trentside Path	<p><i>A new footpath is proposed...from Colwick to Burton Meadows along the North bank of the River Trent</i></p>	<p>Design through Colwick Industrial Estate allows for the creation of a riverside footpath. Gedling BC responsible for all necessary legal agreements with landowners</p>	Positive

Local Planning Authority	Policy Number	Description	Influence on Nottingham Trent Left Bank FAS.	Overall Impact of FAS on Planning Policy
	T9 – Cycle routes	<i>Planning permission will not be granted for development which would prejudice the implementation of the proposed cycle routes shown on the Proposals Map or the continuity of existing cycle routes, unless the proposal includes an alternative cycle route which is no less safe for public use. Where new developments are proposed in such area, contributions will be sought for new cycle routes and facilities as either on or off site works.</i>	Design through Colwick Industrial Estate allows for the creation of a riverside multi-user footpath. Gedling BC responsible for all necessary legal agreements with landowners	Positive
Broxtowe³	RC5 – Protection of Open Space	<i>The development of open spaces shown on the Proposals Map...will not be permitted unless:</i> <i>a) no local deficiency of open space will result; or</i> <i>b) where such a deficiency will result, either an equivalent and equally accessible area is laid out and made available for the same open space purpose, or it has been demonstrated that redevelopment of a small part of the site will result in substantially enhanced sports or recreation facilities on the remainder of the site; or</i> <i>c) the development relates to the improvement of the recreational potential of the land or provides ancillary facilities; and</i> <i>d) In all of the above cases, the development will not detract from the open character, environmental and landscape value of the land.</i>	Reach 3, 8, 12 and 13 through Attenborough, Erewash and Rylands falls under land allocations protected by policy RC5. No long term impact on the future use or character of area.	Neutral
	RC10 – Allotments	<i>Development on the existing public and private allotments shown on the Proposals Map...will not be permitted unless:</i> <i>a) there is no demand for the use of the land as allotments, or, where there is such demand, an equivalent and equally accessible area is laid out and made available by the applicant for use as allotments; and</i> <i>b) the land does not make an important contribution to the ecological value of the area, or to visual amenity, such as a break in a built-up frontage; and</i> <i>c) if the proposed development is for other than open space or playing fields, there is no shortage of open space or playing field provision in the locality.</i>	Reach 12 through Attenborough, Erewash and Rylands falls under land allocations protected by policy RC5. No long term impact on the allotments.	Neutral
	RC12 – Protected Open Areas	<i>Development will not be permitted which would detract from the character or function of the protected open areas shown on the Proposals Map...Chilwell Manor Golf Course</i>	Reach 11 through Attenborough, Erewash and Rylands passes through Chilwell Manor Golf Course. No long term impact on the future use or character of area.	Neutral

Local Planning Authority	Policy Number	Description	Influence on Nottingham Trent Left Bank FAS.	Overall Impact of FAS on Planning Policy
	RC16 - Greenways	<i>Important links between built-up areas and the countryside are designated by the Plan as greenways and identified on the Proposals Map. Opportunity will be taken to enhance public access along these routes, and to enhance their environmental character and appearance, including through new development. Planning permission will not be granted for development which would harm their function, or their environmental, ecological or recreational value.</i>	The scheme through Attenborough, Erewash and Rylands falls under land allocations protected by policies RC16. No long term impact on the future use or character of area.	Neutral
Nottingham ⁴	Policy R5 – Playing Fields and Sports Grounds	<p><i>Planning permission will not be granted for development which would result in the loss of existing playing fields and sports grounds including those at educational establishments unless:</i></p> <ul style="list-style-type: none"> <i>a) there is no existing or future need for the facility, and development does not adversely affect the overall quality of provision;</i> <i>b) equivalent or improved alternative provision can be made in a suitable location</i> <i>c) the proposed development only affects land incapable of forming, or forming part of, a playing pitch and does not result in the loss of, or inability to make use of any playing pitch;</i> <i>d) the sites contribution to the visual amenity of the surrounding area or to the Open Space Network is not unacceptably harmed, and</i> <i>e) the sites role as part of a wildlife corridor or reserve is not unacceptably diminished.</i> 	The scheme is near the Open Space Network (Reach 1, 4 and 5, Meadows). Embankment proposed across Wilford Grove Recreation Ground goes against planning policy however, the proposals have been discussed and agreed with Nottingham City Council.	Negative

Local Planning Authority	Policy Number	Description	Influence on Nottingham Trent Left Bank FAS.	Overall Impact of FAS on Planning Policy
	R1 – Development of Open Space	<p><i>Planning applications for development which would adversely affect the parks and open spaces and the green links between them forming the Open Space Network...will be considered against the following criteria:</i></p> <p><i>a) whether the land is underused and undervalued, and is not required for open space use within the Network;</i></p> <p><i>b) whether the development would have a detrimental effect on the open space, environmental, landscape character, or wildlife value of the Network as a whole;</i></p> <p><i>c) whether the development will enhance the Network, particularly in areas of open space deficiency and help to achieve the City Council's aims for the open space resource;</i></p> <p><i>d) whether the land is small part of a major open space and would not result in the loss of integrity of the open space or be detrimental to its function as part of the Open Space Network;</i></p> <p><i>e) whether the proposal would involve partial development of a smaller open space and enhancement of the function of the rest of the open space as an amenity locally or as part of the overall Open Space Network.</i></p>	<p>The scheme is near the Open Space Network (Reach 1, 4 and 5, Meadows). Embankment proposed across Wilford Grove Recreation Ground goes against planning policy however, the proposals have been discussed and agreed with Nottingham City Council.</p>	Negative

Table V1.2 National and Regional Planning Policy in relation to Flora and Fauna

Document	Policy	Influence on Nottingham Trent Left Bank FAS	Overall Impact of FAS on Planning Policy
Regional Spatial Strategy for the East Midlands			
Policy 27: Protecting and enhancing the Region's natural and Cultural Assets	<p>Sustainable development should ensure the protection, appropriate management and enhancement of the region's natural and cultural assets (and their settings). In the development and implementation of strategies and programmes in the region, local authorities and other bodies should apply the following principles:</p> <ul style="list-style-type: none"> • The promotion of the highest level of protection for the region's nationally and internationally designated natural and cultural assets; • Damage to natural or cultural assets (and their settings) should be avoided wherever and as far as possible, recognising that such assets are usually irreplaceable; • Unavoidable damage must be clearly justified by a need for development in that location which outweighs the damage that would result and should be reduced to a minimum through mitigation measures; • Unavoidable damage which cannot be unmitigated should be compensated for, preferably in a relevant local context and where possible in ways which also contribute to social and economic objectives; • Overall there should no net loss of natural and cultural assets and opportunities should be sought to achieve a net gain across the region; and • Protection of the region's best and most versatile land. 	The scheme design, mitigation and compensation measures will ensure no significant residual impact on natural or cultural heritage.	Neutral
Policy 28: Priorities for Enhancing the Region's Biodiversity	Local authorities, environmental agencies, developers and businesses should work together to promote a major step change increase in the level of the region's biodiversity....	See <i>Section 9</i> .	Positive
Policy 29: A Regional increase in woodland cover	Local authorities, environmental agencies, developers and businesses should help to create 65,000 ha of tree cover by 2021.	See <i>Section 9</i> .	Neutral
Circular 06/2005 – Biodiversity and Geological Conservation			
Statutory Obligations and Their Impact within the Planning System	Provides guidance on the application of the law relating to planning and nature conservation. It accompanies Planning Policy Statement 9: Biodiversity and Geological Conservation.	See below.	

Document	Policy	Influence on Nottingham Trent Left Bank FAS	Overall Impact of FAS on Planning Policy
Planning Policy Statement 9: Biodiversity and Geological Conservation (paragraphs 7 and 8)			
Para 7.	Many SSSIs are also designated as sites of international importance and will be protected accordingly. Those that are not, or those features of the SSSIs not covered by an international designation, should be given a high degree of protection under the planning system (see also Part II of ODPM/Defra Circular ODPM 06/2005, Defra 01/2005) through appropriate policies in plans.	There are no alternative alignments for the scheme along the boundaries of the Attenborough SSSI and the railway line. Alignment along The Strand in Attenborough to avoid adverse impacts on SSSI. Alignment and compensation measures agreed with Natural England	Neutral with compensation
Para 8.	Where proposed development on land within or outside a SSSI is likely to have an adverse effect on a SSSI (either individually or in combination with other developments), planning permission should not normally be granted. Where an adverse effect on the site's notified special interest features is likely, an exception should be made where the benefits of the development, at this site, clearly outweigh both the impacts that it is likely to have on the broader impacts on the national network of SSSIs. Local authorities should use conditions and/or planning obligations to mitigate the harmful aspects of the development and where possible, to ensure the conservation interest of the site's biodiversity or geological interest.		
Key Principle ii)	Plan policies and planning decisions should aim to maintain, and enhance, restore or add to biodiversity and geological conservation interests. In taking decisions, local planning authorities should ensure that appropriate weight is attached to designated sites of international, national and local importance; protected species; and to biodiversity and geological interests within the wider environment.		
Key Principle vi)	The aim of planning decisions should be to prevent harm to biodiversity and geological interests. Where granting planning permission would result in significant harm to those interests, local planning authorities will need to be satisfied that the development cannot reasonably be located on any alternative sites that would result in less or no harm. In the absence of any such alternatives, local planning authorities should ensure that, before planning permission is granted, adequate mitigation measures are put in place. Where a planning decision would result in significant harm to biodiversity and geological interests which cannot be prevented or adequately mitigated against, appropriate compensation measures should be sought. If that significant harm cannot be prevented, adequately mitigated against, or compensated for, then planning permission should be refused.		

Document	Policy	Influence on Nottingham Trent Left Bank FAS	Overall Impact of FAS on Planning Policy
Nottinghamshire and Nottingham Joint Structure Plan (Deposit Draft Explanatory Memorandum November 2003)			
Policy 2/3 Development in or likely to affect Sites of Special Scientific Interest	Development in or likely to affect Sites of Special Scientific Interest will be subject to special scrutiny. Where such developments may have an adverse effect, either directly or indirectly, on the special interest of the site, planning permission will not be granted unless the reasons for the development clearly outweigh the nature conservation value of the site itself and the national policy to safeguard such sites. Where planning permission is granted, conditions and/or planning obligations will be sought to provide appropriate mitigation and compensation measures.	There are no alternative alignments for the scheme along the boundaries of the Attenborough SSSI and the railway line. Alignment along The Strand in Attenborough to avoid adverse impacts on SSSI. Alignment and compensation measures agreed with Natural England	Neutral with compensation
Policy 2/4 Regionally Important Geological Sites, Sites of Importance For Nature Conservation and Local Nature Reserves.	Development likely to have an adverse impact on a Regionally Important Geological Site, a Site of Importance for Nature Conservation or a Local Nature Reserve will not be permitted unless it can outweigh the need to safeguard the nature conservation value of the site. Where planning permission is granted, harm to the nature conservation interest must be minimised and conditions and/or planning obligation will be sought to provide appropriate mitigation and compensation measures.	The scheme design and compensation measures will ensure no significant residual impacts on the six SINC/LWS directly affected.	Neutral with compensation

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Table V1.3 Relevant Local Planning Policy for Flora & Fauna

Ecological receptor	Borough	Policy Number	Description	Influence on Nottingham Trent Left Bank FAS	Overall Impact of FAS on Planning Policy
Trees and Hedgerow Protection	Erewash ¹	EV14 – Protection of Trees and Hedgerows	<p><i>Planning permission will not be given for development which would destroy hedgerows, areas of woodland, ancient woodland, trees protected by a tree preservation order, or tree conservation area unless their removal would:</i></p> <ol style="list-style-type: none"> <i>1. Be in the interests of good arboricultural practice; or unless</i> <i>2. The proposed development outweighs the amenity and conservation value of the protected trees, woodland or hedgerows.</i> <p><i>If the removal of a hedgerow or one or more trees is permitted as part of a development, a condition may require that a replacement hedgerow or an equivalent number of more new trees be planted either on or near the site.</i></p> <p><i>Where trees are to be retained, planning permission will not be granted for development, including buildings, roads, pavements and underground services which will adversely affect the health of the trees.</i></p>	Trees and hedgerows to be lost. Replacement planting to be carried out and remaining vegetation to be protected.	Neutral with re-planting
	Broxtowe ³	E24 – Trees, Hedgerows and Tree Preservation Orders	<p><i>Development that would adversely affect important trees and hedgerows will not be permitted.</i></p>	Trees and hedgerows to be lost within scheme area. Replacement planting to be carried out and remaining vegetation to be protected.	Adverse due to loss of hedge along Strand but will be replanted

Ecological receptor	Borough	Policy Number	Description	Influence on Nottingham Trent Left Bank FAS	Overall Impact of FAS on Planning Policy
	Nottingham ⁴	NE4 – Trees	<p><i>Existing trees will be protected, and the planting of additional trees secured, by:</i></p> <p><i>a. the imposition of planning conditions or negotiation of a planning obligation to offset the loss of, or impact on, any trees present on, or adjacent to, a site prior to development and to offset any loss of, or impact on, their contribution to amenity and other natural resources;</i></p>	<p>Trees and hedgerows to be lost within scheme area. Replacement planting to be carried out and remaining vegetation to be protected. Trees along the Victoria Embankment to be protected.</p>	Neutral with re-planting
Protected Species	Erewash ¹	EV11 – Protected Species and Threatened Species	<p><i>Development that would cause either indirect or adverse impacts on species that are protected by law or identified as nationally rare will only be permitted where:</i></p> <ol style="list-style-type: none"> <i>1. A full and detailed survey has been carried out by a qualified ecological consultant to determine the status of the population, the likely impact of all phases or the development and any mitigation that may be necessary. Proposals are submitted and supported by a section 106 obligation that clearly demonstrates how the necessary mitigation may be achieved so that favourable conservation status of the species can be maintained on site.</i> <i>2. It is not a European protected species as defined in the 1994 Conservation (Natural Habitats, &C.) Regulations. Mitigation measures may be proposed in order to avoid or reduce disturbance to an acceptable level. However, permission will be granted only where impacts have been clearly identified in an ecological and/or geological statement, and acceptable measures to minimise or remove the impact can be implemented, managed or monitored in accordance with an agreed scheme. Priority will be given to retaining or replacing as many of the important features on the site. The borough council will require evidence to demonstrate that the retention or replacement is unviable prior to considering off site replacements, which will be required only as a last resort. Where such measures cannot be secured by appropriate planning conditions they will be secured via legal agreements and section 106 obligations.</i> 	<p>Surveys undertaken and mitigation set out in Section 7.5. Bats and birds only protected species confirmed present.</p>	Neutral

Ecological receptor	Borough	Policy Number	Description	Influence on Nottingham Trent Left Bank FAS	Overall Impact of FAS on Planning Policy
	Nottingham ⁴	NE3 – Conservation of species	<p><i>Planning permission will not be granted for development which would have an adverse impact on species protected by law or their habitats or of special importance to Nottingham and Nottinghamshire, unless it is demonstrated that there is an overriding need for the development.</i></p> <p><i>Where planning permission is granted, planning conditions and/or obligations will be negotiated to ensure the favourable conservation status of the species</i></p>	Surveys undertaken and mitigation set out in Section 7.5. Bats and birds only protected species confirmed present.	Neutral
Habitat Protection and Enhancement	Erewash ¹	EV12 – Nature Conservation – Planning Obligations and Conditions	<i>In considering development proposals the use of planning conditions and planning obligations will be considered where necessary to offset harm and secure the beneficial management of features of major importance to wildlife.</i>	Scheme will impact on SINC/LWS (see Section 7.5). Mitigation and compensation measures will ensure no significant adverse residual impact.	Neutral
		EV13 – Creative Conservation	<i>Creative conservation will be carried out wherever opportunities arise.</i>	Compensation habitat creation and enhancement will be carried out; refer to Section 7.5 and Appendix F.	Positive
	Broxtowe ³	E19 – Other Nature Conservation Resources	<i>On development sites of 0.5 hectares or more, wherever opportunities arise, the Council will seek, as appropriate, the enhancement of existing nature conservation resources and the provision of new resources.</i>	As above	Neutral

Ecological receptor	Borough	Policy Number	Description	Influence on Nottingham Trent Left Bank FAS	Overall Impact of FAS on Planning Policy
	Gedling ²	ENV48 – Hedgerow Protection	<i>Development which involves the loss of, or adversely affects one or more important hedgerows will not be permitted unless the desirability of the proposed development clearly outweighs their archaeological, historical, wildlife or landscape value.</i>	No important hedges are to be removed in the Colwick Scheme Area	Neutral
	Nottingham ⁴	NE4 – Biological or Geological Sites of Importance for Nature Conservation	<i>Planning permission for development which affects Biological or Geological Sites of Importance for Nature Conservation, which have been allocated for development in the Plan, or sites other than those covered by Policy NE1 which are identified as supporting features of nature conservation interest, will be granted as long as measures are taken to:</i> <i>a. safeguard and protect flora and/or fauna ‘in situ’; or</i> <i>b. where that is impossible provide suitable alternative habitats for the flora and/or fauna displaced by the development.</i>	No significant impact on SINC/LWS. Work only to existing flood defence.	Neutral
Conservation designations	Erewash ¹	EV10 – Sites of Special Scientific Interest, Regionally Important Geological Sites and Geomorphological Sites, Local Nature Reserves and Sites of Importance for Nature Conservation	<i>1. Development in or likely to affect Sites of Scientific Interest (SSSI) will be subject to special scrutiny. Where such development may have an adverse effect, directly or indirectly on the special interest of the site it will not be permitted unless the reasons for the development clearly outweigh the nature conservation value of the site itself and the national policy to safeguard such sites.</i> <i>2. Development likely to have a significant adverse effect on a Local Nature Reserves, a Site of Importance for Nature Conservation or a regionally important geological/geomorphological site will not be permitted unless it can be demonstrated that there are reasons for the proposal which outweigh the need to safeguard the nature conservation value of the site.</i> <i>In some cases where development is permitted which would damage the nature conservation value of the site or feature, such damage will be kept to a minimum. Conditions and/or section 106 planning obligations will be used to secure necessary mitigation or compensatory measures</i>	SINC/LWS affected but design and alignment chosen to minimise impacts. Compensation habitat creation and enhancement will be carried out; refer to Section 7.5 and Appendix F.	Adverse but will be compensatory habitat

Ecological receptor	Borough	Policy Number	Description	Influence on Nottingham Trent Left Bank FAS	Overall Impact of FAS on Planning Policy
		E16 – Sites of Importance for Nature Conservation	<p><i>Planning permission will not be granted for development on or adjoining local nature reserves or Sites of Importance for Nature Conservation, which would damage or devalue their interest, unless there are special reasons which outweigh the recognised value of the sites.</i></p> <p><i>Where it is accepted that there are special reasons for development which outweigh the local value of the site, the applicant shall minimise harm to the sites features. Compensation for the loss of the site’s features of interest will be required, secured by planning conditions or negotiated planning obligations. Wherever opportunities arise, appropriate measures should be taken to enable the improvement or creation of Sites of Importance for Nature Conservation.</i></p>	SINCs/LWS affected but design and alignment chosen to minimise impacts. Compensation habitat creation and enhancement will be carried out; refer to Section 7.5 and Appendix F.	N/A
	Nottingham ⁴	NE1 – Nature Conservation	<p><i>Development in or likely to affect Sites of Special Scientific Interest will be subject to special scrutiny.</i></p> <p><i>Where such development may have an adverse effect, directly or indirectly, on the special interest of the site, planning permission will not be granted unless the reasons for development clearly outweigh the nature conservation value of the site itself and the national policy to safeguard such sites.</i></p> <p><i>Where planning permission is granted, conditions and/or planning obligations will be sought to provide appropriate mitigation and compensation measures.</i></p>	No SSSIs affected.	N/A
		NE2 – Nature Conservation	<p><i>Development likely to have an adverse impact on the flora, fauna, landscape or geological features of a Local Nature Reserve, Site of Importance for Nature Conservation or other locally important sites will not be permitted unless it can be clearly demonstrated that there are reasons for the proposal which outweigh the need to safeguard the nature conservation value of the site.</i></p> <p><i>Where planning permission is granted, conditions and/or planning obligations will be sought to provide appropriate mitigation and compensation measures.</i></p>	No significant impact on SINC (Colwick Country Park) as only minor works to existing flood defence.	Neutral

Table V1.4 Relevant Local Planning Policy for Land Use and Landscape

Receptor	Borough	Policy Number	Description	Influence on Nottingham Trent Left Bank FAS	Overall Impact of FAS on Planning Policy
Green Belts	Erewash ¹	GB1 – Green Belt	<i>Within the Green Belt, as defined on the proposals map, there will be a presumption against inappropriate development, except in very special circumstances where inappropriate development can be justified ...</i>	The scheme passes through the Erewash green belt which is adjacent to the river. The work will involve raising the current embankment (Reaches 1-11 Sawley, Trent Meadows).	Neutral
	Gedling ²	ENV26 – Control of Development in the Green Belt	<i>Within the Green Belt, as defined on the Proposals Map, planning permission will be granted for appropriate development, including...</i>	No areas of Green Belt will be affected.	Neutral
	Broxtowe ³	E8 – Development in the Green Belt	<i>Planning permission will not be granted for development in the Green Belt except where it constitutes appropriate development.</i>	Reaches 1, 2, 3, 5, 6 9, 10 and 13 through Attenborough, Erewash and Rylands pass through the green belt. Existing embankments will be raised and, amongst other proposals, lock gates to Beeston Canal will be replaced. No significant impacts are envisaged.	Neutral
	Nottingham ⁴	NE7 – Green Belt	<i>Within the Green Belt, as shown on the Proposals Map, there will be a presumption against development ...</i>	Sections of the scheme through Meadows pass through the green belt. No significant impacts are envisaged.	Neutral

Receptor	Borough	Policy Number	Description	Influence on Nottingham Trent Left Bank FAS	Overall Impact of FAS on Planning Policy
Rivers and Water-courses	Nottingham ⁴	R4 – Rivers and Watercourses	<i>States that Planning Permission for development which could adversely affect the River Trent Corridor, Nottingham Beeston Canal, River Leen Corridor and Fairham Brook Corridor will not be granted. The City Council intends to enhance the potential of these water features, from the recreational, amenity, landscape and visual point of view.</i>	Scheme runs along the River Trent Corridor but will not adversely affect it.	Neutral

Table V1.5 Relevant Local Planning Policy for Cultural Heritage and Archaeology

Receptor	Borough	Policy Number	Description	Influence on Nottingham Trent Left Bank FAS	Overall Impact of FAS on Planning Policy
Archaeology	Nottingham ⁴	BE16 – Archaeology	<p><i>Planning permission will be granted for development in the archaeological constraint areas...or other sites of known or suspected archaeological significance, provided that information derived from an archaeological 'desk-based' assessment and/or field evaluation, carried out as part of the application, shows that:</i></p> <p><i>a) no archaeological resources are likely to be affected by the development; or</i></p> <p><i>b) where archaeological resources are likely to be affected, the remains are preserved 'in-situ'; or</i></p> <p><i>c) where remains are able to be removed, they can be fully investigated, recorded and secured, as part of the development.</i></p>	<p>The scheme runs within archaeological constraint areas. (Reaches 1 and 2, Meadows) Archaeological assessment undertaken and mitigation strategy to be agreed.</p>	Neutral
Conservation Areas	Erewash ¹	EV5 – Conservation Areas – Development Control	<p><i>1. Proposals for new developments, including conversions, alterations and extensions and changes of use will only be permitted where the Borough Council is satisfied that such proposals will preserve or enhance the special character and appearance of the Conservation Area . Buildings, open spaces, trees and other features which contribute to the special character and appearance of the Conservation Area will be conserved and protected from harmful development...</i></p>	<p>The proposed location of the temporary site compound (Reach 1, Sawley) is within a Conservation Area. The present embankment within this area is to be raised. Harrington Arms and wall around 6 River View will be clad in materials agreed with the Conservation Officer.</p>	Neutral

Receptor	Borough	Policy Number	Description	Influence on Nottingham Trent Left Bank FAS	Overall Impact of FAS on Planning Policy
	Broxtowe ³	E3 – Development within Conservation Areas	<i>Planning permission will only be granted for development within or in the vicinity of a Conservation Area which preserves or enhances the character and appearance of the area having regard to its location, scale, design and materials.</i>	Reaches 7 and 8, Attenborough, Erewash and Rylands are within a Conservation Area. Detailed design and replacement planting will ensure landscape character will be preserved. Wall cladding to be agreed with Conservation Officer.	Neutral
		E4 – Demolition within Conservation Areas	<i>Conservation Area consent will not be given for a building or structure which contributes to the character or appearance of a Conservation Area. Where a building makes little or no contribution to the character or appearance of a Conservation Area, Conservation Area consent will not be granted unless the proposed demolition forms part of a scheme which would preserve or enhance the character and appearance of the area.</i>	Reaches 7 and 8, Attenborough, Erewash and Rylands are within a Conservation Area. Detailed design and replacement planting will ensure landscape character will be preserved. Proposed realignment for wall at 49 The Strand will require Conservation Area Consent.	Neutral

Receptor	Borough	Policy Number	Description	Influence on Nottingham Trent Left Bank FAS	Overall Impact of FAS on Planning Policy
Ancient Monuments	Broxtowe ³	E21 – Ancient Monuments	<i>Planning permission will not be granted for development which would detrimentally affect Scheduled Ancient Monuments shown on the Proposals Map, or their setting.</i>	Reach 7, Attenborough, Erewash and Rylands runs close to an ancient monument. Archaeological assessment undertaken and mitigation strategy to be agreed.	Neutral.

¹ Erewash Borough Local Plan July 2005

² Gedling Borough Local Plan adopted July 2005

³ Broxtowe Local Plan September 2004

⁴ Nottingham Local Plan Review Proposed Modifications 2003

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ANNEX 2
Background and Methodologies for Flora and Fauna Impact Assessment

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Legislation

The key pieces of relevant legislation for the protection of flora and fauna are listed below:

- The **European Community Directive on the Conservation of Wild Birds (Directive 79/409/EEC)** came into force in April 1982. It requires all member states to maintain populations of naturally occurring wild birds, and to preserve a sufficient diversity and area of habitats for their conservation. A list of bird species that require special conservation by means of protecting their habitat is included in Annex I to the Directive.
- EC Directive 92/43/EEC on the **Conservation of Natural Habitats and of Wild Flora and Fauna ('the Habitats Directive')** implemented in the UK by **The Conservation (Natural Habitats, & c.) Regulations 1994 (as amended)**. The Annexes to this Directive list the species and habitats identified as of 'community interest', and for which the Commission requires the establishment of a network of sites to protect examples of value at European level. These sites are referred to as Special Areas of Conservation (SACs). Individual habitats or species also receive protection. Lists of protected habitats can be found in Annex 1 and protected species in Annex 2 of the Habitats Directive. The latter is also listed in Annex 1 of the Birds Directive.
- The **Wildlife and Countryside Act 1981** (as amended) remains the primary UK mechanism for statutory site designation and protection, and the protection of individual species. Through it, areas of national or regional conservation value (in terms of their biological or geological interest) can be designated as Sites of Special Scientific Interest (SSSIs). This affords protection by way of limiting the activities which can be carried out on such sites, and imposes penalties for damage or destruction of the special interest. The *Wildlife and Countryside Act* also contains a number of schedules of species subject to varying levels of protection. The provisions of the *Wildlife and Countryside Act* are modified and in some cases replaced by subsequent legislation contained within the *Conservation (Natural Habitats & c.) Regulations 1994* and the *Countryside and Rights of Ways Act (the 'CRoW Act') 2000*. Under the *Wildlife and Countryside Act*, the Environment Agency is a Section 28G authority and must take reasonable steps consistent with the proper exercise of its functions to further, that is actively improve, the conservation and enhancement of the special features of the SSSI.
- The **Countryside and Rights of Way Act 2000** strengthens the provisions of the 1981 *Wildlife and Countryside Act* both in respect of statutory sites, such as SSSIs, and protected species. It also places a statutory obligation on local authorities and other public bodies to further conservation of biodiversity in the exercise of their functions. This provides a statutory basis to the Biodiversity Action Plan (BAP) process which begun with the Government's publication of the UK Biodiversity Action Plan in 1994. Practical measures to safeguard biodiversity are described in the UK Biodiversity Action Plan. Although the UK BAP does not give any statutory legal protection, the presence of a priority habitat and/or species

would be a planning consideration. However, many of the species listed are statutorily protected under UK or European legislation.

The key legislation for individual species that is relevant to this scheme is summarised in Table V2.1.

Table V2.1 Protected Species Legislation

Species	Key legal protection
Birds	All wild birds, their nests and eggs are, with few exceptions, fully protected by law. In addition, over eighty species or groups of species are listed under Schedule 1 of the <i>Wildlife and Countryside Act</i> . These species are specially protected by increased penalties and cannot be intentionally disturbed when nesting, with additional protection also provided to species listed in Annex IV of the <i>Habitats Directive</i> .
Badgers (<i>Meles meles</i>)	Badgers are the subject of separate legislation contained within the <i>Protection of Badgers Act 1992</i> . This means that it is unlawful to knowingly kill, capture, disturb or injure any individual or intentionally damage, destroy or obstruct an area used for breeding, resting or sheltering badgers. A NE licence is required for heavy machinery work within 30m, light machinery within 20m and hand digging within 10m of a badger sett.
Bats	All bat species are protected in accordance with Schedule 5 of the <i>Wildlife and Countryside Act (1981, as amended)</i> . This protection extends to both species and roost sites. Bat roosts are protected at all times of the year regardless of whether bats are present at the time. In addition, all bats are listed under Annex II of the European Unions <i>Habitats Directive</i> . Bat species have been identified as Biodiversity Action Plan species.
Otter (<i>Lutra lutra</i>)	The otter is fully protected under the <i>Wildlife and Countryside Act</i> making it an offence to damage, destroy or obstruct access to any structure or place which is used by otters. Otter is also listed under Annexes II and IV (a) of the European Union <i>Habitat Directive</i> .
Water vole (<i>Arvicola terrestris</i>)	The water vole is fully protected under the <i>Wildlife and Countryside Act</i> making it an offence to kill or injure a water vole. It is also an offence to damage, destroy or obstruct access to any structure or place which is used by watervoles.
Reptiles	All native reptiles are listed on Schedule 5 of the <i>Wildlife and Countryside Act</i> and are afforded different levels of protection. For the four most commonly occurring species (adder <i>Vipera berus</i> , grass snake <i>Natrix natrix</i> , slow-worm <i>Anguis fragilis</i> and common lizard <i>Lacerta vivipera</i>), the protection extends to killing and injury although does not include habitat protection.
Great crested newt (<i>Triturus cristatus</i>)	Protected under the <i>Wildlife and Countryside Act</i> and under Annex II and IV(a) of the European Union's <i>Habitats Directive</i> . Under the legal protection afforded great crested newt it is an offence to knowingly kill, harm, injure or disturb a great crested newt or its habitat. It is also an offence to damage, destroy or obstruct access to any structure or place used for shelter protection or breeding by the species; or to disturb it while it is occupying such a structure or place. Where a project or plan has been identified as impacting on great crested newt, the appropriate authority (in England, NE) can issue licences which make otherwise illegal actions lawful. Such licences can, however, only be issued for "preserving public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment." Likewise, licenses for species such as great crested newt can only be issued if there is no alternative solution.

Field Survey Methodologies

Detailed field surveys were undertaken between January and September 2006 and updated in May/June 2008 (see Table 7.1 in main report for dates). Figures V2.1 to V2.5 show the survey location areas.

Extended Phase 1 Survey

A walkover survey was carried out to map habitats and identify any potential protected species habitat that had not been previously identified (Institute of Environmental Assessment 1995).

Hedgerows

Hedgerows around Attenborough village green were surveyed. The methodology followed the simplified points-based system used to assess hedgerows under the biological criteria of the Hedgerow Regulations 1997. Within each 100m section (or hedgerows less than 100m long) the middle 30m was surveyed. For longer hedgerows two or more 30m sections were surveyed. For each hedgerow (or sub-section), points were assigned according to how many qualifying features were recorded. Each hedgerow was thus assigned an overall score, which would qualify it as 'important' or 'not important' under the Hedgerow Regulations 1997.

The UK Habitat Action Plan defines a species-rich hedge as one which, in an average 30m length, contains five or more native woody species. Recently planted species-rich hedgerows are included. Hedgerows which contain fewer woody species but a rich ground flora of herbaceous plants should also be included, but practical criteria to identify them have yet to be confirmed. For the purposes of this survey, therefore, a hedgerow qualifies as species-rich under the terms of the UK BAP if it contains five or more native woody species. The methodology to assess this was, therefore, the same as the Hedgerow Regulations survey.

Botanical

Areas were identified for detailed botanical survey through desk study and the extended Phase 1 habitat survey.

Where it was considered that the stand could be assigned to a named National Vegetation Classification (NVC) community, it was mapped as accurately as possible using a combination of aerial photographs and on-ground reference points. It was sampled using a methodology adapted from standard NVC protocol (JNCC 2006). Data was entered in the VESPAN III Record routine and imported into MATCH II, which is a computer programme to aid the assignment of vegetation data to the communities and sub-communities of the NVC. In some cases, it was possible to assign stands to sub-community level but in others, only community level could be assigned with confidence. Possible matches suggested by MATCH were 'ground-truthed' by the lead surveyor's experience of NVC survey in order to reach a satisfactory decision.

All other stands were sampled by walking a transect and noting species and abundance within a 1m radius of the surveyor at approximately 10 equidistance sample stops.

Arboricultural Survey

A walkover survey was undertaken by an experienced arboriculturist. Trees within the proposed working area of the scheme were examined in May/June 2008. The trees were assessed on their quality, condition and wildlife value and given grades between 1 and 4, where 1 is the highest and 4 the lowest.

Breeding Birds

Three surveys were conducted between April and June 2006 to assess breeding bird activity at the site. Each consisted of an evening/dusk survey followed by a dawn survey the following morning.

On each survey, an experienced ornithologist walked the entire length of the survey length, except for a short section of private gardens adjacent to Works Pond. The locations and numbers of all bird species present were recorded.

All recording was done from the reserve side of the railway line. The birds on the western side are considered to be largely incidental to this survey, except where territories clearly included both sides of the railway line.

This methodology was employed to ensure that the vast majority of species present at the site were recorded over the three visits. Certain species that may be using the area as part of a larger territory, for example nocturnal species such as owls, may be missed.

Wintering Birds

Six surveys were carried out between January and March 2006 in Attenborough SSSI. Each comprised two days, with half of the reserve covered on each day. The whole survey was conducted from the network of footpaths around the reserve. The surveys continued until dusk or the site was resurveyed at night, to establish if there was a redistribution of wildfowl utilising areas that were not depleted of food during the day.

On each survey, the total number of all waterfowl species was recorded for each lake as a whole. Note was specifically made of any waterfowl in the proximity of the railway line and also of the activity of each species (feeding, loafing or sleeping).

The survey did not attempt to count non-waterfowl species, which are not relevant to the current survey, although species that are notable or otherwise relevant are summarised.

Badgers

During the extended Phase 1 surveys all signs of badgers were searched for:

- setts
- latrines/dung pits
- badger hairs
- badger foraging pathways

- badger scrapes
- footprints.

Bats

An initial walkover of the sites identified for survey was carried out in July 2006. The purpose was to identify any trees or other structure which would require an emergence watch or further survey.

Following this walkover, a programme of evening surveys was determined, including both emergence watches and transects with stationary points.

Emergence watches were carried out in 2006-2007 on selected structures and all standard trees with bat roost potential. Commencing at sunset, either one or two surveyors equipped with bat detectors remained at the selected station for at least one hour. All bats seen or heard during this time, either emerging from the tree, commuting past or feeding around it, were recorded and mapped with the time of registration.

For tree groups or woodland blocks, emergence watches were carried out by up to four surveyors positioned at suitable locations around the site. All bat activity near, around or over the site was recorded.

Transects were carried out on all but one site. This involved walking each section, where access allowed, and stopping at regular intervals to record for five minutes.

In 2008 during the Phase 1 Habitat Survey ecologists examined the trees to be affected by the works for their potential to provide bat roosting habitat and carried out additional emergence/swarming update surveys.

Water Voles and Otters

Water vole surveys were undertaken in accordance with the methodology outlined in *Water Vole Conservation Handbook* (Strachan, 2006). All waterbodies were searched for potential otter signs, including footprints, spraints, feeding remains, runs into/out of the water, laying up sites and holts.

Otter surveys were undertaken throughout the extended Phase 1 survey area. Detailed water vole surveys were confined to 50m of the construction areas.

Amphibians

Four surveys were undertaken between April and June 2006, with at least two between mid April to mid May 2006. All potential newt breeding habitats within 250 to 500m of the proposed defences were surveyed. The surrounding habitat was also assessed for connectivity and suitability for newt dispersal and potential metapopulations.

The ponds were subject to torch surveys, egg searches and refuge searches following standard methodologies (English Nature 2001).

Reptiles

Two methodologies were employed, namely direct observation and placing of artificial refugia.

Direct Observation

The area to be impacted and adjacent areas were walked slowly, treading lightly, with the sun behind the surveyor. An area at least 3 to 4m in front was paid particular attention to for potential basking spots.

'Tinning'

Refugia (carpet tiles) were placed at intervals along the impacted and adjacent areas. Refugia were approximately 0.5m² in area. Between five and ten refuges per hectare were placed. Five visits in suitable weather conditions were made.

Invertebrates

The sites for detailed survey were identified after a walkover survey by an experienced entomologist. The habitat was classified according to the criteria listed in Table V2.2. All the sites with high potential, and a representative sample of the medium quality sites, were selected for detailed field survey. No sites were assessed to be of excellent potential.

At each site for detailed survey, water and pitfall traps were set. An hour of active searching was undertaken, which involved direct observation, sweep netting, hand beating and sorting of litter.

Crayfish within Clifton ponds and adjacent waterbodies were surveyed by Nottinghamshire Wildlife Trust using systematic checks of the banks. Kick sampling for 45 minutes was taken of each sample site.

Table V2.2 Criteria used to Assess the Likely Quality of Semi-Natural Habitats for Important Invertebrates

Category	Definition
Negligible	Semi-natural habitat missing to very small in extent and key-species absent
Low	Semi-natural habitats present but the micro-habitats specifically associated with important invertebrates missing or limited in extent.
Medium	Semi-natural habitats present with at least some of the micro-habitats associated with important invertebrates present.
High	Semi-natural habitats present with most of the key micro-habitats associated with important invertebrates in that habitat present.
Excellent	Semi-natural habitats present with extensive areas of key micro-habitats with a range of variation within these micro-habitats.

Impact Assessment

The value or potential value of the ecological resource was determined within a geographical context; refer to Table V2.3. The exception was for invertebrates where a set of criteria based on that proposed by Colin Platt Associates (2006) was used; refer to Table V2.4. It is modified slightly to restrict the criteria for the individual species to those based on national criteria only rather than any regional criteria.

Table V2.3 Valuation of Ecological Receptors

Level of Value	Examples
International	<ul style="list-style-type: none"> • An internationally designated site or candidate site (e.g. SPA, pSPA, SAC, cSAC, pSAC, Ramsar site, Biogenetic Reserve) or an area which the country agency has determined meets the published selection criteria for such designation, irrespective of whether or not it has yet been notified. • A viable area of habitat type listed in Annex 1 of the Habitats Directive, or smaller areas of such habitat which are essential to maintain the viability of a larger whole. • Any regular occurring population of an internationally important species, which is threatened or rare in the UK, i.e. it is a UK Red Data Book species or listed as occurring in 15 or fewer 10km squares in the UK (categories 1 and 2 in the UK BAP) or of uncertain conservation status or of global conservation concern in the UK BAP. • A regularly occurring, nationally significant population/number of any internationally important species.
National (e.g. England)	<ul style="list-style-type: none"> • A nationally designated site (e.g. SSSI, NNR, Marine Nature Reserve) or a discrete area, which the country conservation agency has determined meets the published selection criteria for national designation (e.g. SSSI selection guidelines) irrespective of whether or not it has yet been notified. • A viable area of a priority habitat identified in the UK BAP, or of smaller areas of such habitat which are essential to maintain the viability of a larger whole. • Any regularly occurring population of a nationally important species which is threatened or rare in the region or county (see local BAP). • A regularly occurring, regionally or county significant population/number of any nationally important species. • A feature identified as of critical importance in the UK BAP.
Regional	<ul style="list-style-type: none"> • Viable areas of key habitat identified in the Regional BAP or smaller area of such habitat which are essential to maintain the viability of a larger whole. • Viable areas of key habitat identified as being of Regional value in the appropriate Natural Area profile. • Any regularly occurring, locally significant population of a species listed as being nationally scarce, which occurs in 16-100 10km squares in the UK or in a Regional BAP or relevant Natural Area on account of its regional rarity or localisation. • A regularly occurring, locally significant number of a regionally important species. • Sites which exceed the County-level designations but fall short of SSSI selection guidelines, where these occur.
County	<ul style="list-style-type: none"> • Semi-natural ancient woodland greater than 0.25 ha. • County sites and other sites which the designating authority has determined meet the published ecological selection criteria for designation, including Local Nature Reserves selected on County ecological criteria. • A viable area of habitat identified in County BAP. • Any regularly occurring, locally significant population of a species which is listed in a County "Red Data Book" or BAP on account of its regional rarity or localisation. • A regularly occurring, locally significant number of a County important species.

Level of Value	Examples
District (including City/Borough)	<ul style="list-style-type: none"> Semi-natural ancient woodland smaller than 0.25 ha. Areas of habitat identified in a sub-County BAP. District sites that the designating authority has determined meet the published ecological selection criteria for designation, including Local Nature Reserve selected on District criteria. Sites/features that are scarce within the District or which appreciably enrich the District habitat resource. A diverse and/or ecologically valuable hedgerow network. A population of a species that is listed in a District BAP because of its rarity in the locality because of its regional rarity or localisation. A regularly occurring, locally significant number of a District important species during a critical phase of its life cycle.
Local	<ul style="list-style-type: none"> Areas of habitat considered to appreciably enrich the habitat resource within the context of the Parish or neighbourhood. Local Nature Reserves selected on Parish ecological criteria.

Table V2.4 Criteria Used to Define Significance of Invertebrate Habitats

Significance	Description	Minimum qualifying criteria*
International	European important site.	Internationally important invertebrate populations or RDBI species or containing any habitats or species that are threatened or rare at an European level.
National	UK important site.	Achieving SSSI invertebrate criteria or containing RDB2 or containing viable populations of RDB3 species or containing viable populations of species protected under UK legislation or containing habitats that are threatened or rare nationally.
Regional	Site with populations of invertebrates or invertebrate habitats considered scarce.	Habitat that is scarce or threatened in the region or which has, or is reasonably expected to have the presence of an assemblage of invertebrates including at least ten Nationally Notable species.
County	Site with populations of invertebrates or invertebrate habitats considered scarce or rare or threatened in the county in question.	Habitat that is scarce or threatened in county and/or which contains or is reasonably expected to contain an assemblage of invertebrates that includes viable populations of at least five Nationally Notable species.
District	Site with population of invertebrates or invertebrate habitats considered scarce or rare or threatened in the administrative District.	A rather vague definition of habitats falling below county significance level but which may be of greater significance than merely local. They include sites for which Nationally Notable species in the range from 1 to 4 examples are reasonably expected but not yet necessarily recorded and where this omission is considered likely to be partly due to under-recording.
Local	Site with populations of invertebrates or invertebrate habitats considered scarce or rare or threatened in the affected and neighbouring Parishes.	Habitats or species unique or of some other significance within the local area.
Low Significance	-	Although almost no area is completely without significance these are the areas with nothing more than expected "background" population of common species and the occasional Nationally Notable species.

* RDB = Red Data Book

Table V2.5 Magnitude of Change

Magnitude of Change				
Examples	High	Medium	Low	Very Low
Extent	75% of area or receptor affected	25-75% of area or receptor affected	5 to 25% of area or receptor affected	>0, but <5% of area or receptor affected
Integrity	Adverse affect on integrity of site, in terms of coherence of ecological structure or function	Significant impacts on a site's ecological objectives	Neither integrity nor significant impacts affected, but minor adverse effects	No observable impact

Table V2.6 Guide to Determination of Ecological Impact Assessment*

Magnitude of Change (see Table V2.5)	Geographical value of resource					
	International	National	Regional	County	District	Local
High	Significant at International level (major)	Significant at National level (major)	Significant at Regional level (major)	Significant at County level (major)	Significant at District level (moderate)	Significant at Local level (moderate)
Medium	Significant at International level (major)	Significant at National level (major)	Significant at Regional level (moderate)	Significant at County level (moderate)	Significant at District level (minor)	Significant at Local level (minor)
Low	Significant at International level (moderate)	Significant at National level (moderate)	Not significant at Regional level (minor)	Not significant at County level (minor)	Not significant at District level (none)	Not significant at Local level (none)
Very Low	Not significant at International level (minor)	Not significant at National level (minor)	Not significant at Regional level (none)	Not significant at County level (none)	Not significant at District level (none)	Not significant at Local level (none)
No Change	None	None	None	None	None	None

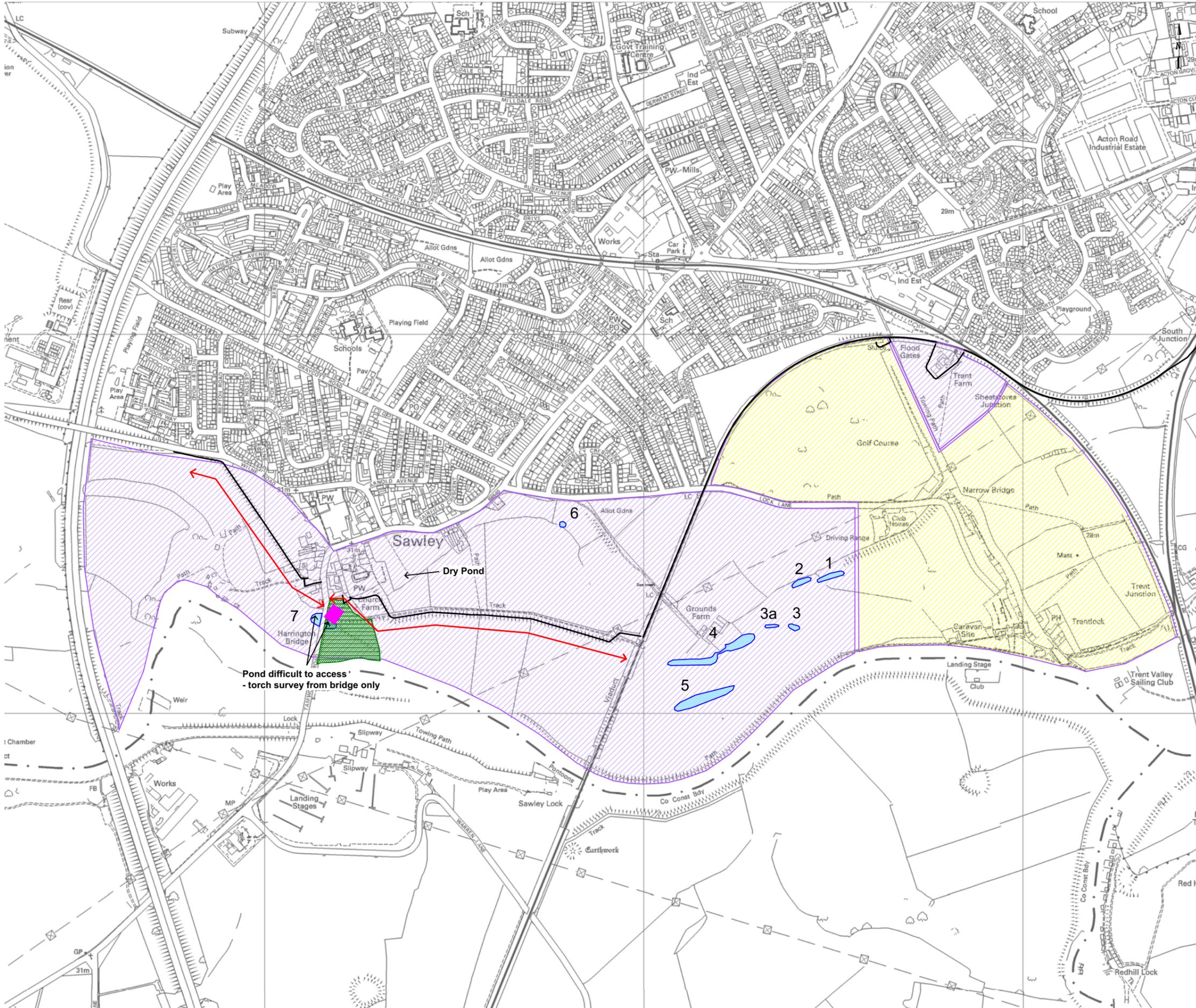
*The assessment of significance (in brackets) moderates the EcIA assessment to the standard determination of Impact Assessment given in Table 6.1, for comparative purposes across all the environmental receptors.

The value of the receptor (Table V2.3) and the magnitude of the change arising from the activity (Table V2.5) are the two principal considerations in determining the significance of the potential impact; refer to Table V2.6.

The degree of confidence in the predictions is based on the following scale:

- Certain: probability estimated at 95% chance or higher.
- Probable: probability estimated above 50% but below 95%.
- Unlikely: probability estimated at above 5% but less than 50%.
- Extremely unlikely: probability estimated at less than 5%.

The duration of the impacts is as Table 6.2 in the main report.



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		Checked	CJ	Date:	April 07	
		Reviewed	ES	Date:	April 07	
Rev.	Nature of Revision	Drawn	Chkd.	Rvwd.	Appd.	Date
1	New defence line	NG	CJ	ES	ES	09/08

SURVEY KEY

-  Extended Phase 1 & Land-use Survey including badger, otter, water vole and bat roosts
-  Phase 1 & Land-use Survey from Public Rights of Way
-  Surveyed ponds (amphibians)
-  Detailed Botanical Survey
-  Detailed invertebrate survey
-  Defence
-  Bat Survey

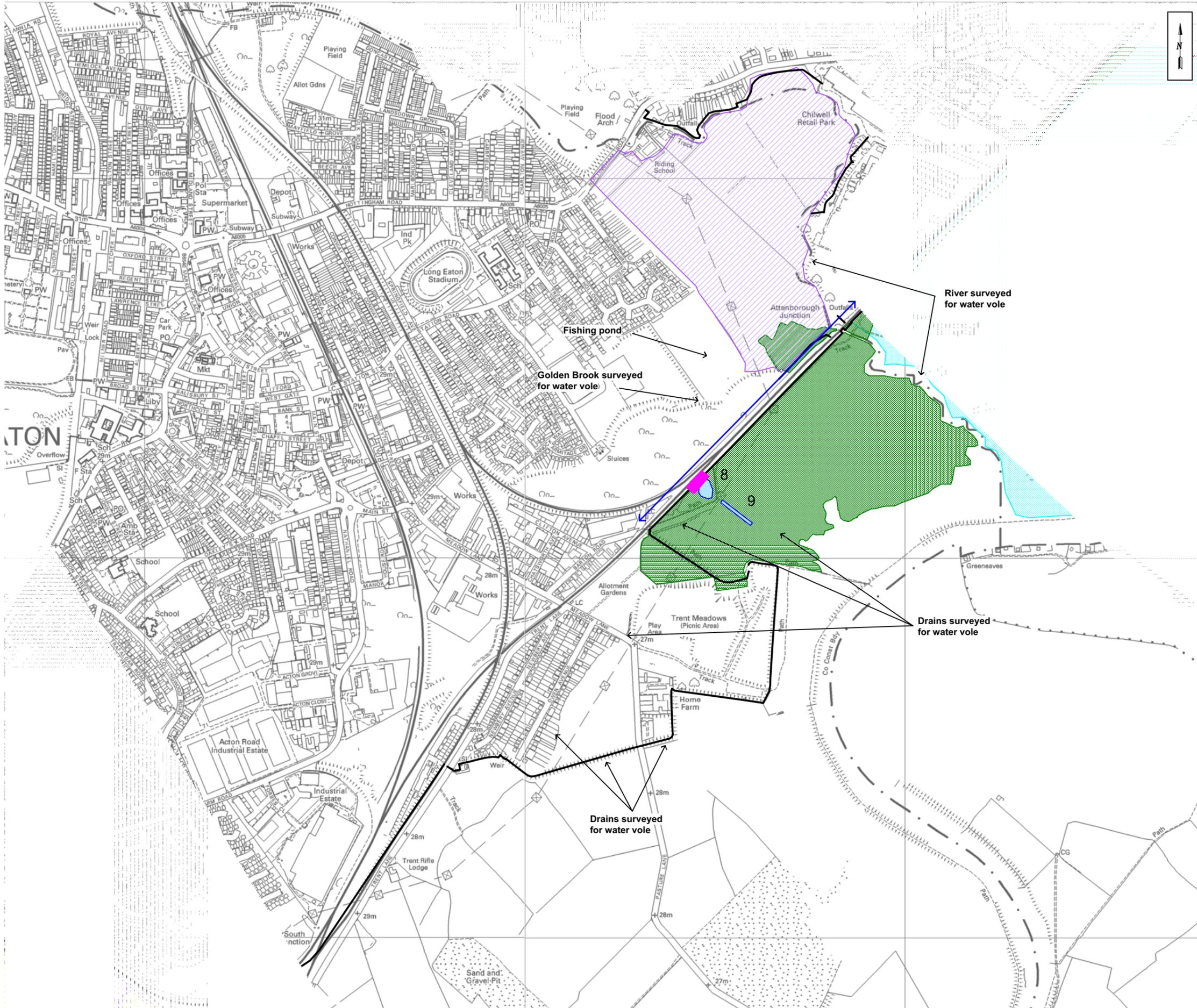
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Specialist Ecological Survey Locations
Sawley



Contract no. 108806	Approved: ES	Date: Oct 08
Scale: 1:5,000 (at A1)	Drawing no. Figure V2.1	

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		Checked	CJ	Date:	April 07	
		Reviewed	ES	Date:	April 07	
Rev.	Nature of Revision	Drawn	Chkd.	Rvwd.	Appd.	Date
1	New defence line	NG	CJ	ES	ES	09/08

SURVEY KEY

- Extended Phase 1 & land-use survey including badger, otter, water vole and bat roosts (*)
- Phase 1 & land-use survey from Public Rights of Way
- Surveyed ponds (amphibians)
- Detailed Botanical Survey
- Detailed invertebrate survey
- Defence
- Bat survey
- Breeding bird survey
- Wintering bird survey

Note
 * = All areas within 30m of proposed works subject to extended phase 1 survey. Only additional areas surveyed.
 All water courses within 70m of proposed works surveyed for otters.

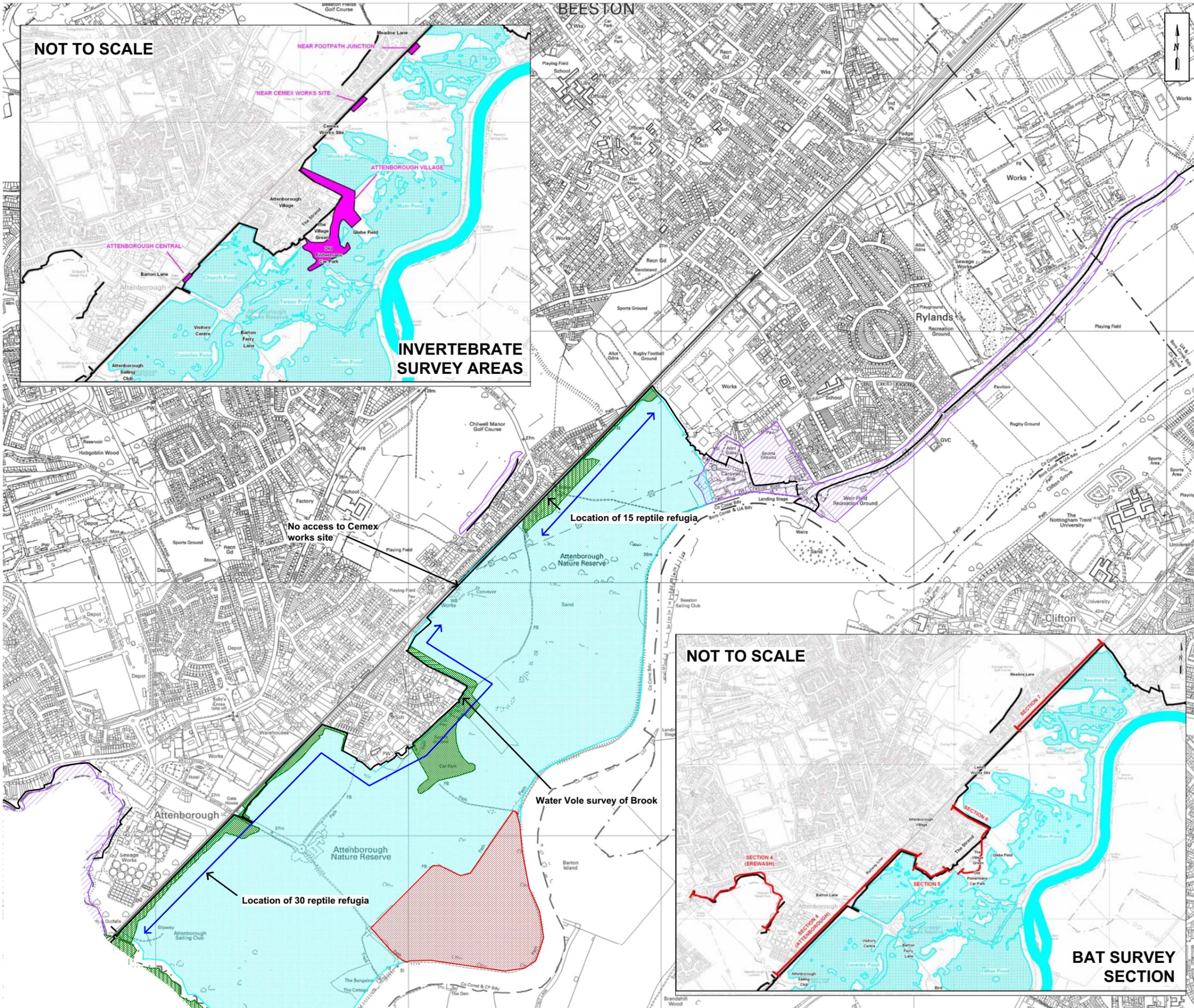
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Specialist Ecological Survey Locations
 Trent Meadows



Contract no. 108806	Approved: ES	Date: Oct 08
Scale: 1:5,000 (at A1)	Drawing no. Figure V2.2	

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NOT TO SCALE

INVERTEBRATE SURVEY AREAS

NOT TO SCALE

BAT SURVEY SECTION

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		Reviewed	ES	Date:	April 07	
Rev.	Nature of Revision	Drawn	Chkd.	Rvwd.	Appd.	Date
1	New defence line	NG	CJ	ES	ES	09/08

SURVEY KEY

- Extended Phase 1 & land-use survey including badger, otter, water vole and bat roosts (*)
- Phase 1 & land-use survey from Public Rights of Way
- Surveyed ponds (amphibians)
- Detailed botanical survey
- Detailed invertebrate survey
- Defence
- Bat survey
- Breeding bird survey
- Wintering bird survey
- Crayfish Survey

Note
 * = All areas within 30m of proposed works subject to extended phase 1 survey. Only additional areas surveyed are shown.
 All water courses within 70m of proposed works surveyed for otters.

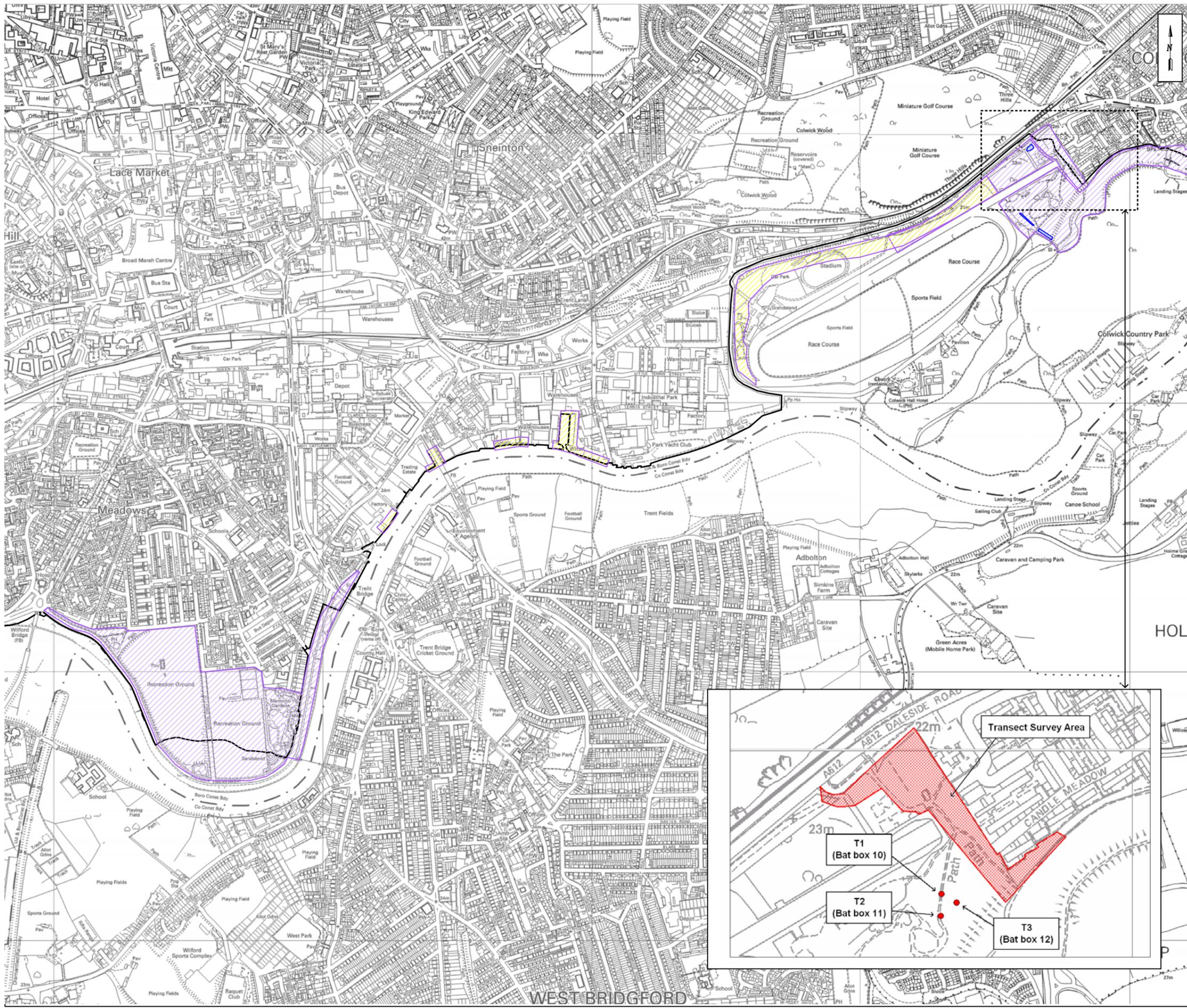
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Specialist Ecological Survey Locations
 Attenborough, Erewash & Rylands



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Scale: 1:7,500 (at A1)	Drawing no. Figure V2.3	

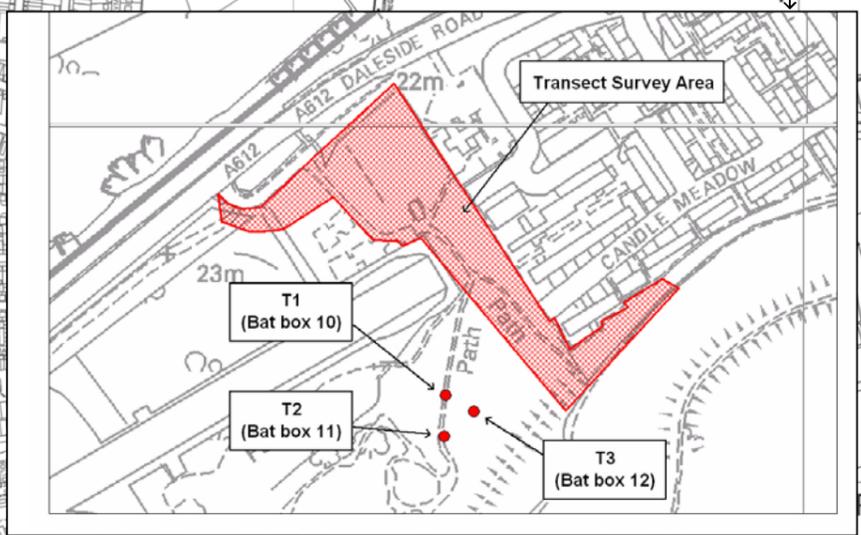
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		Reviewed	ES	Date:	April 07	
Rev.	Nature of Revision	Drawn	Chkd.	Rvwd.	Appd.	Date
1	New defence line	NG	CJ	ES	ES	09/08

SURVEY KEY

-  Extended Phase 1 & land-use survey including badger, otter, water vole and bat roosts
-  Phase 1 & land-use survey from Public Rights of Way
-  Surveyed ponds (amphibians)
-  Defence
-  Bat Survey



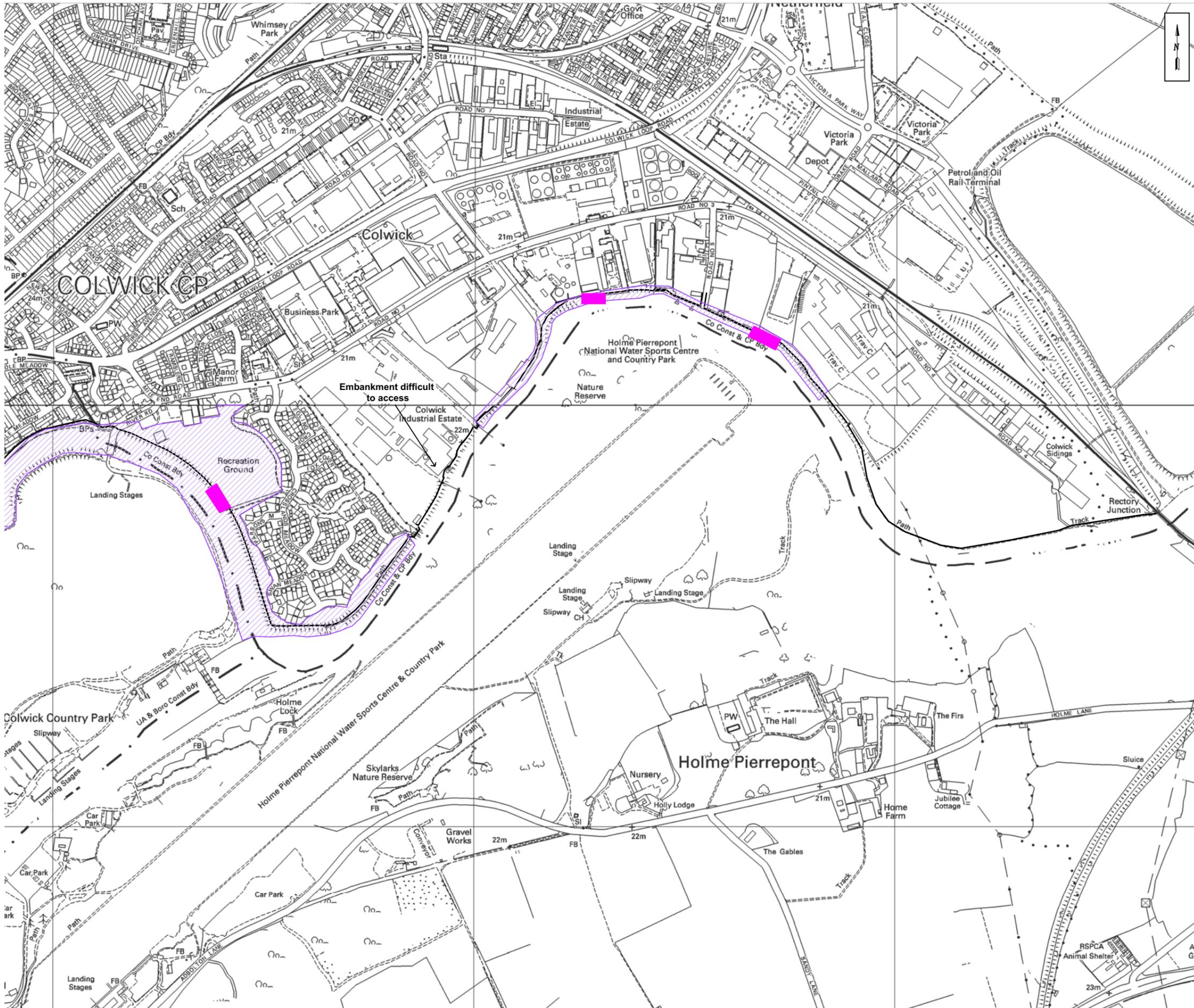
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Specialist Ecological Survey Locations
Meadows and Colwick Country Park



Contract no. 108806	Approved: ES	Date: Oct 08
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		Checked	CJ	Date:	April 07	
		Reviewed	ES	Date:	April 07	
Rev.	Nature of Revision	Drawn	Chkd.	Rvwd.	Appd.	Date
1	New defence line	NG	CJ	ES	ES	09/08

SURVEY KEY

-  Extended Phase 1 & land-use survey including badger, otter, water vole and bat roosts
-  Detailed invertebrate survey
-  Defence

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Specialist Ecological Survey Locations
Colwick



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ANNEX 3
Methodology for Landscape and Visual Amenity Assessment

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Annex 3 Methodology for Landscape and Visual Amenity Assessment

Introduction

The landscape and visual impact assessment was based on the second edition of the 'Guidelines for Landscape and Visual Impact Assessment' (GLVIA) published by the Landscape Institute and the Institute of Environmental Management and Assessment (IEMA) in March 2002.

The GLVIA states that *'landscape and visual effects are independent but related issues; landscape effects are changes in the landscape, its character and quality, while visual effects relate to the appearance of these changes and the resulting effect on visual amenity'*.

The method by which landscape and visual sensitivity is determined, together with the magnitude of change, and the subsequent evaluation of significance to determine the level of effect is summarised later in this annex.

Relevant Terminology

The term '**landscape**' encompasses the whole of our external environment, whether within villages, towns, cities or the countryside. A landscape is the human perception of the relationship between landform, vegetation and the built environment, such as the pattern of buildings, streets, open spaces and trees. The dictionary defines '**visual**' as *'capable of being seen; visible'*.

There are a number of terms that are frequently used in this landscape and visual impact assessment. These terms are used to define and assess the existing visual and landscape character of the area. Some of the frequently used terms include:

- **Landscape Elements:** These are the physical components within the landscape. The Landscape Institute defines them as *'the individual elements that make up the landscape including prominent or eye-catching features such as hills, valleys, woods, trees and hedges, ponds, buildings and roads'*.
- **Landscape Character:** The combination of landscape elements that make one area distinctive from another. The GLVIA defines landscape character as *'the distinct and recognisable pattern of elements that occurs consistently in a particular type of landscape, and how this is perceived by people. It reflects particular combinations of geology, landform, soils, vegetation, land use and human settlement'*. The landscape character creates a particular sense of place.
- **Landscape Designation:** These are provisions to identify and protect areas of high landscape character or visual quality. Areas deemed to be of national importance are identified and protected by law, and are known as **Statutory Landscape Designations**. Areas deemed to be of regional or local importance are identified and protected at a local level, usually by the Local Planning Authority, and are known as **Non-Statutory Landscape Designations**.
- **Landscape Quality:** The state of repair, or the condition, of a particular landscape and the elements within that landscape.
- **Landscape Value:** The relative value or importance attached to a landscape, often as a basis for a landscape designation, because of its

quality. The human perception of a landscape, such as scenic beauty, tranquillity or wildness, cultural associations or other conservation issues.

- **Landscape Capacity:** The capacity of a particular landscape to absorb change without unacceptable adverse effects on its character. Capacity is likely to vary according to the type and nature of proposed change.
- **Landscape Sensitivity:** The extent to which a landscape can accept change without unacceptable adverse effects on its character.
- **Landscape Effects:** The GLVIA defines '**landscape effects**' as the potential or predicted '*change in the elements, characteristics, character and qualities of the landscape as a result of development*'. These may be positive or adverse effects on the existing landscape character. The landscape effects may also be either permanent or temporary.
- **Residual Impacts:** Residual impacts are those impacts which remain after all practicable mitigation and reinstatement proposals have successfully established.
- **Visual Amenity:** The value of a particular area or view in terms of what is seen.
- **Visual Receptors:** People who could view the proposed development. The main visual receptors include residents, tourists, road users and recreational users of an area. People at their place of work may also be affected to a lesser extent, as they are considered to have their attention focused on their work or activity rather than the surrounding views.
- **Visual Sensitivity:** The sensitivity of a visual receptor to the views around them.
- **Visual Effect:** The GLVIA defines '**visual effects**' as '*the change in the appearance of the landscape as a result of development. This can be positive (i.e. beneficial or an improvement) or adverse (i.e. adverse or a detraction)*'.

The landscape impact of the proposed development was determined using factors such as the sensitivity placed on a particular landscape and the magnitude of change likely to result from the implementation of the scheme. The **sensitivity** was determined by an assessment of the existing landscape, in terms of its quality, value and capacity, and is classified as *high, medium* or *low*. This classification is based on professional judgement or by reference to national and local landscape designations.

Visual effects are recognised by the Landscape Institute as an independent but related issue to landscape effects. These relate to the change in the appearance of the landscape as a result of the development. Visual receptors may be classified as being of *high, medium* or *low sensitivity*. This classification is based on an assessment by landscape professionals.

The **magnitude of change** likely to result from the proposed development is classified in this assessment as *high, medium, low* or *negligible*. Some effects may be quantifiable, such as the length of hedgerow to be lost, however, the magnitude of change is generally based on an assessment by landscape professionals of the degree of change to the existing landscape resource.

The **significance of landscape and visual effects** is assessed by taking into consideration sensitivity against the predicted magnitude of change. The evaluation of significance determines the **level of effect**, which is classified as ‘*substantial*’, ‘*moderate*’, ‘*slight*’ or ‘*negligible*’. Within this assessment, the level of landscape and visual effects is considered separately.

Significance Evaluation Methodology

Landscape Evaluation Methodology

The **sensitivity** of the area to change was determined by an assessment of the existing landscape, and is classified as *high*, *medium* or *low*. The definitions of these sensitivity categories are summarised in Table V3.1.

Table V3.1 Summary of Sensitive Landscape Resources

Sensitivity	Comments / Examples
High	Designated landscapes (e.g. Registered Parks and Gardens or Conservation Areas) and non-designated landscapes in good condition with a distinctive positive character and/or valued elements. These areas have a lower capacity to accommodate change and include private residential gardens.
Medium	Non-designated landscapes with less defined character in reasonable condition with some valued elements, but exhibiting signs or erosion or dilution of character as a result of some intrusive elements. There would be some tolerance of change subject to sensitive design and mitigation.
Low	Non-designated landscapes with poorly defined character that may have some features of note. Landscapes in a poor condition of repair which may have occasional valued elements. Relatively unimportant landscapes tolerant of substantial change.

The **magnitude of change** likely to result from the proposed development is classified in this assessment as *high*, *medium*, *low* or *negligible*. The definitions of these magnitude categories are summarised in Table V3.2.

Table V3.2 Summary of Magnitude of Landscape Effects

Magnitude of Change	Predicted Landscape Effects
High	Total loss or major alteration to the key elements of the landscape. These changes may occur over an extensive area or represent a localised change to notable features that would lead to a change in the overall landscape quality and character.
Medium	Partial loss or alteration to key characteristics of the landscape to partially change the overall landscape quality and character.
Low	Minor loss or alteration to key elements of the existing environment but the overall landscape character will remain the same.
Negligible	Very minor loss or alteration to one or more key features of the landscape. Changes will be barely noticeable.

The evaluation of significance considers the **level of effect** resulting from the combination of sensitivity against the predicted magnitude of change. This results in four classifications of levels of effect, defined in this assessment as ‘*substantial*’, ‘*moderate*’, ‘*slight*’ or ‘*negligible*’. The evaluation of the level of landscape effects is summarised in Table V3.3.

Table V3.3 Evaluation of Significance of Landscape Effects

Magnitude of Change	Sensitivity		
	High	Medium	Low
High	Substantial	Moderate/Substantial	Moderate
Medium	Moderate/Substantial	Moderate	Slight/Moderate
Low	Moderate	Slight/Moderate	Slight
Negligible	Slight	Slight/Negligible	Negligible

Key:		Significant Effect		Not Significant Effect
-------------	--	--------------------	--	------------------------

Visual Impact Significance Evaluation Methodology

The **sensitivity** of a visual receptor was determined by an assessment of the existing views, and is classified as *high*, *medium* or *low*. The definitions of these sensitivity categories are summarised in Table V3.4

Table V3.4 Summary of Visual Receptor Sensitivity

Sensitivity	Comments / Examples
High	Residents in individual properties and communities
Medium	Recreational users of open spaces, footpaths and landscapes valued at a regional or local level. These views will be experienced by walkers and cyclists.
Low	People travelling through or past the affected landscape in cars, on trains or other transport routes and people at their places of work.

The **magnitude of change** likely to result from the proposed development is classified in this assessment as *high, medium, low or negligible*. The definitions of these magnitude categories are summarised in Table V3.5.

Table V3.5 Summary of Magnitude of Visual Effects

Magnitude of Visual Change	Predicted Landscape Effects
High	A substantial change to, or an obstruction of, a view that is experienced by a large number of people. The addition of a prominent feature that is directly visible, usually in the foreground.
Medium	A change to, or partial view of, a new element within the view that may be readily noticed. The addition of a new feature that may be partly screened or viewed intermittently, usually in the middle ground.
Low	A small change affecting a limited part of the view that may be obliquely viewed or partly screened, and usually in the background. This may include views from moving vehicular transport.
Negligible	A small or intermittent change to an existing view. The addition of a feature that is viewed obliquely, mostly screened and/or appearing in the distant background.

Evaluation of Visual Significance

As with the landscape assessment, the visual sensitivity and the magnitude of change were considered in a matrix table to evaluate the **level of visual effects**. This results in four classifications of levels of effect, defined in this assessment as ‘*substantial*’, ‘*moderate*’, ‘*slight*’ or ‘*negligible*’. The means of evaluating the level of visual effects of the proposed development is summarised in Table V3.3.

Residual Impacts

To determine the level of landscape and visual effect on the completion on reinstatement and mitigation works the re-evaluation of landscape and visual significance is conducted. The re-evaluation assumes successful reinstatement and mitigation measures, which can lead to defining a different level of significance for the residual impacts.

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ANNEX 4
Figures

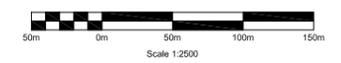
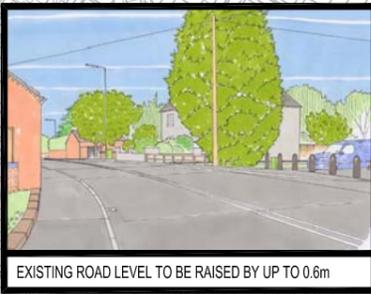
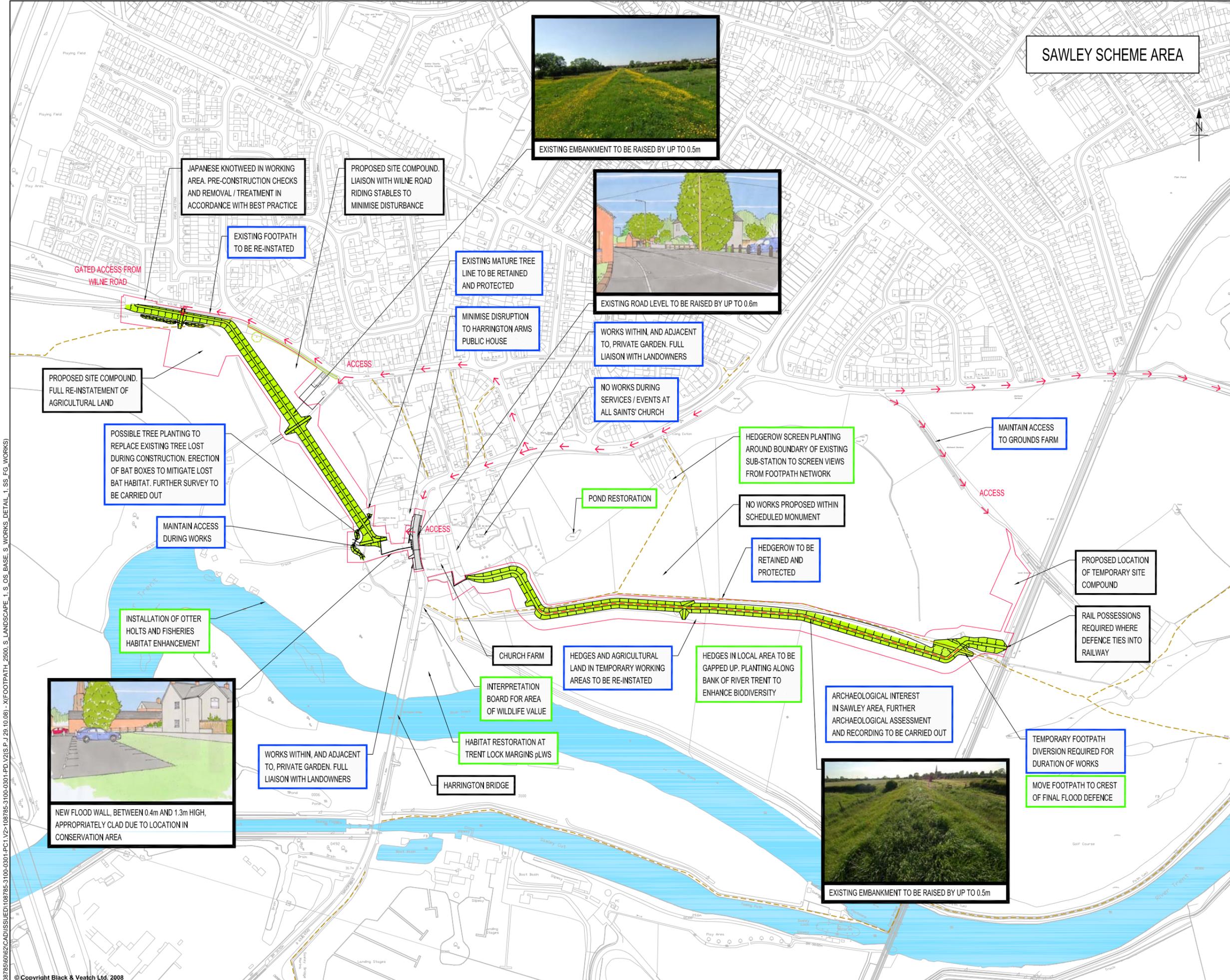
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- LEGEND**
- MITIGATION OR COMPENSATORY HABITAT
 - PROPOSED ENHANCEMENT
 - NOTE
 - PROPOSED SITE BOUNDARY
 - PROPOSED REINSTATEMENT GRASS SEEDING
 - PROPOSED FOOTPATH ENHANCEMENT WORKS
 - EXISTING PUBLIC RIGHTS OF WAY

SAWLEY SCHEME AREA



PD	SPJ	EAS	SGB	OCT.08	UPDATED ENVIRONMENTAL STATEMENT
PC	SPJ	EAS	SGB	OCT.08	UPDATED ENVIRONMENTAL STATEMENT
Rev	Drawn	Checked	Reviewed	Date	Description

Designed by: EAS Date: JAN.07
 Drawn by: SPJ Date: JAN.07
 Checked by: EAS Date: FEB.07
 Reviewed by: EAS Date: FEB.07



Client drawing No. Revision



Project
NOTTINGHAM TRENT LEFT BANK FLOOD ALLEVIATION SCHEME

Drawing title
FIGURE V4.1 SCHEME OVERVIEW SHEET 1 OF 12

Approved by: EAST Date: OCT.08
 Drawing scale: 1:2500 Sheet size: A1

Drawing No. 108785 - 3100 - 0301 Revision PD

108785/60/62/CAD/ISSUED/108785-3100-0301-PC1/V2-108785-3100-0301-PD/V2(S.P./J.29.10.08) - X/FOOTPATH_2500_S_LANDSCAPE_1_S_OS_BASE_S_WORKS_DETAIL_1_SS_FG_WORKS

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SAWLEY SCHEME AREA



EMBANKMENT WORKS WITHIN LWS. MITIGATION METHOD STATEMENT TO BE FOLLOWED WITH APPROPRIATE RE-INSTATEMENT

CANAL TO BE CLOSED IN WINTER TO MINIMISE IMPACT

PROPOSED LOCATION OF TEMPORARY SITE COMPOUND

HABITAT ENHANCEMENT WITHIN LWS TO BE AGREED WITH DWT

ACCESS TO TON INDUSTRIAL ESTATE TO BE MAINTAINED

AGRICULTURAL ACCESS TO BE MAINTAINED AND FIELD BOUNDARY TO BE REINSTATE

RAIL POSSESSIONS REQUIRED WHERE DEFENCE TIES INTO RAILWAY

SIGNIFICANT DISTURBANCE TO TRENT FARM DURING CONSTRUCTION. CLOSE LIAISON WITH OWNERS

EXISTING FOOTPATH OVER TRENT FARM EMBANKMENT TO BE RE-INSTATE FOLLOWING WORKS

EXISTING PUBLIC RIGHTS OF WAY TO BE TEMPORARILY DIVERTED DURING WORKS

FULL RE-INSTATEMENT OF AGRICULTURAL LAND

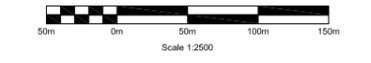
ARCHAEOLOGICAL INTEREST AROUND TRENT FARM, FURTHER ARCHAEOLOGICAL ASSESSMENT AND RECORDING TO BE CARRIED OUT



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- LEGEND**
- MITIGATION OR COMPENSATORY HABITAT
 - PROPOSED ENHANCEMENT
 - NOTE
 - PROPOSED SITE BOUNDARY
 - PROPOSED REINSTATEMENT GRASS SEEDING
 - PROPOSED FOOTPATH ENHANCEMENT WORKS
 - EXISTING PUBLIC RIGHTS OF WAY



Rev	Drawn	Checked	Reviewed	Date	Description
PB	SPJ	EAS	SGB	OCT.08	UPDATED ENVIRONMENTAL STATEMENT

Client
 Environment Agency

Client drawing No. Revision
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 Tel: +44(0)1244 304100 E-mail: bvcs@bv.com

Project
NOTTINGHAM TRENT LEFT BANK FLOOD ALLEVIATION SCHEME

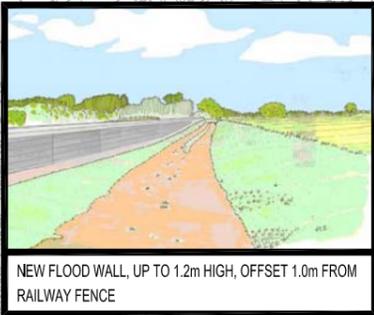
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Approved by:	EAST	Date:	OCT.08
Drawing scale:	1:2500	Sheet size:	A1
Drawing No.	108785 - 3100 - 0302	Revision	PB

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TRENT MEADOWS SCHEME AREA



NEW EMBANKMENT, UP TO 1.7m HIGH

NEW FOOTPATH ADJACENT TO FLOOD WALL, WITH MULTI-USER ACCESS

JAPANESE KNOTWEED IN, AND CLOSE TO, WORKING AREA ALONG RAILWAY. PRE-CONSTRUCTION CHECKS AND REMOVAL / TREATMENT IN ACCORDANCE WITH BEST PRACTICE

ALL WORKS WITHIN THESE AREAS ARE WITHIN LWS. MITIGATION METHOD STATEMENT TO BE FOLLOWED WITH APPROPRIATE RE-INSTATEMENT

COMPENSATORY HABITAT RESTORATION / CREATION TO BE CARRIED OUT WITHIN LWS

EXISTING TRACK TO BE USED FOR ACCESS

POTENTIAL BAT ROOSTS IN BARTON POOL LWS. FURTHER SURVEY TO BE CARRIED OUT

EXISTING TREES ADJACENT TO THE PROPOSED FLOOD WALL, AND WITHIN THE WORKING AREA, TO BE REMOVED

PLANTING ON FLOOD EMBANKMENT IN BARTON POOL LWS AND CONNECTION OF BARTON POOL TO THE DITCH NETWORK IN TRENT MEADOWS pLWS

INTERPRETATION BOARD AT TRENT MEADOWS pLWS

EXISTING TREES OUTSIDE WORKING AREA TO BE RETAINED AND PROTECTED

EXISTING PUBLIC RIGHT OF WAY TO BE TEMPORARILY DIVERTED DURING WORKS

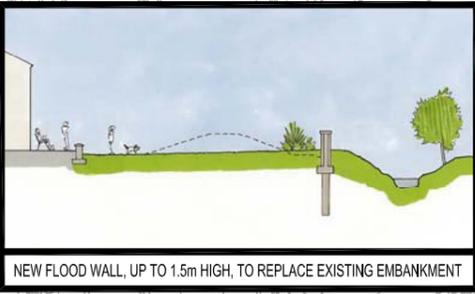


ACCESS FROM PASTURE LANE

LIAISON WITH ALLOTMENT HOLDERS OVER PROPOSED WORKS. ACCESS CONFINED TO EXISTING TRACK

EXISTING TREES TO BE RETAINED ADJACENT TO EMBANKMENT

ADDITIONAL SEATING TO BE PROVIDED IN TRENT MEADOWS PICNIC AREA



PROPOSED LOCATION OF TEMPORARY SITE COMPOUND

HOME FARM

FULL RE-INSTATEMENT OF AGRICULTURAL LAND

NEWBERY AVENUE

SIGNIFICANT DISTURBANCE TO GARDENS DURING CONSTRUCTION. FULL REINSTATEMENT AND CLOSE LIAISON WITH OWNERS

FLOOD WALL TO BE BRICK CLAD TO REDUCE VISUAL IMPACT THROUGH GARDENS

ACCESS FROM TRENT LANE

ACCESS

SAWLEY BROOK PUMPING STATION

WORKS MAY DISTURB PALAEOCHANNEL. FURTHER GEO-ARCHAEOLOGICAL ASSESSMENT TO BE CARRIED OUT

EXISTING EMBANKMENT TO BE RAISED UP TO 0.6m

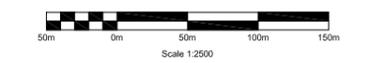
PASTURE LANE TO BE RAISED BY 0.55m

ACCESS ALONG TRENT LANE TO BE MAINTAINED DURING WORKS

Note: The limits, including the height and depth of the Works, shown in this drawing are not to be taken as limiting the obligations of the contractor under Contract.

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- LEGEND**
- MITIGATION OR COMPENSATORY HABITAT
 - PROPOSED ENHANCEMENT
 - NOTE
 - PROPOSED SITE BOUNDARY
 - PROPOSED REINSTATEMENT GRASS SEEDING
 - PROPOSED FOOTPATH ENHANCEMENT WORKS
 - EXISTING PUBLIC RIGHTS OF WAY



PC	SPJ	EAS	SGB	OCT.08	UPDATED ENVIRONMENTAL STATEMENT
PB	SPJ	EAS	SGB	OCT.08	UPDATED ENVIRONMENTAL STATEMENT
Rev	Drawn	Checked	Reviewed	Date	Description

Designed by:	EAS	Date:	JAN.07
Drawn by:	SPJ	Date:	JAN.07
Checked by:	EAS	Date:	MAR.07
Reviewed by:	EAS	Date:	MAR.07



Client drawing No. Revision



Project
NOTTINGHAM TRENT LEFT BANK FLOOD ALLEVIATION SCHEME

Drawing title
FIGURE V4.3 SCHEME OVERVIEW SHEET 3 OF 12

Approved by:	EAST	Date:	OCT.08
Drawing scale:	1:2500	Sheet size:	A1

108785/60/62/CAD/ISSUED/108785-3200-0301-PC.V2(S.P.1.29.10.08) - XIE - WORKS_DETAIL - FOOTPATH_DETAIL - OS_BASE - TM - WORKS_DETAIL

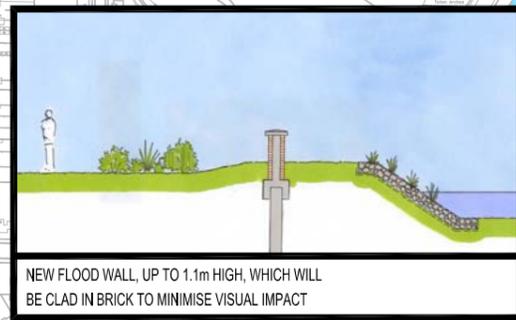
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EREWASH SCHEME AREA

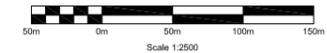
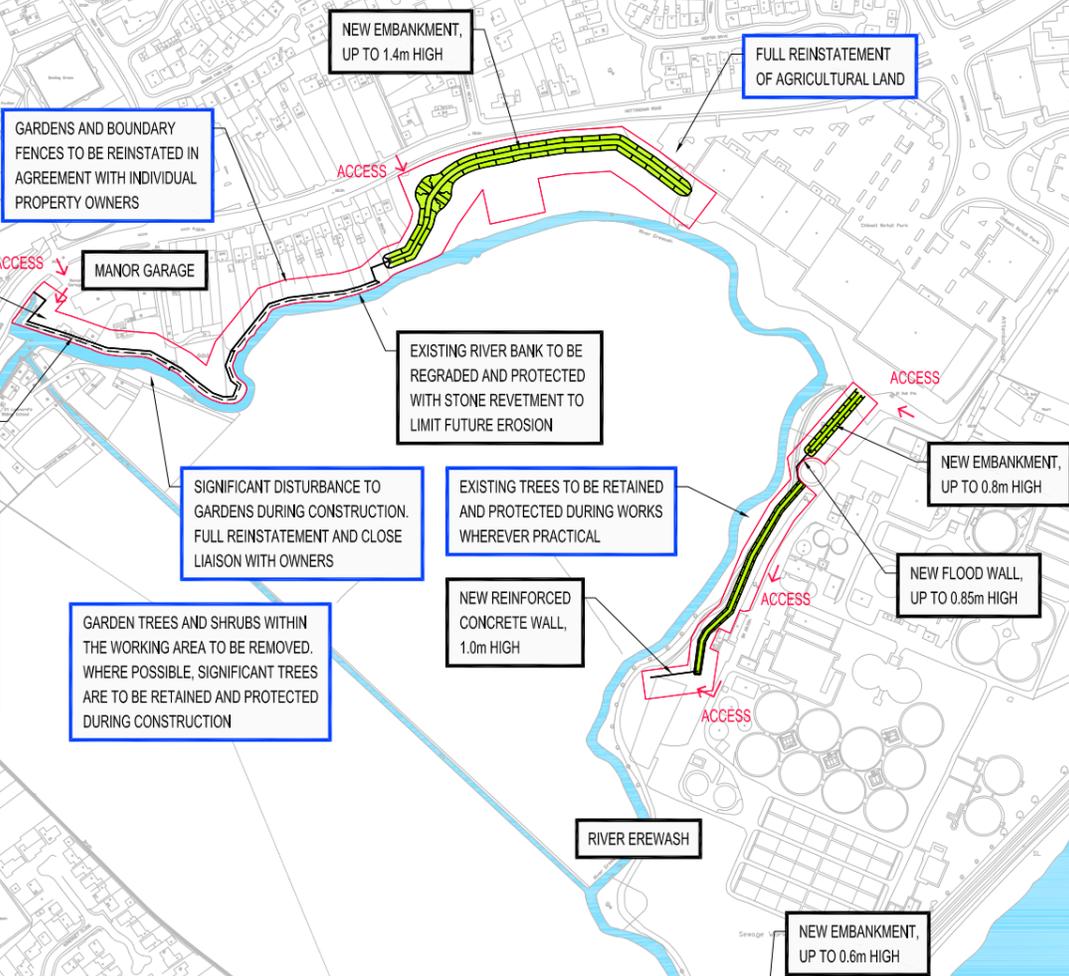
Note: The limits, including the height and depths of the Works, shown in this drawing are not to be taken as limiting the obligations of the contractor under Contract.

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- LEGEND**
- MITIGATION OR COMPENSATORY HABITAT
 - PROPOSED ENHANCEMENT
 - NOTE
 - PROPOSED SITE BOUNDARY
 - PROPOSED REINSTATEMENT GRASS SEEDING
 - PROPOSED FOOTPATH ENHANCEMENT WORKS
 - EXISTING PUBLIC RIGHTS OF WAY



NEW FLOOD WALL, UP TO 1.1m HIGH, WHICH WILL BE CLAD IN BRICK TO MINIMISE VISUAL IMPACT



Rev	Drawn	Checked	Reviewed	Date	Description
PB	SPJ	EAS	SGB	OCT.08	UPDATED ENVIRONMENTAL STATEMENT



Client drawing No. Revision



Project: **NOTTINGHAM TRENT LEFT BANK FLOOD ALLEVIATION SCHEME**

Drawing title: **FIGURE V4.4 SCHEME OVERVIEW SHEET 4 OF 12**

Approved by: EAST Date: OCT.08

Drawing scale: 1:2500 Sheet size: A1

Drawing No. 108785 — 3700 — 0301 Revision PB

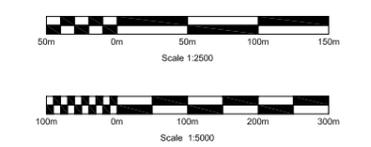
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- LEGEND**
- MITIGATION OR COMPENSATORY HABITAT
 - PROPOSED ENHANCEMENT
 - NOTE
 - PROPOSED SITE BOUNDARY
 - PROPOSED REINSTATEMENT GRASS SEEDING
 - PROPOSED FOOTPATH ENHANCEMENT WORKS
 - EXISTING PUBLIC RIGHTS OF WAY
 - PROPOSED HABITAT CREATION AREAS
 - NEW MARGINAL HABITAT (TO BE CONSTRUCTED IN ADVANCE: EARLY 2009)



Rev	Drawn	Checked	Released	Date	Description
PC	SP	EA	SG	OCT.0	UPDATED ENVIRONMENTAL STATEMENT
PB	SPJ	EAS	SGB	OCT.08	UPDATED ENVIRONMENTAL STATEMENT

Designed by: EAS Date: JAN.07
 Drawn by: SPJ Date: JAN.07
 Checked by: EAS Date: MAR.07
 Reviewed by: EAS Date: MAR.07



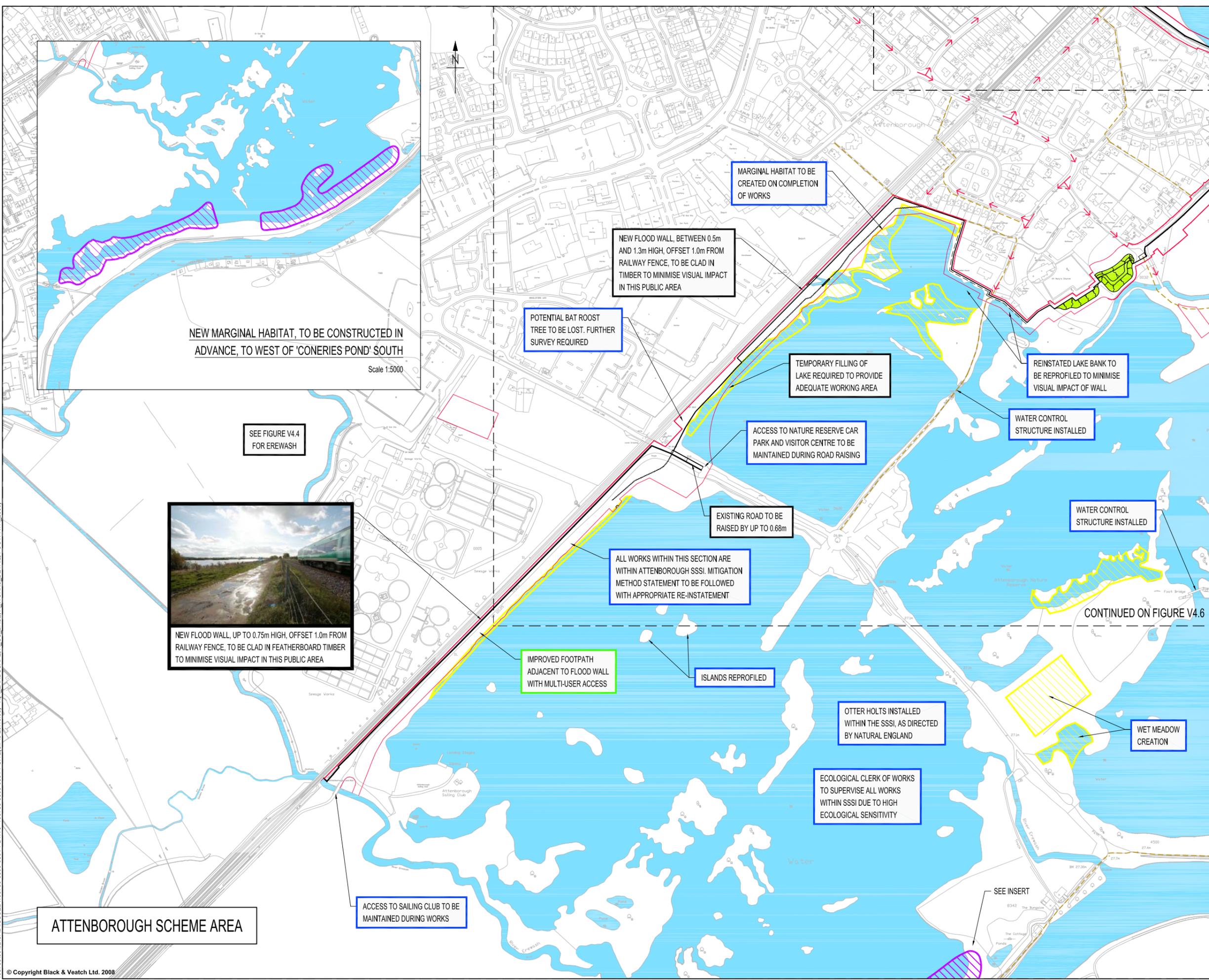
Client drawing No. Revision



Project
**NOTTINGHAM TRENT LEFT BANK
 FLOOD ALLEVIATION SCHEME**

Drawing title
**FIGURE V4.5
 SCHEME OVERVIEW
 SHEET 5 OF 12**

Approved by: EAST Date: OCT.08
 Drawing No: 1:2500 1:5000 Sheet size: A1
 Drawing No: 108785 - 3300 - 0301 Revision: PC



108785/60/62/CAD/ISSUED/108785-3300-0301-PB1_V3-108785-3300-0301-PC_V2(S.P. 1, 2, 10, 08) -X/A LANDSCAPE, A, OS, BASE, A, WORKS, DETAIL, FOOTPATH, 2500

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ATTENBOROUGH SCHEME AREA

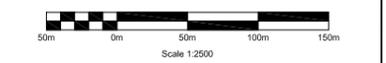
CONTINUED ON FIGURE V4.5

CONTINUED ON FIGURE V4.7

Note: The limits, including the height and depths of the Works, shown in this drawing are not to be taken as limiting the obligations of the contractor under Contract.

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- LEGEND**
- MITIGATION OR COMPENSATORY HABITAT
 - PROPOSED ENHANCEMENT
 - NOTE
 - PROPOSED SITE BOUNDARY
 - PROPOSED REINSTATEMENT GRASS SEEDING
 - PROPOSED FOOTPATH ENHANCEMENT WORKS
 - EXISTING PUBLIC RIGHTS OF WAY
 - PROPOSED HABITAT CREATION AREAS



PC	SPJ	EAS	SGB	OCT.08	UPDATED ENVIRONMENTAL STATEMENT
PB	SPJ	EAS	SGB	OCT.08	UPDATED ENVIRONMENTAL STATEMENT
Rev	Drawn	Checked	Reviewed	Date	Description

Designed by:	EAS	Date:	JAN.07
Drawn by:	SPJ	Date:	JAN.07
Checked by:	EAS	Date:	MAR.07
Reviewed by:	EAS	Date:	MAR.07

Client

Client drawing No. Revision

BLACK & VEATCH
Black & Veatch Limited
38 City Road, Chester, CH1 3AE, United Kingdom
Tel: +44(0)1244 304100 E-mail: bvcs@bv.com

Project
NOTTINGHAM TRENT LEFT BANK FLOOD ALLEVIATION SCHEME

Drawing title
FIGURE V4.6 SCHEME OVERVIEW SHEET 6 OF 12

Approved by:	EAST	Date:	OCT.08
Drawing size:	1:2500	Sheet size:	A1
Drawing No.	108785 - 3300 - 0302	Revision	PC

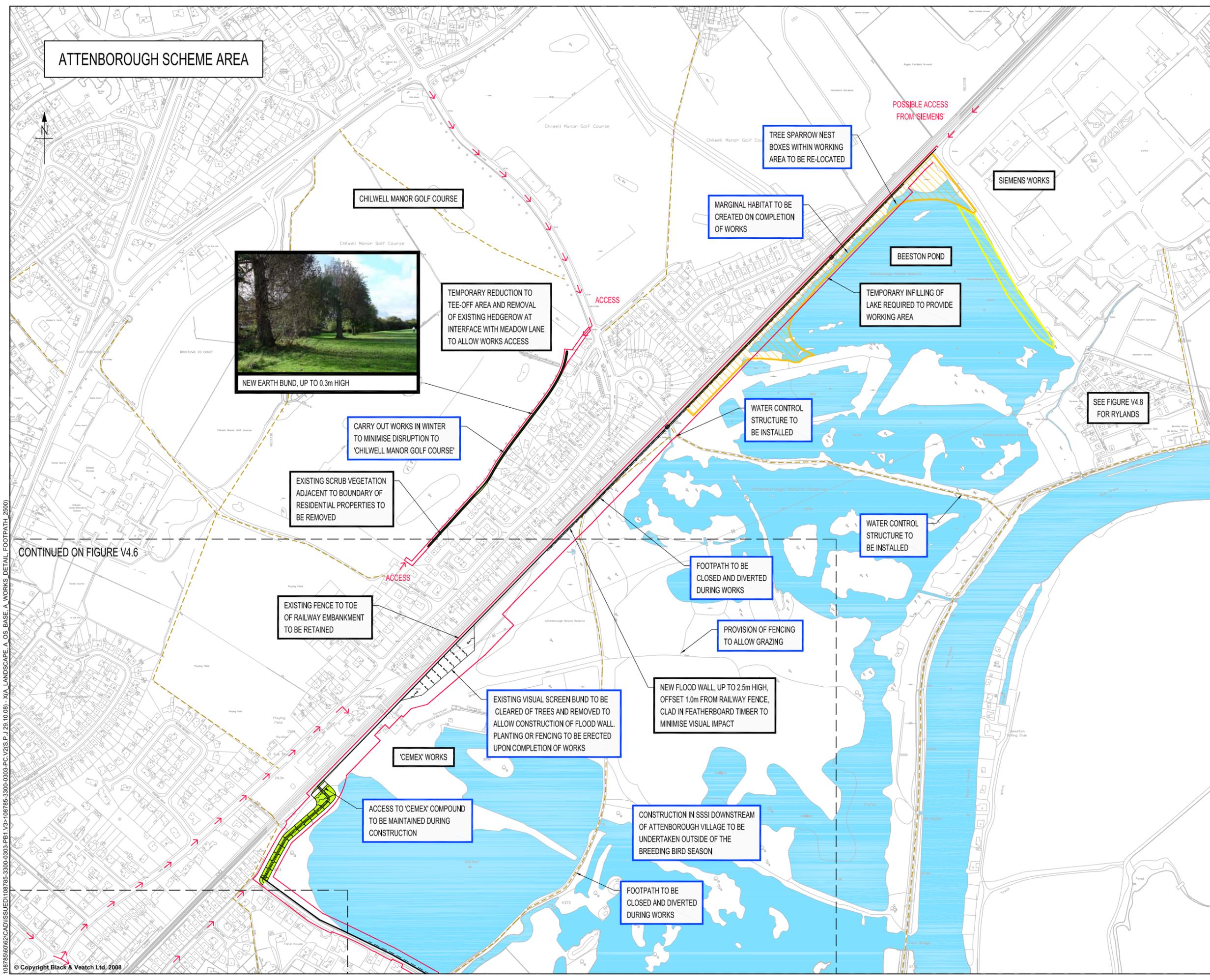


NEW FLOOD WALL, WITH NATURAL STONE CLADDING, TO REPLACE EXISTING HEDGEROW. GROUND TO BE REPROFILED LOCALLY TO MINIMISE THE VISUAL HEIGHT OF THE WALL, UP TO 1.5m. NEW HEDGEROW PLANTED ON 'THE STRAND' SIDE OF THE WALL TO MINIMISE VISUAL IMPACT

108785/60/62/CAD/ISSUED/108785-3300-0302-PB1_V3-108785-3300-0302-PC_V2(S.P.)_29.10.08 - X/A LANDSCAPE, A, OS, BASE, A, WORKS DETAIL, FOOTPATH, 2500

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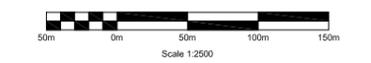
ATTENBOROUGH SCHEME AREA



Note: The limits, including the height and depth of the Works, shown in this drawing are not to be taken as limiting the obligations of the contractor under Contract.

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- LEGEND**
- MITIGATION OR COMPENSATORY HABITAT
 - PROPOSED ENHANCEMENT
 - NOTE
 - PROPOSED SITE BOUNDARY
 - PROPOSED REINSTATEMENT GRASS SEEDING
 - PROPOSED FOOTPATH ENHANCEMENT WORKS
 - EXISTING PUBLIC RIGHTS OF WAY
 - PROPOSED HABITAT CREATION AREAS
 - NEW WET WOODLAND



PC	SPJ	EAS	SGB	OCT.08	UPDATED ENVIRONMENTAL STATEMENT
PB	SPJ	EAS	SGB	OCT.08	UPDATED ENVIRONMENTAL STATEMENT
Rev	Drawn	Checked	Reviewed	Date	Description

Designed by: CWa Date: MAR.07
 Drawn by: SPJ Date: MAR.07
 Checked by: EAS Date: MAR.07
 Reviewed by: EAS Date: MAR.07



Client drawing No. Revision



Project
NOTTINGHAM TRENT LEFT BANK FLOOD ALLEVIATION SCHEME

Drawing title
**FIGURE V4.7
 SCHEME OVERVIEW
 SHEET 7 OF 12**

Approved by: EAST Date: OCT.08
 Drawing scale: 1:2500 Sheet size: A1
 Drawing No. 108785 - 3300 - 0303 Revision PC

108785/60/62/CAD/ISSUED/108785-3300-0303-PC V2(S.P. 1.29.10.08) - X/A LANDSCAPE, A_DS_BASE, A_WORKS DETAIL, FOOTPATH_2500

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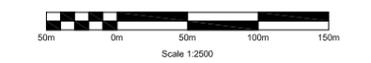
RYLANDS SCHEME AREA

Drawing No: 108785-3400-0301
 Cat Ref: Rev: PC

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- LEGEND**
- MITIGATION OR COMPENSATORY HABITAT
 - PROPOSED ENHANCEMENT
 - NOTE
 - PROPOSED SITE BOUNDARY
 - PROPOSED REINSTATEMENT GRASS SEEDING
 - PROPOSED FOOTPATH ENHANCEMENT WORKS
 - EXISTING PUBLIC RIGHTS OF WAY



PC	SPJ	EAS	SGB	OCT.08	UPDATED ENVIRONMENTAL STATEMENT
PB	SPJ	EAS	SGB	OCT.08	UPDATED ENVIRONMENTAL STATEMENT
Rev	Drawn	Checked	Reviewed	Date	Description

Designed by: EAS Date: JAN.07
 Drawn by: SPJ Date: JAN.07
 Checked by: EAS Date: MAR.07
 Reviewed by: EAS Date: MAR.07



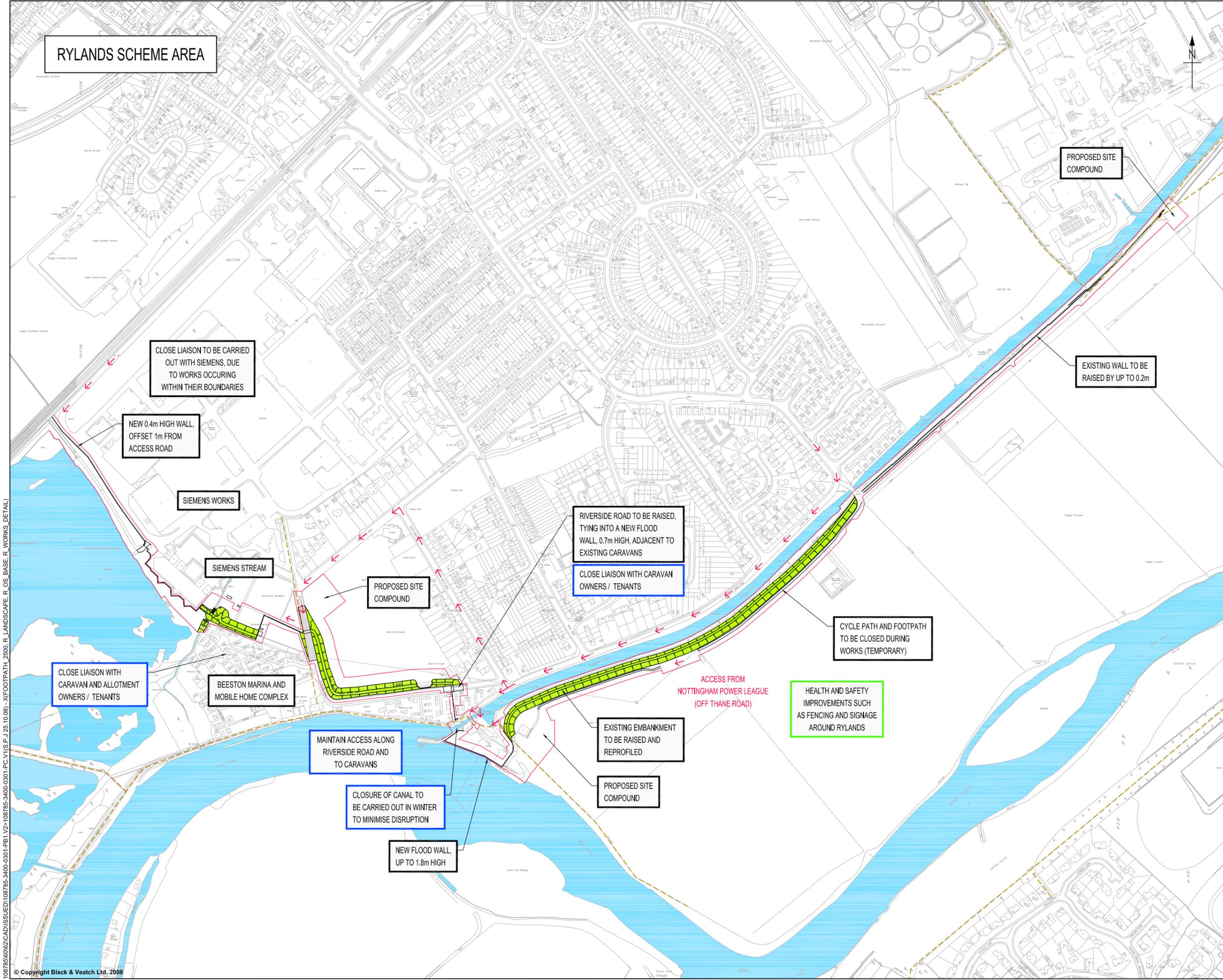
Client drawing No. Revision



Project
NOTTINGHAM TRENT LEFT BANK FLOOD ALLEVIATION SCHEME

Drawing title
FIGURE V4.8 SCHEME OVERVIEW SHEET 8 OF 12

Approved by: EAST Date: OCT.08
 Drawing scale: 1:2500 Sheet size: A1
 Drawing No: 108785 - 3400 - 0301 Revision: PC



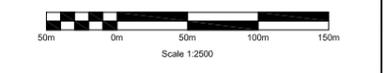
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- LEGEND**
- MITIGATION OR COMPENSATORY HABITAT
 - PROPOSED ENHANCEMENT
 - NOTE
 - PROPOSED SITE BOUNDARY
 - PROPOSED REINSTATEMENT GRASS SEEDING
 - PROPOSED FOOTPATH ENHANCEMENT WORKS
 - EXISTING PUBLIC RIGHTS OF WAY



Rev	Drawn	Checked	Reviewed	Date	Description
PC	SPJ	EAS	SGB	OCT.08	UPDATED ENVIRONMENTAL STATEMENT
PB	SPJ	EAS	SGB	OCT.08	UPDATED ENVIRONMENTAL STATEMENT

Designed by:	EAS	Date:	JAN.07
Drawn by:	SPJ	Date:	JAN.07
Checked by:	EAS	Date:	MAR.07
Reviewed by:	EAS	Date:	MAR.07



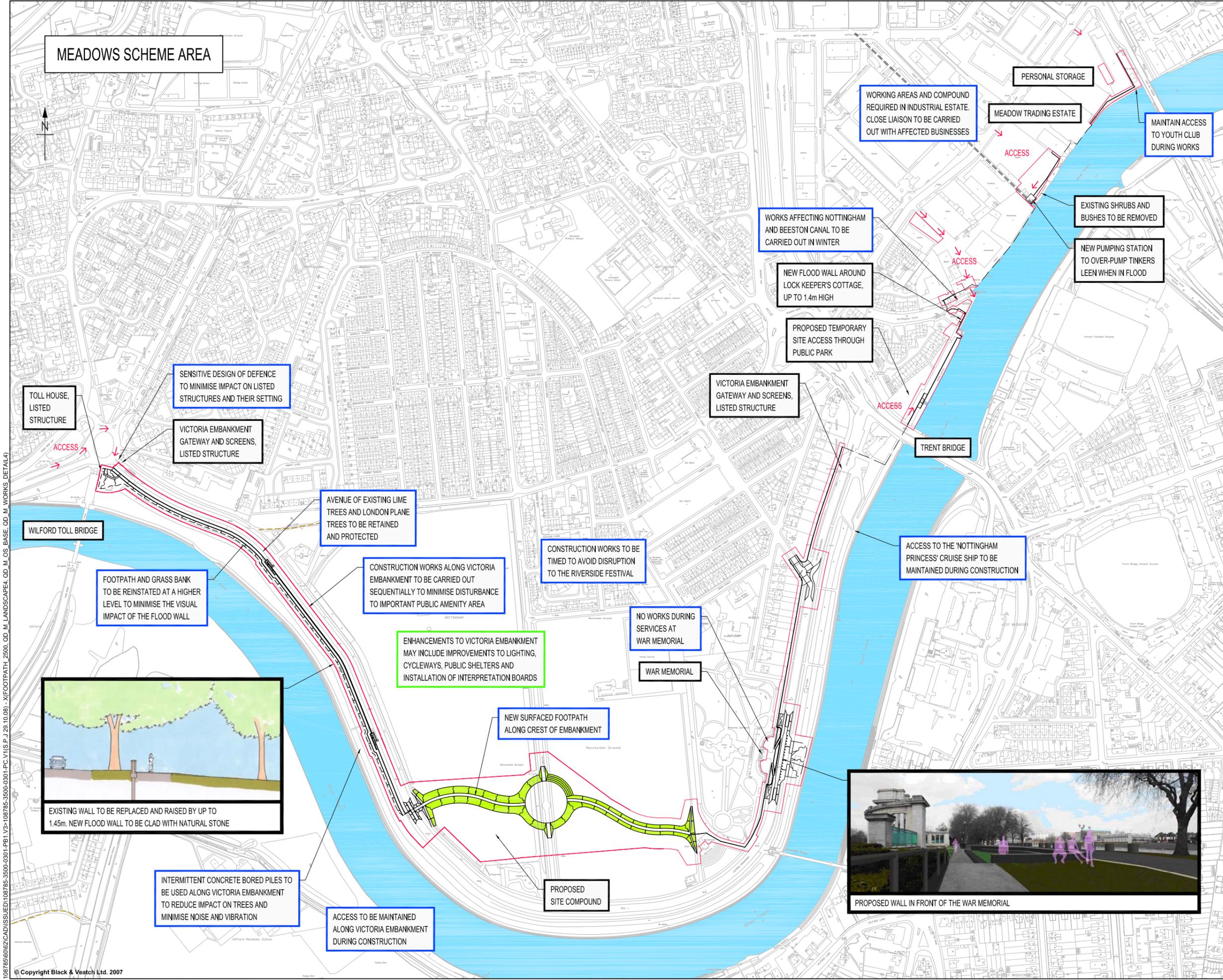
Client drawing No.	Revision



Project: NOTTINGHAM TRENT LEFT BANK FLOOD ALLEVIATION SCHEME

Drawing title: **FIGURE V4.9**
SCHEME OVERVIEW
SHEET 9 OF 12

Approved by:	EAST	Date:	OCT.08
Drawing scale:	1:2500	Sheet size:	A1
Drawing No.	108785 - 3500 - 0301	Revision	PC



MEADOWS SCHEME AREA

WORKING AREAS AND COMPOUND REQUIRED IN INDUSTRIAL ESTATE. CLOSE LIAISON TO BE CARRIED OUT WITH AFFECTED BUSINESSES

PERSONAL STORAGE

MAINTAIN ACCESS TO YOUTH CLUB DURING WORKS

MEADOW TRADING ESTATE

EXISTING SHRUBS AND BUSHES TO BE REMOVED

NEW PUMPING STATION TO OVER-PUMP TINKERS LEEN WHEN IN FLOOD

WORKS AFFECTING NOTTINGHAM AND BEESTON CANAL TO BE CARRIED OUT IN WINTER

NEW FLOOD WALL AROUND LOCK KEEPER'S COTTAGE, UP TO 1.4m HIGH

PROPOSED TEMPORARY SITE ACCESS THROUGH PUBLIC PARK

VICTORIA EMBANKMENT GATEWAY AND SCREENS, LISTED STRUCTURE

TRENT BRIDGE

SENSITIVE DESIGN OF DEFENCE TO MINIMISE IMPACT ON LISTED STRUCTURES AND THEIR SETTING

TOLL HOUSE, LISTED STRUCTURE

VICTORIA EMBANKMENT GATEWAY AND SCREENS, LISTED STRUCTURE

AVENUE OF EXISTING LIME TREES AND LONDON PLANE TREES TO BE RETAINED AND PROTECTED

CONSTRUCTION WORKS TO BE TIMED TO AVOID DISRUPTION TO THE RIVERSIDE FESTIVAL

ACCESS TO THE 'NOTTINGHAM PRINCESS' CRUISE SHIP TO BE MAINTAINED DURING CONSTRUCTION

WILFORD TOLL BRIDGE

FOOTPATH AND GRASS BANK TO BE REINSTATED AT A HIGHER LEVEL TO MINIMISE THE VISUAL IMPACT OF THE FLOOD WALL

CONSTRUCTION WORKS ALONG VICTORIA EMBANKMENT TO BE CARRIED OUT SEQUENTIALLY TO MINIMISE DISTURBANCE TO IMPORTANT PUBLIC AMENITY AREA

NO WORKS DURING SERVICES AT WAR MEMORIAL

WAR MEMORIAL

ENHANCEMENTS TO VICTORIA EMBANKMENT MAY INCLUDE IMPROVEMENTS TO LIGHTING, CYCLEWAYS, PUBLIC SHELTERS AND INSTALLATION OF INTERPRETATION BOARDS

NEW SURFACED FOOTPATH ALONG CREST OF EMBANKMENT

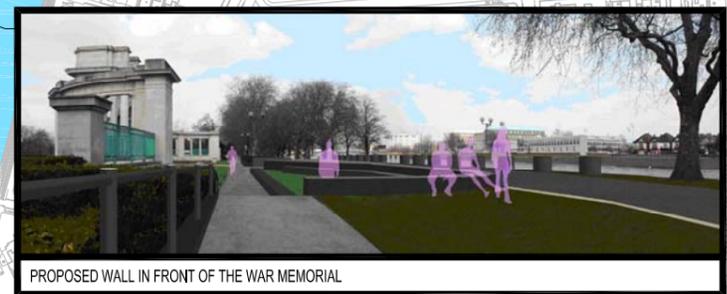


EXISTING WALL TO BE REPLACED AND RAISED BY UP TO 1.45m. NEW FLOOD WALL TO BE CLAD WITH NATURAL STONE

INTERMITTENT CONCRETE BORED PILES TO BE USED ALONG VICTORIA EMBANKMENT TO REDUCE IMPACT ON TREES AND MINIMISE NOISE AND VIBRATION

ACCESS TO BE MAINTAINED ALONG VICTORIA EMBANKMENT DURING CONSTRUCTION

PROPOSED SITE COMPOUND

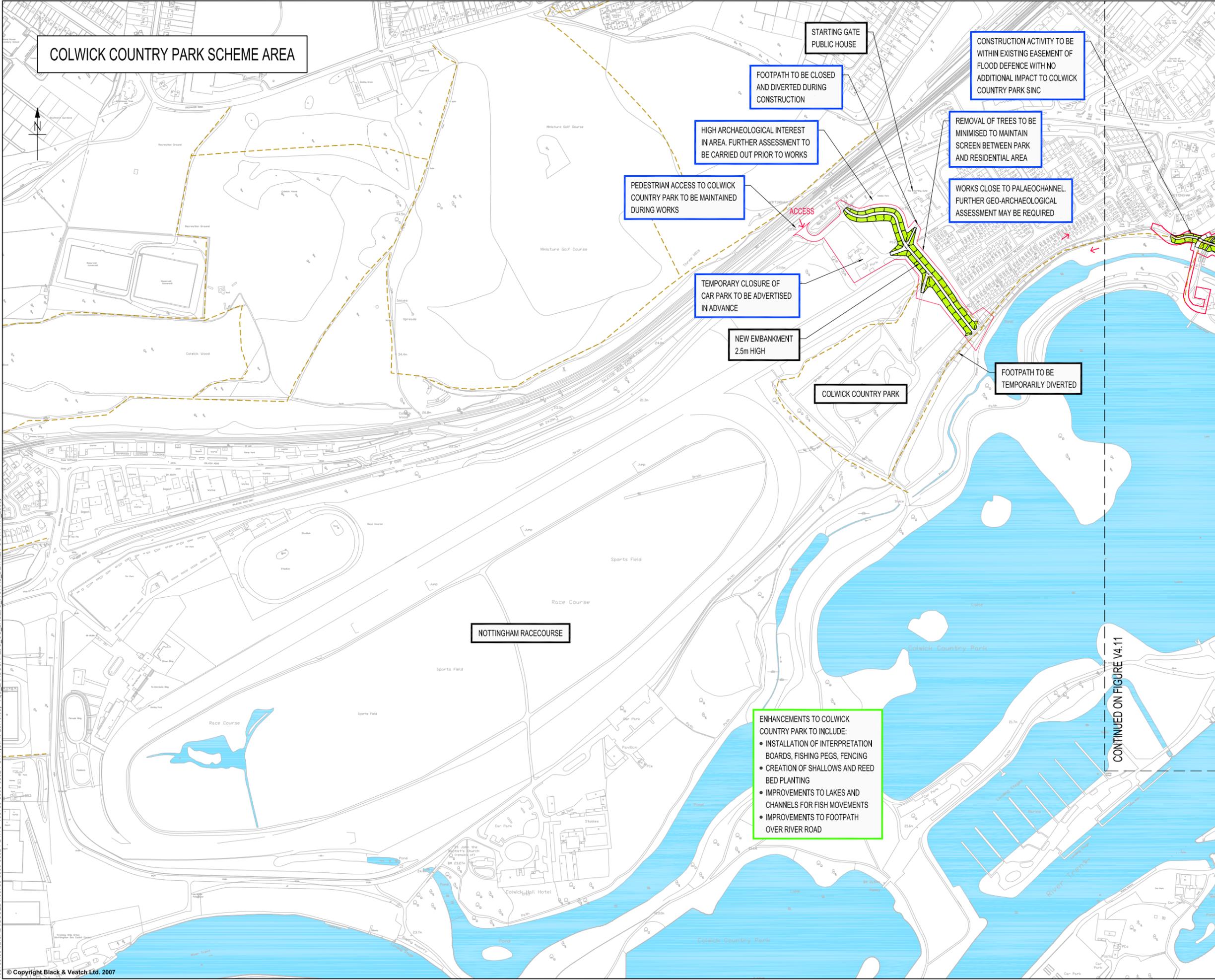


PROPOSED WALL IN FRONT OF THE WAR MEMORIAL

108785/60/62/CAD/ISSUED/108785-3500-0301-PB1_V3-108785-3500-0301-PC_V1(S.P. 1.29.10.08) - X/FOOTPATH_2500_OD_M_LANDSCAPE4_OD_M_OS_BASE_OD_M_WORKS_DETAIL4

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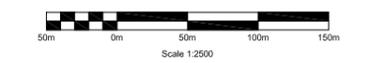
COLWICK COUNTRY PARK SCHEME AREA



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- LEGEND**
- MITIGATION OR COMPENSATORY HABITAT
 - PROPOSED ENHANCEMENT
 - NOTE
 - PROPOSED SITE BOUNDARY
 - PROPOSED REINSTATEMENT GRASS SEEDING
 - EXISTING PUBLIC RIGHTS OF WAY



PC	SPJ	EAS	SGB	OCT.08	UPDATED ENVIRONMENTAL STATEMENT
PB	SPJ	EAS	SGB	OCT.08	UPDATED ENVIRONMENTAL STATEMENT
Rev	Drawn	Checked	Reviewed	Date	Description

Designed by:	EAS	Date:	JAN.07
Drawn by:	SPJ	Date:	JAN.07
Checked by:	EAS	Date:	MAR.07
Reviewed by:	EAS	Date:	MAR.07



Client drawing No.	Revision
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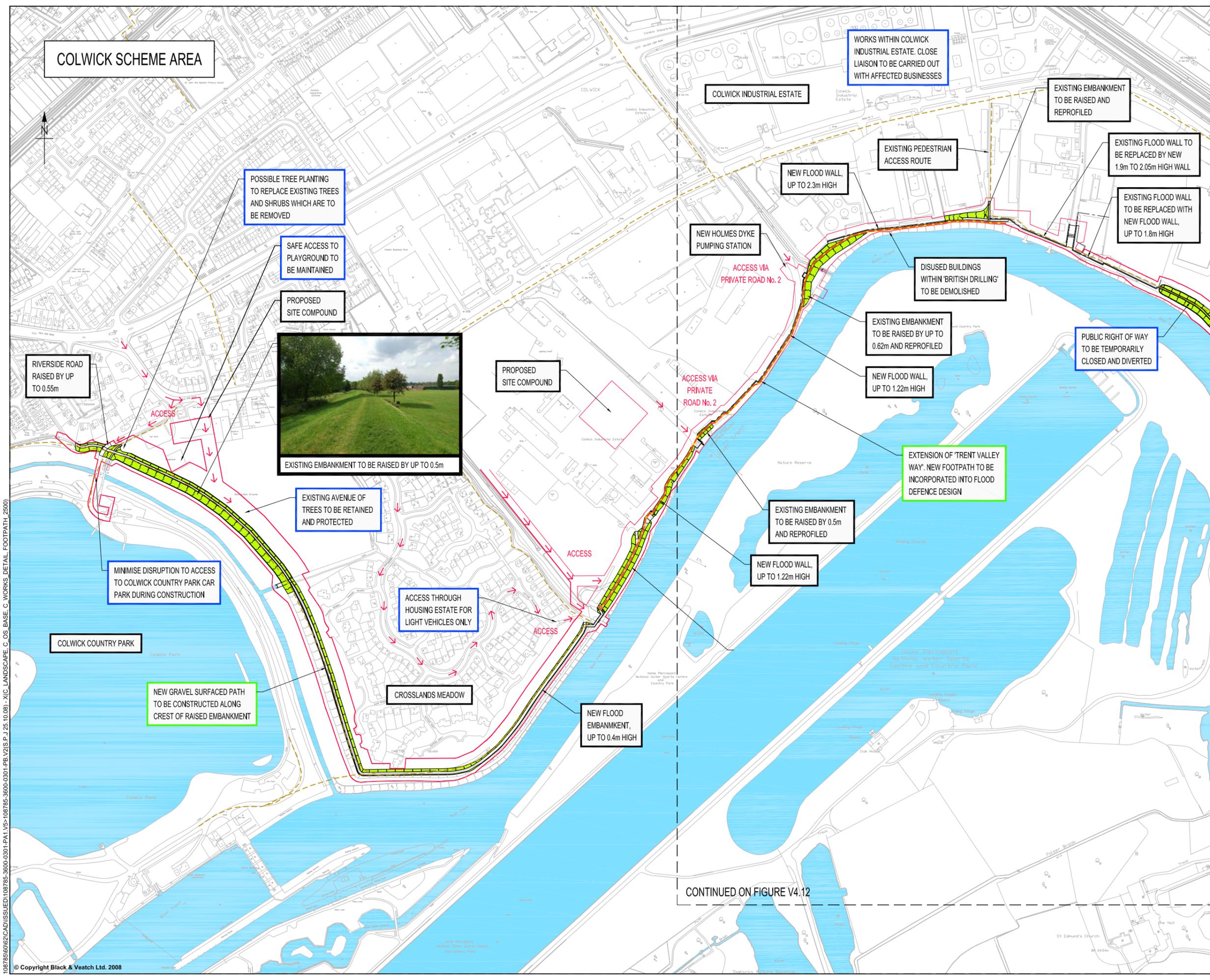
Project
NOTTINGHAM TRENT LEFT BANK FLOOD ALLEVIATION SCHEME

Drawing title
FIGURE V4.10 SCHEME OVERVIEW SHEET 10 OF 12

Approved by:	EAST	Date:	OCT.08
Drawing No.:	1:2500	Sheet size:	A1
Drawing No.:	108785 - 3500 - 0302	Revision	PC

108785/60/62/CAD/ISSUED/108785-3500-0302-PC.V1 (S.P. 1.29.10.08) - XC LANDSCAPE, C. OS. BASE, C. WORKS DETAIL, FOOTPATH, 2500

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COLWICK SCHEME AREA

WORKS WITHIN COLWICK INDUSTRIAL ESTATE. CLOSE LIAISON TO BE CARRIED OUT WITH AFFECTED BUSINESSES

EXISTING EMBANKMENT TO BE RAISED AND REPROFILED

EXISTING FLOOD WALL TO BE REPLACED BY NEW 1.9m TO 2.05m HIGH WALL

EXISTING FLOOD WALL TO BE REPLACED WITH NEW FLOOD WALL, UP TO 1.8m HIGH

EXISTING PEDESTRIAN ACCESS ROUTE

NEW FLOOD WALL, UP TO 2.3m HIGH

NEW HOLMES DYKE PUMPING STATION

DISUSED BUILDINGS WITHIN 'BRITISH DRILLING' TO BE DEMOLISHED

EXISTING EMBANKMENT TO BE RAISED BY UP TO 0.62m AND REPROFILED

PUBLIC RIGHT OF WAY TO BE TEMPORARILY CLOSED AND DIVERTED

NEW FLOOD WALL, UP TO 1.22m HIGH

EXTENSION OF 'TRENT VALLEY WAY'. NEW FOOTPATH TO BE INCORPORATED INTO FLOOD DEFENCE DESIGN

EXISTING EMBANKMENT TO BE RAISED BY 0.5m AND REPROFILED

NEW FLOOD WALL, UP TO 1.22m HIGH

NEW FLOOD EMBANKMENT, UP TO 0.4m HIGH



EXISTING EMBANKMENT TO BE RAISED BY UP TO 0.5m

EXISTING AVENUE OF TREES TO BE RETAINED AND PROTECTED

POSSIBLE TREE PLANTING TO REPLACE EXISTING TREES AND SHRUBS WHICH ARE TO BE REMOVED

SAFE ACCESS TO PLAYGROUND TO BE MAINTAINED

PROPOSED SITE COMPOUND

PROPOSED SITE COMPOUND

RIVERSIDE ROAD RAISED BY UP TO 0.55m

MINIMISE DISRUPTION TO ACCESS TO COLWICK COUNTRY PARK CAR PARK DURING CONSTRUCTION

ACCESS THROUGH HOUSING ESTATE FOR LIGHT VEHICLES ONLY

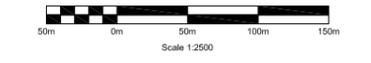
NEW GRAVEL SURFACED PATH TO BE CONSTRUCTED ALONG CREST OF RAISED EMBANKMENT

CONTINUED ON FIGURE V4.12

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- LEGEND**
- MITIGATION OR COMPENSATORY HABITAT
 - PROPOSED ENHANCEMENT
 - NOTE
 - PROPOSED SITE BOUNDARY
 - PROPOSED REINSTATEMENT GRASS SEEDING
 - PROPOSED FOOTPATH ENHANCEMENT WORKS
 - EXISTING PUBLIC RIGHTS OF WAY
 - NEW 'TRENT VALLEY WAY'



Rev	Drawn	Checked	Reviewed	Date	Description
PB	SPJ	EAS	SGB	OCT.08	UPDATED ENVIRONMENTAL STATEMENT



Client drawing No. _____ Revision _____

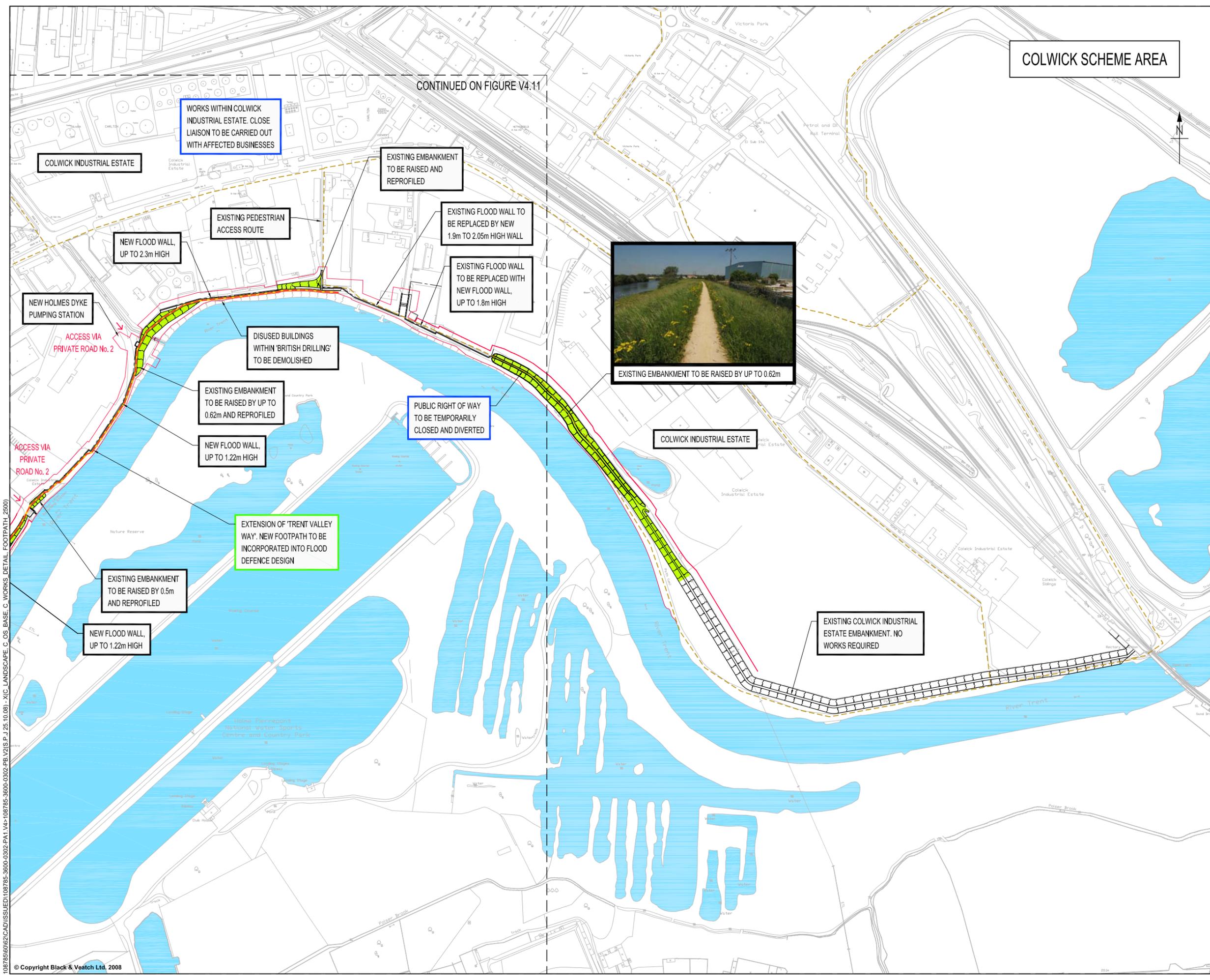


Project: **NOTTINGHAM TRENT LEFT BANK FLOOD ALLEVIATION SCHEME**

Drawing title: **FIGURE V4.11 SCHEME OVERVIEW SHEET 11 OF 12**

Approved by:	EAST	Date:	OCT.08
Drawing scale:	1:2500	Sheet size:	A1
Drawing No.	108785 - 3600 - 0301	Revision	PB

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COLWICK SCHEME AREA

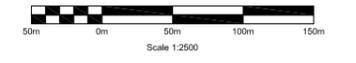
CONTINUED ON FIGURE V4.11

Drawing No: 108785-3600-0302
 Cad Ref: Rev: PB

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- LEGEND**
- MITIGATION OR COMPENSATORY HABITAT
 - PROPOSED ENHANCEMENT
 - NOTE
 - PROPOSED SITE BOUNDARY
 - PROPOSED REINSTATEMENT GRASS SEEDING
 - PROPOSED FOOTPATH ENHANCEMENT WORKS
 - EXISTING PUBLIC RIGHTS OF WAY
 - NEW 'TRENT VALLEY WAY'



PB	SPJ	EAS	SGB	OCT.08	UPDATED ENVIRONMENTAL STATEMENT
Rev	Drawn	Checked	Reviewed	Date	Description
	Designed by:	EAS		Date:	JAN.07
	Drawn by:	SPJ		Date:	JAN.07
	Checked by:	EAS		Date:	MAR.07
	Reviewed by:	EAS		Date:	MAR.07

Client

Client drawing No. Revision

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Project
NOTTINGHAM TRENT LEFT BANK FLOOD ALLEVIATION SCHEME

Drawing title
FIGURE V4.12 SCHEME OVERVIEW SHEET 12 OF 12

Approved by: EAST Date: OCT.08
 Drawing scale: 1:2500 Sheet size: A1
 Drawing No. 108785 - 3600 - 0302 Revision PB

108785/60/62/CAD/ISSUED/108785-3600-0302-PA1.V4-108785-3600-0302-PB.V2(S.P.1.25.10.08) -XIC LANDSCAPE, C. DS, BASE, C. WORKS DETAIL, FOOTPATH, 25000