Environment Agency

York Flood Alleviation Scheme – Foss Flood Storage Area

Planning Application:

Design, Access and Sustainability Statement

iema EIA

We are the Environment Agency. We protect and improve the environment and make it a better place for people and wildlife. We operate at the place where environmental change has its greatest impact on people's lives. We reduce the risks to people and properties from flooding; make sure there is enough water for people and wildlife; protect and improve air, land and water quality and apply the environmental standards within which industry can operate.

Acting to reduce climate change and helping people and wildlife adapt to its consequences are at the heart of all that we do. We cannot do this alone. We work closely with a wide range of partners including government, business, local authorities, other agencies, civil society groups and the communities we serve.

Version

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Contents

1 Introduction

1.1 Purpose

1.1.1 This Design and Access Statement has been prepared by Capita Property and Infrastructure Ltd (Capita), acting on behalf of the Environment Agency (EA). It forms part of a planning application submitted for the creation of the Foss Flood Storage Area (FSA), as part of the York Flood Alleviation Scheme (FAS).

1.1.2 The purpose of this document is to provide a commentary on the design process undertaken and explain the guiding principles that have underpinned and resulted in the final proposal.

1.2 Background to the Scheme

1.2.1 Storm Desmond in December 2015 brought flooding to many areas of Britain and North Yorkshire. The City of York saw some of the highest river levels on record, with significant impacts on local communities.

1.2.2 York has a long history of damaging flooding dating back to 1263. The most recent significant flood events in York have occurred in 1947, 1978, 1982, 2000 and 2015.

1.2.3 Defences across much of the city were installed, or greatly expanded, following the 1978 floods, including the Foss Flood Barrier being installed in 1987. This followed from the observation that greater flooding arose under certain conditions due to waters from the River Foss rather than the River Ouse.

1.2.4 During the 2015 event, however, conditions were such that widespread flooding was caused along the River Foss and its tributaries. The Foss Barrier was closed in order to try and reduce the impact along the river's corridor. However the barrier's infrastructure would have been overwhelmed if it had not been opened subsequently. This action actually reduced the severity of the flooding along the Foss by allowing the retained quantities of water to be released downstream.

1.2.5 However, despite this, communities living along the Foss were some of the most badly affected by the 2015 event. The majority of properties that flooded were located close to the centre of York, although there was also property flooding along the length of the river. Many houses in this area have gardens backing directly onto the river, providing a route for flood water. Huntington Road floods on a regular basis, causing disruption to a busy route into and out of York City Centre.

1.2.6 Flooding of the scale experienced in 2015 was the result of the wettest December on record followed by further heavy rains. Whilst the River Ouse generally responds slowly to rainfall, the River Foss responds quickly to heavy rain and flooding can be very sudden. Whilst the Foss Barrier have reduced the risk of flooding for many properties, the effects of the barrier weakens past the Heworth Green road bridge crossing of the Foss. This means that there are many properties upstream of this roundabout that are therefore still at a high risk of flooding.

1.3 Environment Agency Response

1.3.1 National flood risk modelling, developed for general planning purposes, indicates most land adjacent to the River Foss in York is located in the most vulnerable flood zone meaning this is land with a greater than 1-in-100 chance of flooding from river sources in any given year.

1.3.2 Though river sources are a key driver of flooding in York, the topography, number of watercourses and evidence from previous flood events indicate that river level response to heavy rainfall can be rapid. Current climate change predictions indicate that instances of extreme weather events will increase, which will increase the risk of flooding to the area.

1.3.3 In November 2016, the EA published a Five Year Plan for York, which set out high-level options for new and improved flood defences across the city to meet the target of better protecting 2,000 properties within the city. The plan established the basis for the further examination of potential solutions and recognised that one of the high-level options was the development of an upstream flood storage area to protect the Foss communities.

1.3.4 The ambitions of the 5-year plan were translated into the York Flood Alleviation Scheme (FAS), a series of individual and scheme proposals to comprehensively address the flood risks to property and people identified throughout the city. The York FAS as a whole has the following overall strategic aims:

- to reduce the risk of flooding to properties and people;
- to strengthen the City's resilience to flooding by reducing the risk of flooding to infrastructure, transport links, utilities and businesses;
- to work collaboratively to make an effective contribution to sustainable development and where possible secure economic growth;
- to strive to achieve multiple benefits where possible; and
- to ensure the selection of preferred option(s) follows the best practice *Flood and Coastal Erosion Risk Management Appraisal Guidance* (DEFRA, March 2010).

2 Selection of Development Site

2.1 Introduction

2.1.1 The selection of the particular site and broad solution presented in this application has emerged from an iterative process conducted to provide the optimum solution. The starting point was consideration of protecting properties along the Foss corridor north of the Heworth Green road bridge in York to Strensall village.

2.1.2 A total of 465 residential and 25 non-residential properties are at risk of flooding within this corridor should the area experience a 1-in-100 year flood event including the expected increase in future years due to climate change to 2080.

2.1.3 This section provides a brief overview of the process through which the proposed development emerged as the preferred option to deal with the flood risk along this section of the Foss corridor. A full report '*York 5 Year Plan, Flood Cells F8, F10, F11 - Options Appraisal Report*, Environment Agency, October 2018' (OAR) detailing the entire process is available on request.

2.1.4 Once the location of the properties and areas at risk were defined the examination of the broad design alternatives along the corridor could commence.

2.2 Development of Scheme Options

2.2.1 The proposed site and broad design solution evolved through a three stage process:

Stage 1: Option Generation and Sifting (Long List)

Stage 2: Detailed Option Appraisal (Short List) and Selection

Stage 3: Detailed Design

Stage 1: Option Generation and Sifting (Long List)

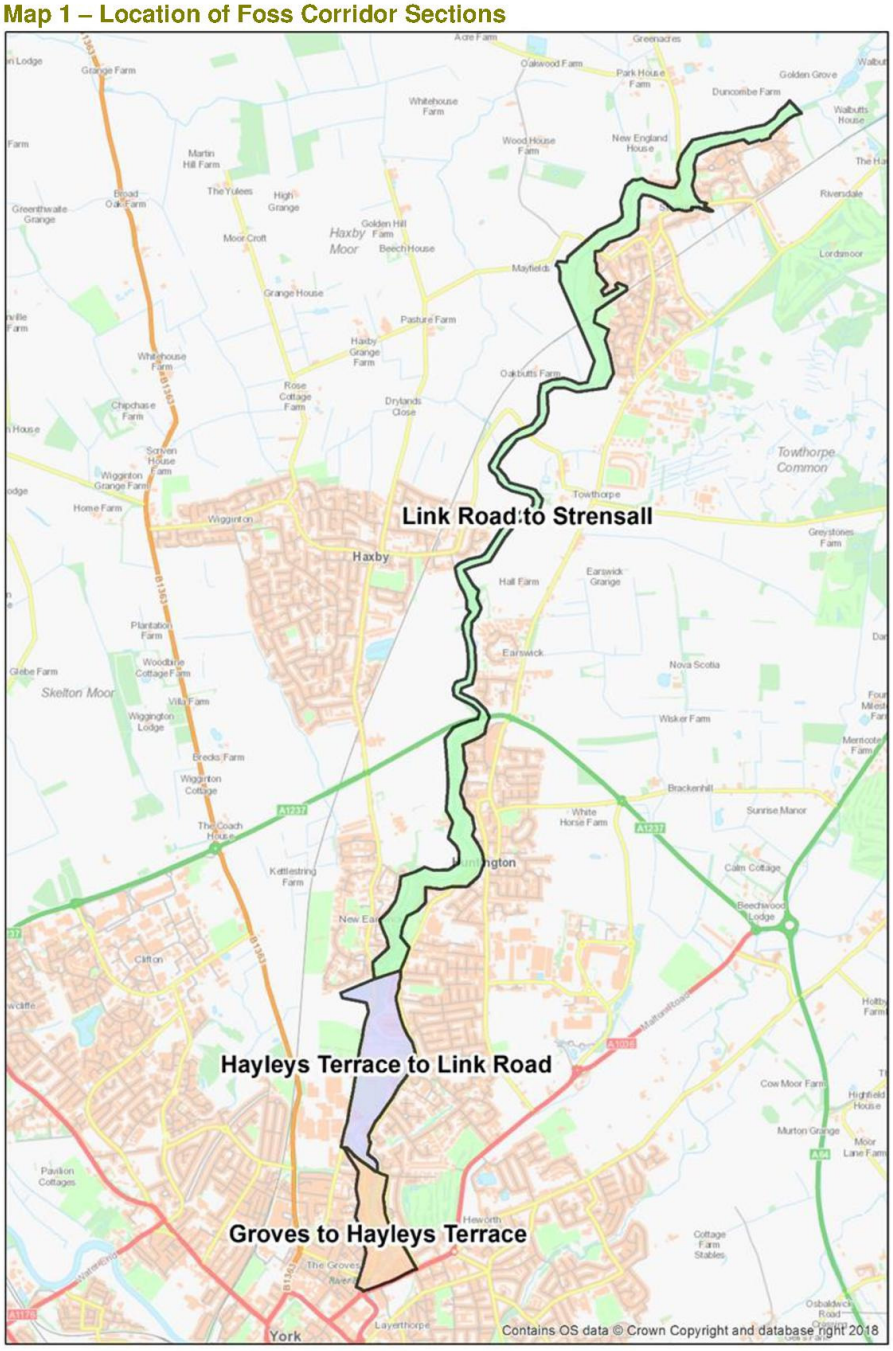
2.2.2 As part of the first stage an objective assessment of a long list of options was undertaken in order to identify options to progress to the short list stage.

2.2.3 This consisted of the development and assessment of options within three areas along the corridor. These areas are illustrated on Map 1 on the following page and consist of the following stretches along the Foss:

- From the Heworth Green (A1036) Foss bridge crossing in The Groves area of York to Haley's Terrace/Fossway,
- From Haley's Terrace/Fossway to Link Road,
- From Link Road to Strensall village.

2.2.4 A long list of interventions was developed to identify possible flood schemes to improve the protection afforded to those areas that could be delivered in the individual areas themselves and/or by protecting those areas through catchment-wide options.

Map 1 – Location of Foss Corridor Sections



2.2.5 A workshop was held with EA representatives and City of York Council to sift the long list and agree on 'unlikely', 'likely' and 'possible' interventions; only 'likely' and 'possible' interventions were taken forward to the short list.

2.2.6 The workshop screened out the 'non-starters' based on the themes of flood risk, technical, economic, environment, social and safety. The process could then move to the second stage of appraising the short listed options.

Stage 2: Detailed Option Appraisal (Short List) and Selection

2.2.7 In addition to being able to contribute towards the overall aims of the York FAS the appraisal considered any proposal's ability to achieve a series of objectives derived from the York FAS and the characteristics of the Foss corridor. The broad categories of those objectives are summarised below:

- Flood Risk – this considered maximising the number of properties protected overall and within each flood cell, increases in risk due to climate change, reducing risk to life, infrastructure, business and transport links whilst avoiding increasing flood risk elsewhere as a result of delivery.
- Technical and Engineering – was the design flexible to accommodate future adaptation, how easy would it be to build, amount of disruption caused during construction and ease of maintenance and operation.
- Environment, Social and Cultural – these categories covered a wide range of issues and impacts including visual, heritage, biodiversity, ground conditions watercourse impacts, disruption and access.
- Consultation and Consents - stakeholder engagement and consideration of potential significant environmental effects and requirements for planning and/or other consents.
- Economics - appraisal of whole life costs and benefits in accordance with best practice guidance.

2.2.8 In considering these objectives the assessment took into account key constraints and opportunities covering the York FAS as a whole and the characteristics of the Foss corridor. Some examples of the constraints and opportunities that influencing the decision-making and site selection are described below.

2.3 Overall Key Constraints

2.3.1 The York FAS as a whole is subject to the following constraints which had an influence on the chosen solution:

- Time-bound funding constraints – there are central government conditions on some of the funding requiring that it must be used to provide benefits by 2021;
- Timely delivery, conclusion of options assessment and delivery of viable flood defence schemes on the ground;
- Heritage, Townscape and Landscape – The City of York is a place of significant historic character with a large number of designated heritage assets both above and below ground. Flood defence options need to take into account the special character of the City, particularly within the York Central Historic Core Conservation Area and the Areas of Archaeological Importance. There is potential to impact upon identified assets and to introduce changes to the setting of these assets;
- Planning and Environmental Legislation - All elements of the individual projects will need to comply with the relevant planning and environmental legislation and a number of different types of consents, for example Scheduled Monument Consent, SSSI Assent, may be required;
- Stakeholder and Landowner Agreement – Due to the spatial extent of the shortlisted options the number of landowners that may need to be engaged will be large, especially in the more highly urbanised areas;
- Protected species – There will be a requirement for a number of protected species surveys to inform planning applications and/or mitigation works before/during construction. Seasonal constraints on protected species surveys represent a potential constraint on the programme. These specific

ecological surveys are currently being programmed to remove the risk of delay to the programmed planning and construction dates.

2.4 Northern River Foss Corridor - Key Constraints

2.4.1 In addition to the above the following are key constraints identified within the corridor as a whole:

- Heworth Green/East Parade Conservation Area located at the downstream end;
- York Area of Archaeological Importance located within the more urban built up areas;
- Strensall Common SSSI and SAC is located within 500m of the corridor's northern boundary;
- River acts as a wildlife corridor;
- Public footpath runs beside the river's right;
- Multiple private properties border the banks;
- Agricultural land at the northern end consists of numerous landowners which would require separate negotiation and compensation if works proposed on their land;
- Potential impact on wider land drainage must be considered;
- Utilities, in particular high voltage National Grid pylons are located through farmland at the northern end; and
- Narrow working conditions particularly in the more urban areas due to limited space between properties and the watercourse.

2.5 Northern River Foss Corridor - Key Opportunities

2.5.1 Whilst there are a notable number of constraints, there are also potential opportunities such as:

- Environmental improvements and in-channel biodiversity along the River Foss channel, for example, through the incorporation of bankside cover and the creation of aquatic ledges to create micro-habitats;
- Potential for water quality improvements in the River Foss by mitigating some of the agricultural runoff from upstream fields;
- Potential to improve existing public rights of way along the River Foss as well as improving connection to local recreational and amenity features; and
- Potential to better understand the heritage and archaeology of the local area through archaeological discoveries and digs.

2.6 Short Listed Options

2.6.1 The short-listing process produced both catchment-wide options and also localised interventions within each of the three identified sections of the Foss corridor.

2.6.2 Amongst the 'do something' options an opportunity to create an upstream flood storage area was identified. The flood storage location considered most suitable was that in the general area upstream of the village of Strensall, in the vicinity of Walbutts Farm. This location is well situated for capturing flow within the catchment, it being downstream of several tributaries. The potential for intercepting flow would be reduced at locations further upstream. The area is also designated as Flood Zone 3, and as such already vulnerable to flooding.

2.6.3 Locations to the west of Strensall, between Strensall and Haxby, and west of Earswick were also considered. The site to the west of Strensall was ruled out as defences would need to be constructed at Strensall along the Foss; much of this area is already in Flood Zone 3. The latter two locations were both discounted as a result of their proximity to urban developments.

2.6.4 In addition to the 'do something' options taken forward to more detailed appraisal 'do nothing' and 'do minimum' options were also considered. All these are discussed in further detail below.

Do Nothing

2.6.5 In the 'do nothing' option, all capital and maintenance expenditure on flood defence assets and flood management practices would cease. This option was only used as a baseline as it was considered to be impractical as existing flood defences would deteriorate and eventually fail and flood risk would also increase due to the impacts of climate change.

Do Minimum

2.6.6 In the 'do minimum' option all current flood risk management activities in York would continue at their current standard. Existing defences would be maintained at their current level and existing flood risk management activities would continue throughout the appraisal period. However, flood risk would increase over the appraisal period as a result of climate change.

2.6.7 The 'do something' Short List options are summarised below along with the basic rational for including them.

Option 1A: Linear Defences Only

2.6.8 This solution would require the construction of permanent and temporary hard engineered defences along all vulnerable sections consisting of new walls plus temporary protection for infrastructure most at risk.

2.6.9 Within the different areas the following interventions in combination were shortlisted:

Groves to Haley's Terrace

- Walls to protect properties on the right bank of the Foss on the towpath near Yearsley Crescent and low spot upstream of the Fossview development. This option provided a high level of protection to the residential properties.
- Flood wall to protect properties along Heworth Green from Fossview to Heworth Green on the right bank and at Heworth Green on the left bank. This infrastructure would also provide a high level of protection to residential properties and would also formalise existing defences protecting the Fossview properties.

Haley's Terrace to Link Road

- Install linear defences on left bank to protect properties on Meadowfields Drive with a temporary extension along Huntington Road. This offered a high level of protection to the properties and Huntington Road itself.
- Install linear defence on both banks near to the Huntington Road bridge. The main benefit of this option is to prevent overflows immediately downstream.
- Install linear defence on the right bank at Yearsley Crescent. The main benefit of this option is to prevent overflows immediately downstream.

Link Road to Strensall

- New linear defences combined with raising existing defences which would provide a high level of protection to properties on Pollard Close.

- Combination of linear and temporary defences which would protect a limited number of properties, provide a high level of protection to the nearby substation and Huntington Road itself.

Option 1B: Linear Defences Only – Adaptive

2.6.10 This would also require hard engineered solutions consisting of adapting existing and gradually increasing new linear defences including by raising existing walls plus temporary protection for vulnerable infrastructure. This would provide a lower initial standard of protection to properties, but would have a lower initial cost when compared to Option 1A.

Option 2A: Flood Storage Area

2.6.11 Flood Storage Area to be created north of Walbutts at Lilling Low Lane which would also require some minor downstream interventions to cover residual flood risk. This option was considered to have potentially significant flood risk benefits and be economically viable. If combined with other options, it could also make defences in the urban area cheaper, lower and have less of an impact.

Option 2B: Flood Storage Area (with increased capacity to account for Climate Change)

2.6.12 Flood Storage Area to be created at Lilling Low Lane which would also require some minor downstream interventions to cover residual flood risk. Provides additional protection over Option 2A allowing it to provide longer term defence against anticipated climate change effects.

2.6.13 Three further options were also considered (3A, 3B and 3C) that provided different combinations of a FSA and the adaptive defence approach.

2.7 Short List Analysis

2.7.1 The Short List Options, including Do Nothing, Do Minimum, and all Do Something options, were appraised against the objectives discussed above. Table 1 below is extracted from the OAR and summarises the scores of the various options. The lower the score the better the solution was aligned to the objective category in all options.

2.7.2 As can be seen option 2A was found to be best aligned with the overall objectives when averaged out, however, was ranked only fifth-best in terms of its standard of flood protection and reduction of flood risk. It was estimated to offer protection to greater numbers of properties and reduce the risk to life to a greater extent than the options involving only linear defences.

2.7.3 Option 2B was a very close second in the analysis (mostly as a result of its higher construction costs) but it offered the best overall standard of flood protection. Options 2A and 2B were rated highly for their ability to account for multiple sources of flood risk, due to their placement on the confluence of multiple upstream watercourses.

2.7.4 The combination options (3A, 3B and 3C) scored significantly worse than the pure FSA options due to the amount of works taking place within the urban area. This added greatly to the complexity of delivery, requiring consents and engagement from a large number of nearby stakeholders such as residents and businesses, as well as generating significant environmental impacts, such as noise and air quality impacts during construction, visual impacts, and potential damage to heritage assets, among others. These potential impacts would again be exacerbated by the large number of residents, business and communities in the urban area.

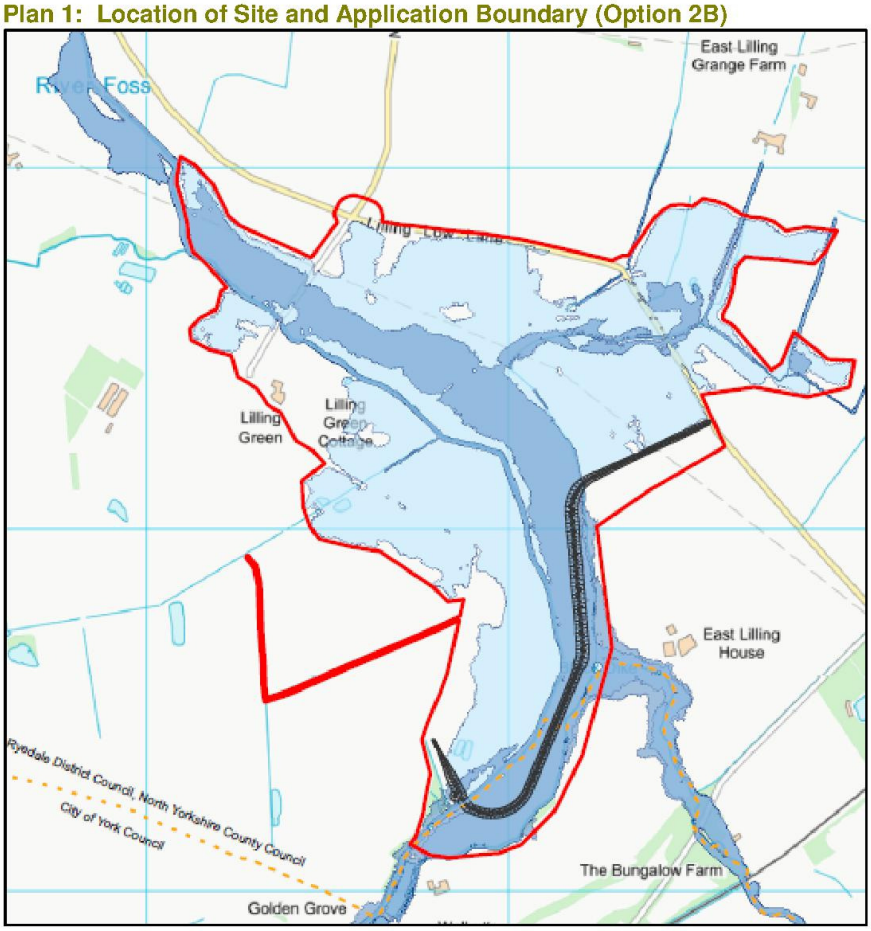
2.7.5 By contrast, the flood storage options, whilst still having impacts, their extent and scale would be significantly lower, affecting fewer landownerships, people and places.

Table 1: Appraisal Summary and Option Ranking

Option	Flood Risk	Technical	Environmental	Consents	Economic	Average Score	Ranking
Do Nothing	9.00	5.80	6.82	5.50	1.00	5.62	6
Do Minimum	7.13	5.60	4.27	5.00	2.00	4.80	5
Option 1A: Linear Defences Only	5.63	7.80	4.18	8.50	8.00	6.82	9
Option 1B: Linear Defences Only - Adaptive	6.13	6.40	4.64	7.50	7.00	6.33	8
Option 2A: Flood Storage Area	4.38	3.20	1.64	1.00	3.00	2.64	1
Option 2B: Flood Storage Area with increased capacity to account for Climate Change	1.25	3.40	2.27	2.00	5.00	2.78	2
Option 3A: Combined & Adaptive. FSA and Minor Interventions then Linear Defences	2.25	4.40	5.09	6.00	6.00	4.75	4
Option 3B: Combined & Adaptive. Linear Defences then FSA and Minor Interventions	3.25	5.40	5.18	8.00	9.00	6.17	7
Option 3C: Combined & Adaptive. FSA then some Linear Defences and Significant Property Level Interventions	2.25	4.60	4.18	5.00	4.00	4.01	3

2.7.6 Following the analysis the larger area of flood storage (Option 2B) was selected as the preferred option – see Plan 1 below. The decision not to select the highest ranked option was justified on the basis that the reduction in flood risk was deemed the most crucial objective and Option 2B provided the largest reduction in flood risk.

Plan 1: Location of Site and Application Boundary (Option 2B)



2.7.7 The following sections outline the DMRB Stage 3 process of the detailed site assessment and scheme development.

3 Site Context

3.1 Introduction

3.1.1 In order to assess the character and context of the selected site a number of studies were commissioned in order to fully examine the opportunity and seek to assess whether the proposed development was feasible. These studies examined the site's characteristics in order to establish the context within which the scheme could be designed in detail by producing a clear set of design principles and concepts that would drive the detailed design process.

3.1.2 The appraisal built upon the analysis contained in the site selection process described in the previous section.

3.2 Ground Investigations

3.2.1 It was raised at an early stage in selecting the preferred option that if all the material needed to construct the embankments was imported to site it would generate a substantial amount of traffic, which would potentially lead to air quality, noise, transport infrastructure and community impacts.

3.2.2 A decision was therefore taken, when weighing up environmental sensitivities and project needs, to attempt to source all or at least the majority of earthen material required for construction from within the site. Geotechnical investigations were undertaken to assess the suitability of material which could be found on site; these concluded that the material type and quantities required could be sourced on site. Further ground investigations were undertaken to determine the most appropriate and precise locations of the areas to extract the material from. The original analysis in captured in the accompanying Ground Investigations Report, the latter investigations in the Planning Statement and also in the minerals chapter of the Environmental Statement. However, in summary, the basic intention is that 4 'borrow pits' will be excavated – 2 temporary ones and 2 permanent. The layers of top soil and alluvial clay will be excavated and stockpiled on site to use in the surrounding body and top layers of the embankment whilst the underlying Vale of York clay is excavated and used to construct the core section as it is more plastic and will resist water migration.

3.3 Environmental Considerations

3.3.1 Avoiding, reducing or mitigating for any impacts the scheme may have on the environment was a key component of examining context of the site. An appraisal was undertaken the basis of which was the *Preliminary Environmental Information Report, York FAS – Foss Upstream Storage Area*, Environment Agency, January 2018 (PEIR), the findings of which are summarised below and the full report is available on request to the applicant.

3.3.2 The PEIR sought to address all the key issues associated with the potential development based on the basic initial requirements of the need for an embankment to hold flood water and the extraction of at least a significant amount of the material required for its construction from the site itself. It drew together the existing site information and reports and considered potential impacts of the construction works and the final scheme in operation.

3.3.3 A scoping exercise was undertaken to ensure that all potential environmental issues anticipated to be associated with the development were identified along with all

existing information. This provided a basis for assessment work which could identify the key issues to be considered once detailed design began, to inform further investigation work on potential impacts and refine potential design and environmental mitigation proposals.

3.3.4 This approach sought to ensure that all issues and concerns were taken into account at an early stage and that where necessary and practicable, avoidance and mitigation measures could be built into the detailed design. It was also intended to be the basis of discussions with key stakeholders. For example, it formed the basis of the engagement with the local planning authorities in determining whether the development came within the category requiring an Environmental Impact Assessment (EIA) to be undertaken and if so what the scope of such an assessment should be in order to inform any subsequent planning application.

3.3.5 The report provided a desk-based assessment of the initially scoped issues provided a summary of the key issues that needed to be taken into account in the detailed design and recommended further investigation works to provide additional detail where considered necessary.

3.3.6 It included baseline environmental information, potential construction and operational impacts, potential benefits, opportunities and mitigation requirements. It outlined the proposed approach to future environmental assessment for all the identified topics.

3.3.7 The PEIR was informed by desk-based studies, reviews of web-based information, site walkovers and consultation with key stakeholders. A summary of the main issues follows.

Biodiversity and Nature Conservation

3.3.8 The proximity of the site to the Strensall Common Special Area of Conservation (SAC) and Site of Special Scientific Interest (SSSI) highlighted the need to if possible to avoid impacts on this sensitive area and where not to introduce adequate mitigation. Within the proposed site itself there were potential impacts identified on protected species and their habitats. This led to recommendations of further survey work but also highlighted opportunities for mitigation and enhancement (e.g. wetland and species-rich grassland creation).

Cultural Heritage and Archaeology

3.3.9 Whilst there were no identified statutory or non-statutory heritage designations within or close to the site the lack of the proposed scheme detail meant that a full assessment would only be possible once this was known. With this proviso no fundamental issues were raised that would prevent the development of the detailed design. The possible presence of unrecorded archaeology was highlighted as requiring further investigation.

Agricultural Land and Soils

3.3.10 The development is likely to lead to the loss of some good quality agricultural land with consequent impacts on landowners and farmers. Whilst these impacts would be unavoidable mitigation would ensure that the loss of productive land was minimised and a compensation scheme could be put in place to offset the effects.

Landscape and Visual Impact

3.3.11 The impact on the local landscape (part of which is in the York Green Belt) and changes in the views of local residents and users of the adjacent public rights of way could potentially be negative. Using sympathetic design, landscaping, limiting exposed artificial materials and following the existing field pattern where possible were ways in which the scheme could mitigate the potential adverse impacts.

Water Resources and Flood Risk

3.3.12 An initial assessment of possible impacts on hydrology and geomorphology identified both potential negative and positive impacts. Initial mitigation suggestions included ensuring strict pollution controls during construction, provision of compensatory habitats and ensuring safe passage of fish post-development. Further detailed assessments were recommended as the detailed design firmed up.

Community and Socio-Economics

3.3.13 The main issues identified were the loss of agricultural land and potential disturbance from construction activities during development. Both these issues were covered elsewhere in the report and therefore no additional constraints on the design were identified.

Air Quality, Noise and Vibration and Human Health

3.3.14 The assessment considered that potential impact of the development of these three topics were all considered to be predominately restricted to the construction phase. Furthermore the main impacts could be adequately addressed through the implementation of standard environmental protection practices so that there were considered to be no extraordinary impacts that would affect the scheme design.

Existing Infrastructure

3.3.15 This concerned the potential effect on energy and communications assets of which the key elements which needed to be taken into account were two electricity distribution lines crossing the site.

Transport and Access

3.3.16 At the time it was written the PEIR assumed that the bulk of material for the construction of the embankment would be sourced on-site. Construction transport requirements were expected to be the most likely to have an impact and it recommended that they be fully assessed within a transport statement. The potential need to reinforce or modify Ings Lane and Lilling Low Lane were also highlighted.

Major Accidents and Disasters

3.3.17 No extraordinary impacts were anticipated within this topic and construction and operational health and safety plans would be able to mitigate and protect against the potential threats.

Material Production and Usage

3.3.18 The likely gaining of the majority of the materials for the construction of the embankment from on-site meant that the main recommendation was to ensure the design minimised the use of new materials and those that were used would be sourced sustainably.

Geology and Contaminated Land

3.3.19 The initial ground investigation results available at the time of writing the PEIR revealed a low likelihood of any contamination being present. The impact on any underlying geology was also considered to be very low or negligible.

Waste

3.3.20 Any issues arising from the creation and disposal of waste were considered to be sufficiently dealt with through standard mitigation measures.

Climate Change and Carbon Emissions

3.3.21 The construction phase of the project was considered to be likely main source of impacts during the lifetime of the scheme which will obviously be short-term. The use of a carbon calculator in the development of the detailed design and built in adaptability were recommended.

3.3.22 The PEIR, completed in early 2018, directed a number of subsequent studies and surveys that all fed into the design process as it progressed. These included

protected species surveys, an ecological appraisal, transport statement and further landscaping and archaeological assessments. Whilst these reports and surveys were conducted in parallel with the detailed design process the PEIR ensured that the key aspects of these issues and their potential impact on the fundamental design of the scheme were captured before this process began in earnest.

3.3.23 The need for an EIA to be undertaken was pursued with the local planning authorities based on information contained in the PEIR which resulted in the requirement for an assessment to be undertaken covering a limited number of topics. A full commentary of this process is contained in the accompanying Environmental Statement produced from the assessment.

3.3.24 In addition to the PEIR the site context was informed by reference to the policy framework and consultation with the general public and other key stakeholders.

3.4 Consultation

3.4.1 Throughout the process of identifying and developing the preferred option for the Foss corridor, consultation with the public and key stakeholders has been undertaken and recorded.

3.4.2 To inform the detailed design this consultation included seeking the public's views through publicity and public events. Local parish councils and affected landowners were consulted directly. Close liaison was also established and maintained with a stakeholder advisory group and targeted consultation undertaken with interested and directly affected parties.

3.4.3 Amongst the key stakeholders views sought were from those with a direct responsibility for the management of the Strensall Common SAC/SSSI including the Yorkshire Wildlife Trust, Natural England and the Ministry of Defence; the purpose of which was to ensure that the scheme could be designed to avoid any impact on the site rather than require mitigation against adverse impacts. Other views sought included those from the local planning authorities (Ryedale District Council and City of York Council) and North Yorkshire County Council as coordinating minerals authority and as the flood risk and highway authority covering Ryedale District.

3.4.4 Consultation was undertaken to determine any potential effects on infrastructure providers the most important being Northern Powergrid, covering two overhead lines and Yorkshire Water as managers of the Walbutts waste treatment facility. Initial discussions established that one of the power lines would almost certainly be affected.

3.4.5 The desire to retain access to the Public Right of Way (PRoW) adjacent to the site was raised by The Foss Society and local residents.

3.4.6 The Foss Internal Drainage Board (IDB) highlighted a number of issues which were taken forward into the detailed design including maintaining access for their purposes and a strategy for dealing with an 'extreme' flood event that would exceed the capacity of the FSA.

3.4.7 In addition to these initial consultations the process of engagement continued throughout the detailed design process and the accompanying Statement of Community Involvement contains full details of these consultations including the range of issues that emerged and a commentary on how the final scheme design was influenced by the various consultations.

3.5 Planning Policy Context

3.5.1 As discussed above direct consultations were held with the local planning and minerals authorities. This informed an initial appraisal of the key policy issues which would need to be addressed or have an influence on the scheme to be identified. This examined the development plans of the local authorities and the EIA regulations.

3.5.2 Establishing the basis of policy support for the principle for the development was foremost amongst the objectives of the exercise; on balance, support was considered to be strong, when the benefits and impacts of the scheme were weighed together. In terms of individual policy areas, environmental considerations and impacts, particularly on the York Green Belt, were prominent in the considerations to be addressed. The initial review reinforced the importance of addressing the issues identified in the PEIR and through other consultations.

3.5.3 A full assessment of the planning policy context is provided in the accompanying Planning Statement and Application Summary.

3.6 Design

3.6.1 The next two sections discuss the design and access elements comprising the scheme. Included in the commentary are statements about how the issues identified from the assessment of the site's context were considered and to a large extent incorporated into the final design. The commentary above was essentially the initial assessment, however, refining and developing the context, parameters and constraints of the scheme was an ongoing process as more information became available from additional studies and ongoing consultation which all fed into the design process.

4 Design Statement

4.1 Overview

4.1.1 The application site is located in either side of the River Foss northeast of Strensall. It extends from north of the Haxby-Walbutt's waste water treatment works to a point southeast of Bridge Farm. It also extends northeast beyond Lilling Low Lane and towards East Lilling Farm. The downstream extent of the storage would be just upstream of the confluence between Black Dike and the River Foss (Grid reference: 464829, 462217).

4.1.2 The proposed storage area has been designed to provide protection from a 1-in-100 year flood and also cope with the increased impact of climate change up to 2080. It is expected that the Foss FSA project will better protect a total of 490 properties (465 residential and 25 non-residential) from flooding downstream along the Foss corridor in York plus a number of properties in Strensall. In addition to the scheme, 2 residential properties downstream will require further property-level protection measures to achieve this full standard of protection. A single commercial property will also not be fully protected to the design standard. Although better protected by the scheme it will not be offered additional property-level protection.

4.1.3 The project will involve the construction of an earth embankment, approximately 1.65km in length and with an average height of 2.5m and a maximum height of 3.85m above existing ground level, which crosses the River Foss. A flow control structure will allow water through the embankment along the line of the existing river, this will extend to maximum height of 5.75m from the base of the structure part of which will be below the river level. By controlling how much water can flow through, and by the embankment holding water back during high-flow conditions, potential flood waters will back up into a basin defined by the proposed new embankment and the natural topography of the land. This flood storage reservoir will only be full during a 1-in-100 year flood event. The footprint of the flood storage reservoir when full is shown in Plan 2 below which also shows the current baseline flood outline for a similar event.

4.1.4 The site is located within an area of open, arable farmland surrounded by, at most, gentle slopes with isolated prominent farmhouses and associated buildings. The overall flat landscape is divided by the River Foss and crossed by numerous water features (e.g. Black Dike, streams, ditches and temporary ponds).

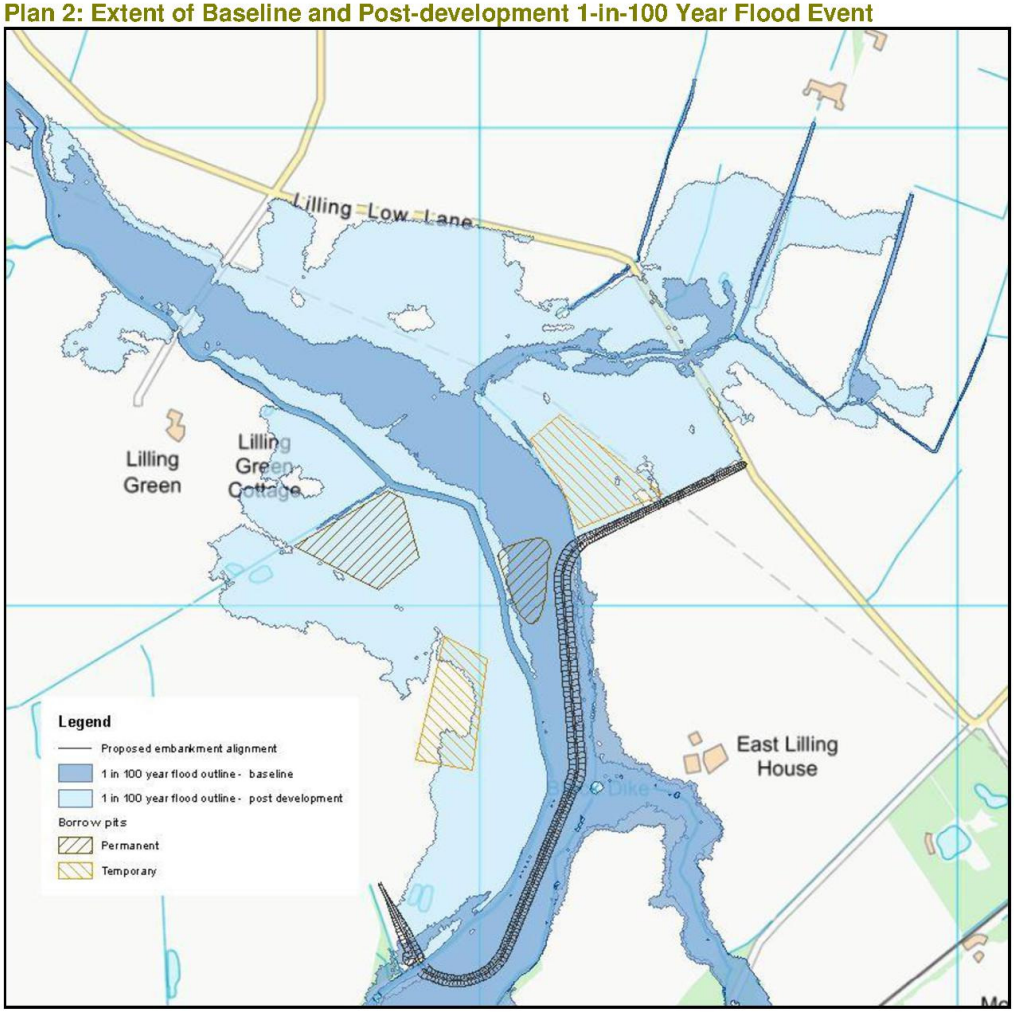
4.1.5 The large fields are a key landscape element emphasised by the there being few boundary features. The hedgerows that are present are relatively small and contain few trees. This provides more prominence to the trees, especially the mature ones that are present.

4.1.6 The open aspect and extended views across the area exaggerates the impact of the tall, large-scale high voltage electricity pylons crossing site approximately northeast to southwest.

4.1.7 The isolated groups of buildings at Lilling Green are within the application site as are parts of Lilling Low Lane and Ings Lane all with narrow carriageways.

4.1.8 A PRoW forming part of the Centenary Way, Ebor Way and the Foss Walk routes is within the redline boundary and partly runs along the eastern boundary and Ings Lane.

Plan 2: Extent of Baseline and Post-development 1-in-100 Year Flood Event



4.1.9 The red line planning boundary (see Plan 1) covers approximately 151.88ha but the physical aspects of the scheme would only permanently use land for the embankment structures, borrow pits and environmental mitigation. The potential area of flood storage at full inundation would occupy approximately 130ha, however, this land would be able to continue in agricultural use (or utilised for environmental mitigation as proposed around the borrow pits) as inundation would be infrequent. The scheme would follow the right (western) bank of the Black Dike, and the planning site boundary includes a section of this watercourse to allow for a short section to be diverted.

4.1.10 Following the identification of the preferred option and with the site identified and its context appraised, development of the outline design was undertaken, with input from the design team. During this iterative process, multiple elements of the design were refined and amended, whilst making considerations for various receptors in the vicinity of the project. Regular discussions within the project team also allowed for mitigation measures to be integrated into the design as opposed to added subsequently. The key elements of the design that were influenced prior to the preferred option being finalised are outlined below.

4.2 Layout, scale and appearance

4.2.1 The proposed storage area has been designed to store up to approximately 1 million cubic meters of excess flood water which, as discussed above, would occupy a total area of approximately 130ha. at full inundation. The scheme consists of the following key physical elements, the embankment and the borrow pits which are both shown in outline on Plan 2 above.

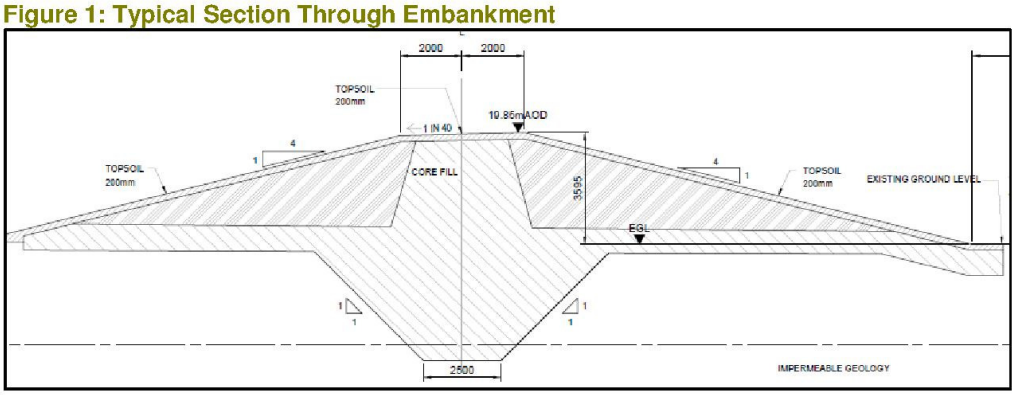
Embankment

4.2.2 The proposed embankment extends generally south to north across the central portion of the application site. It runs for a length of 1.65km from approximately 160m west of the bank of the River Foss, over the river and parallel to (but set back from) the west bank of Black Dike before changing direction towards the northeast, and ending just before Lilling Low Lane.

4.2.3 The general location of the embankment owes much to the desire to avoid any potential to alter the hydrology of the watercourse resulting in negative impacts on Strensall Common. This requirement was one of the key constraints on the development identified through early consultation and engagement with key stakeholders.

4.2.4 In order to construct the embankment a cut-off trench will be excavated to a level ranging between -0.5 to -3m below ground level. Core (Vale of York) clay material will be transported to the trench and compacted in layers. This trench will reach to the level of impermeable geology thereby preventing any seepage under the embankment. It will then be built up above ground level to the required crest level through a combination of core clay and the less dense or siltier clays. Finally, the entire embankment will be top-soiled and grass-seeded. Its height and construction varies along its length. The embankment is 1.65km long, its average height is 2.5m and its maximum reaches 3.85m along parts of the central section, its maximum width is 32m from toe-to-toe. Gradual 1-in-4 slopes apply generally along the whole length and Figure 1 below shows a typical section through the embankment showing the profile and different layers.

Figure 1: Typical Section Through Embankment



4.2.5 In order to achieve the storage capacity required the embankment needs to achieve a height of 19.85m above ordnance datum level. Due to the varying existing ground level across the site the height of the embankment varies considerably. The height and design was determined with reference to the main purpose of the embankment but was also designed to be as wide and low as practical given other constraints, such as minimising the amount of agricultural land lost, in order to help minimise its visual impact and appear to be as 'natural' a possible within the landscape.

4.2.6 At the western end the embankment gradually rises to a height of 2.8m above existing ground level with the wide crest being used to provide a vehicular access

track and turning head, finished in a tarmac surface, to the top of the flow control structure. Beyond the flow control structure the embankment continues for a few metres before sloping down slightly (0.7m) to a lower level at which a 575m length of the embankment is to be provided with a spillway to enable any excess flood water overtopping the storage area to do so without damaging the embankment.

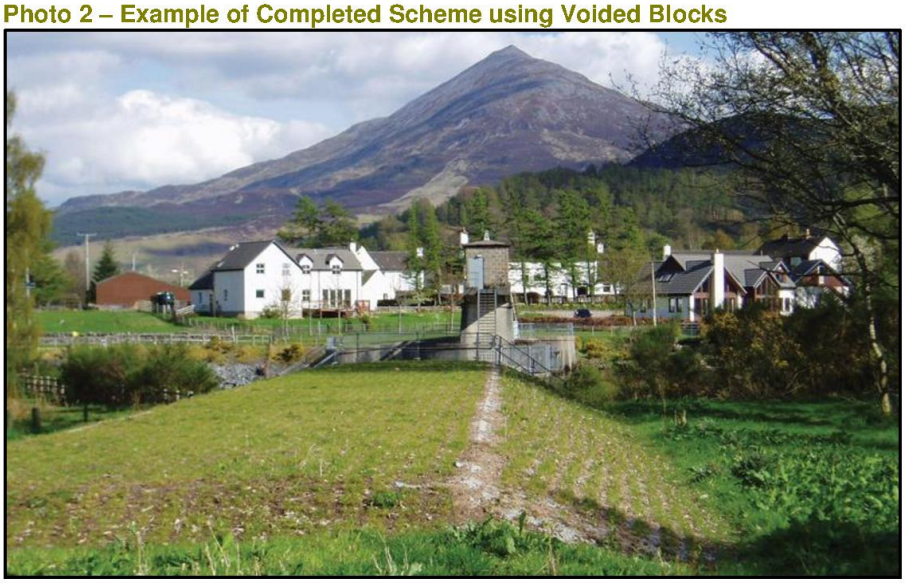
4.2.7 The spillway will be protected on its crest, eastern and southern side by voided concrete sections. These will allow grass to be grown through the voids, to match the rest of the structure, whilst still protecting the top and side of the embankment from being subject to erosion. These concrete blocks will be similar to those illustrated in Photos 1 and 2 overleaf. Beyond the spillway the embankment gains height again and the first 75m of the eastern slope will be reinforced using turf matting to provide additional robustness to this grassed section.

4.2.8 Below the northern end of the spillway opposite the elbow bend in Black Dike a buried wall will provide scour protection to the bund and prevent it from being undercut or undermined by future migration of the watercourse. A similar feature was also incorporated on the western toe of the embankment at the closest point that the Foss comes to the feature prior to passing through the flow control structure.

4.2.9 The remainder of the embankment will be of the earth mound construction described previously. A ramp with a long shallow 1-in-16 slope on either side over the embankment will be created at the western end to allow farm vehicles to cross. This will be constructed from the same material sources from the site to build the main embankment and provided with a crushed stone surface to create a track over the feature with top-soiled and grass-seeded sides. The ramp was seen as an essential feature to prevent severance of farming units.

Photo 1 – Example of Voided Grass Blocks

Photo 2 – Example of Completed Scheme using Voided Blocks



Borrow Pits

4.2.10 The feasibility for sourcing the material for the construction of the preferred option and the location of the borrow pits was determined through consultation with landowners and input from multiple technical specialists.

4.2.11 In order to construct the embankment the required amount of fill is 112,000m3 which will provide material for both the above ground level and the 'core' beneath ground level. The vast majority of this material will be sourced on site which substantially meets the ambition to minimise the amount of vehicle movements necessary, reducing the scheme's impact on the environment and local residents as well as creating the opportunity for biodiversity gains within the excavated hollows. A contingency amount of imported clay has also been allowed for totalling 2,300m3. This will be used to allow the construction timetable to keep to schedule if there is a delay in bringing the on-site borrow pits into use.

4.2.12 The reason for the decision to import some material was based on the need to have a quantity of 'contingency' fill which could be brought onto site to provide flexibility to the construction programme.

4.2.13 Four borrow pits will be created within the site boundary during construction, as indicated in the application drawings. Two of these pits will be temporary and following extraction will be backfilled and fully reinstated to their original condition and use. The remaining two pits will be left permanently excavated and used to provide environmental mitigation following completion of the site works. This arrangement allows there to be certainty regarding the extent of the excavations and amount of suitable material that can be extracted. It allows the vast majority of material to be gained from the on-site pits and transported within the site boundary on temporary haul roads to the embankment locations to enable their construction.

4.2.14 It was also proposed at an early stage that the borrow pits be used to create areas of wetland habitat within the site boundary and within the storage area. The design has been developed with input from river geomorphologists, ecologists and landscape architects to develop the concept of creating a 'backwater' to the River Foss, which is kept wet through a combination of groundwater, the routing of land drainage and flood events during high flow conditions.

4.2.15 After construction, the borrow pits to be retained will be profiled and re-landscaped, providing the opportunity for additional flood storage and the creation of the

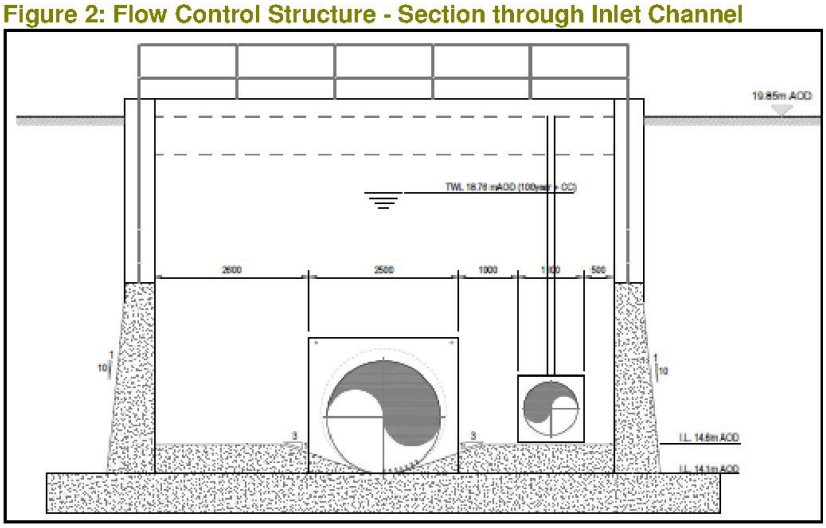
proposed new wetland habitat. The 2 permanent borrow pits between them occupy 4ha. The larger of the two permanent ponds is adjacent to the west bank of the Foss and its irregular shape extend to a maximum of 160m in length. The smaller elongated pit on the eastern bank extends to a maximum length of 125m. The final proposals for the pits are shown in the accompanying landscaping drawings as described in section 4.3.

River Flow Control Structure

4.2.16 The embankment will incorporate a control structure as it crosses the River Foss, this will allow a continuous flow of the river in all circumstances through a tubular opening. This flow has been modelled to cope with the designed flood parameters and will not force water to overtop the embankment under these circumstances.

4.2.17 The structure is to be constructed from concrete and steel, materials which will be retained as the external finishes. It occupies the river section between the two parts of the embankment and is contained by two 30m long concrete wing walls reaching to the top of the embankment approximately 5.75m above the new cast concrete river invert. The structure and river banks are protected from scour by adjoining angled wing walls either side at both ends and sections of rip-rap stone proposed adjacent to the angled wing walls on either bank both upstream and downstream. The width of the structure's concrete headwall is 7.7m and the river flow control is provided by a 2.1m circular opening which will be restricted to 1.9m diameter by a steel plate. This arrangement provides a degree of future-proofing and adaptability with the option to adjust the opening of the steel plate for larger or smaller flows if required. To cope with any blockage of the main opening and a 0.9m diameter penstock gate valve, which will be closed under normal circumstances, is also provided. Figure 2 overleaf shows a section through the inlet channel.

Figure 2: Flow Control Structure - Section through Inlet Channel



4.2.18 Depths in the channel will be monitored by sensors in the channel with readings communicated remotely via telemetry equipment sited on top of the embankment.

4.2.19 Additional engineering works to facilitate the construction of the structure in 'dry' conditions will be required in order to temporarily divert the Foss. A short section of the river Foss will be diverted to the east of the existing alignment as shown on drawing number ENV0000381C-CAA-00-00-DR-C-I0500_24. This temporary channel will be designed to maintain flow capacity of the Foss whilst the structure is being built. Following completion of the flow control structure, the temporary diversion will be removed allowing the Foss to flow through the structure and the remainder of the embankment to be built.

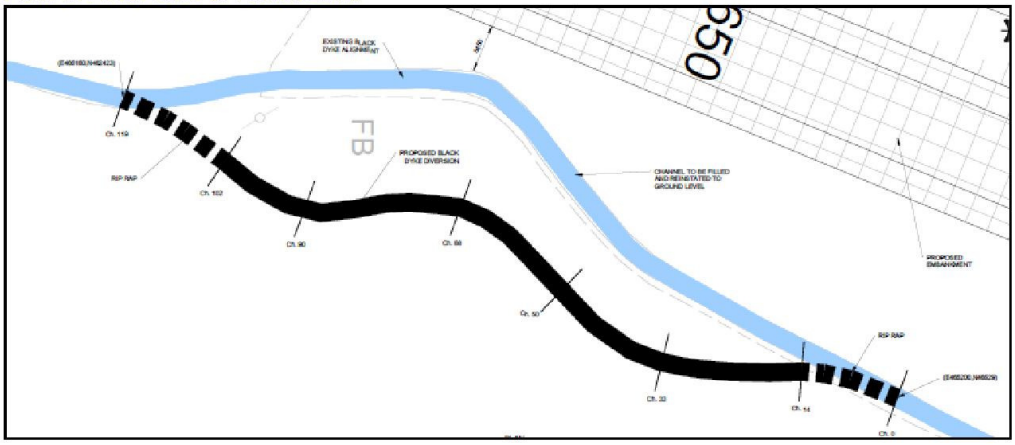
Black Dike Re-alignment and other Drainage Works

4.2.20 Following the early decision to locate the embankment north of Black Dike it was proposed to re-align a short section of Black Dike in order to move the watercourse away from the line of the proposed embankment at its nearest point reducing the possibility of future scouring. This minor change has been determined as not to have any knock-on effects on Strensall Common.

4.2.21 The length of the diversion is 119m as shown in Plan 3 overleaf, full details are provided in drawings ENV0000381C-CAA-00-00-DR-C-I0500_27 and ENV0000381C-CAA-00-00-DR-C-I0500_29 within the application pack. The slopes of the new channel will be planted to provide additional biodiversity gain (see description paragraph 4.3) and will include a flat berm section. The outer bend of the diversion will also be protected by small irregular stone rip-rap of between 100-150mm in length to help prevent any further movement of the watercourse.

4.2.22 An existing land drainage ditch will be diverted into the eastern borrow pit in order to help maintain the 'wet' conditions required in the pit for the biodiversity improvements proposed. In order to ensure the maximum flow into the pit from the ditch an existing section of the ditch north of the proposed embankment will be filled in.

Plan 3: Diversion of Black Dike

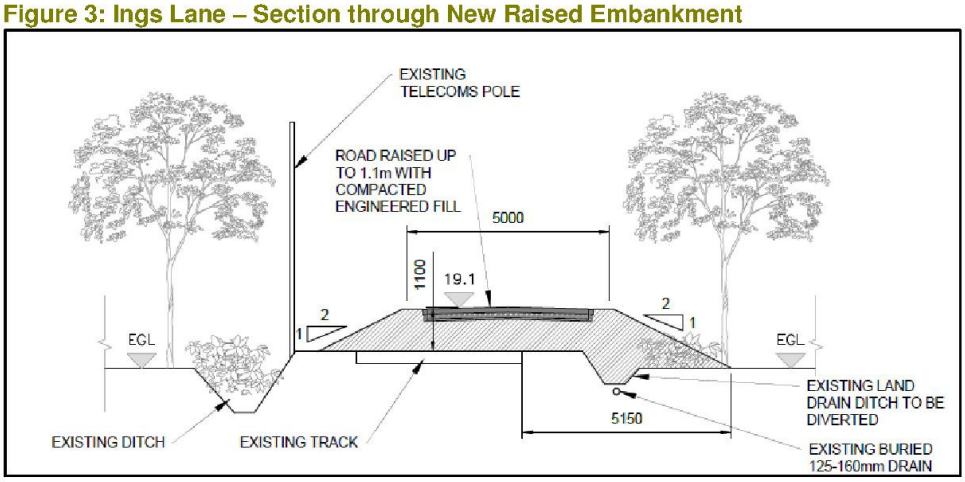


Ings Lane Raising

4.2.23 Baseline data suggests that a short section of Ings Lane would flood during a 1-in-100 year event. However, completion of the development would make the extent of the inundation worse under these flood conditions. In order to mitigate this and improve the access arrangements under flood conditions to Lilling Green and along this section of the PRoW it is proposed to raise this part of the lane to a level above the post-development 1-in-100 year + CC event water height. This is shown in drawing number ENV0000381C-CAA-00-00-DR-C-I0500_28 and involves a section of approximately 200m in length being raised to a maximum height of 1.1m above the existing track level. Figure 3 below shows a typical section through the proposed new lane.

4.2.24 The new 5m wide embankment will be engineered using material gained from the borrow pits and a new track formed using compacted crushed stone to match the existing arrangement. The track will join the eastern end of the existing bridge over the Foss; no changes to the bridge will be necessary to accommodate the works. A temporary diversion of the PRoW will be required and this is fully discussed in the accompanying planning statement.

Figure 3: Ings Lane – Section through New Raised Embankment



Alterations to Utilities

4.2.25 The main services of statutory undertakers running across the site are high level National Grid high voltage electricity power lines suspended from pylons (running generally northwest to southeast, 11kV power line on wooden poles (running northwest from East Lilling House) and BT overhead and underground cables along Ings Lane and from Smith's Lane to East Lilling House. Also partially within the site is a section of the Teeside-Saltend ethylene pipeline which, at its closest, passes just east of Lilling Low Lane. However, there are no impacts on this infrastructure or alterations to the pipeline necessary. The line of all these services is shown on drawing number ENV0000381C-CAA-00-00-DR-C-I0500_25.

4.2.26 The high level pylons will be unaffected by the development as the design allows for any work to be kept at least 35m from any of the pylons. However, the 11 kV powerline serving East Lilling House from Lilling Green is proposed to be removed as it would have to pass over the embankment which is not considered acceptable from a safety perspective. A new service to East Lilling House will be installed from a new connection on Smith's Lane by the statutory undertaker Northern Powergrid.

4.2.27 The works to raise Ings Lane are adjacent to overhead section of the BT line serving East Lilling. At the time of writing no impact on this service is anticipated. If changes are required these will be agreed with Openreach, the service infrastructure provider.

Additional Works

4.2.28 North Yorkshire County Council, as the local highway authority, has requested verge reinforcement where the flood storage extent extends over Lilling Low Lane. The design of the edge protection has been provided by North Yorkshire County Council. Drawing number LAxxxxxx/Patch/01 within the application pack contains the full details of the works which essentially consist of casting a concrete support to the carriageway edge along the western side of the potentially vulnerable section of road.

4.2.29 An area of hard-standing to enable the EA to park and load/un-load grass cutting equipment to maintain the embankment will be created at the eastern end of the embankment with access from Lilling Low Lane. The area will be fenced, gated and provided with a new hedge on the northern boundary.

Means of Enclosure

4.2.30 New fences and gates are proposed around the whole embankment, parking area and access ramp. The fencing will be of a standard 1.2m high wooden post and

wire specification. The gates will also be wooden and of a standard 5-bar field gate style.

4.3 Landscaping

4.3.1 A scheme of landscaping is detailed in the application which focusses on, firstly, seeding of the new embankment in order to integrate the feature into the existing landscape minimising its visual impact. The area of, and around, the borrow pits will also be extensively landscaped with the principal aim of providing species-rich wetland and grassland habitats; the landscaping will also seek to soften the visual impact of, and further integrate, the embankment into the landscape. Compensation for the loss of trees and hedgerows will be provided where the opportunity allows, principally around the borrow pits and Ings Lane.

4.3.2 Full details are containing in drawings ENV0000381C-CAA-00-00-DR-L-C0700_36 to 43. In order for the landscaping and habitat creation proposals to be a success they will require a period of establishment and ongoing management. This has been recognised by the applicant and the details are fully laid out in the accompanying Landscape Environment Management Plan (LEMP).

4.3.3 The following landscaping and habitat creation measures have been integrated into the design if the scheme and shall be implemented during construction.

Wildlife ponds, marginal habitat and biodiversity enhancements

4.3.4 Two large wildlife ponds with and marginal habitat in the location of the borrow pits will be created. These two ponds will provide the main static water body for the site.

4.3.5 Smaller 'settlement' ponds connected to the larger body will also be formed facilitating the creation of adjacent marsh and wet grassland between the two ponds. These areas will be managed for wet meadow and wildflower species. This area will provide excellent cover for wading birds and other wildlife.

4.3.6 These features will create a habitat for a diverse range of invertebrate and amphibians.

4.3.7 Aquatic vegetation has been graded through to marginal and then marsh habitats around the perimeter of the ponds. Site-won material will be used to raise areas of land to create a wildflower habitat. It is intended to create a shallow margin to all pools to encourage wading bird species to feed and nest.

4.3.8 In order to help retain the water levels in the ponds the smaller pond will have an existing land drain diverted into it, a culverted outfall will connect it to the Foss. The larger pond will be connected to the Foss by the lowering of the river's bank allowing water to be retained in it.

4.3.9 Enhancements and improvements to sections of the Foss totalling 225m to increase the ecological capacity will also be undertaken. The length of the proposed Black Dike diversion will also be treated to create additional marginal habitat similar to that proposed for the ponds.

Species-Rich Grassland

4.3.10 Additional areas around the ponds outside the marsh/wetlands will be used to create species-rich grassland. This will further encourage a more diverse range of habitats and associated ecological benefits.

Trees and Hedgerows

4.3.11 Tree and hedgerow planting will be undertaken in multiple locations throughout the site. This will provide compensation for the loss of trees and contribute towards the mitigation of other ecological effects. The areas of proposed tree and hedge planting are:

- trees around the proposed wetlands – these are mainly around the margins of the two permanent ponds;
- trees either side of the western section of the embankment;
- trees either side of the embankment, on the eastern bank of the River Foss adjacent to the eastern end of the spillway; and
- new hedge along the north of Ings Lane, the new hardstanding area and smaller pond.

4.3.12 A Tree Protection Plan will be produced prior to development beginning in order to ensure the safeguarding of any trees or hedgerows that may be at risk from construction activities.

5 Access Statement

5.1 Operational Phase

5.1.1 All access issues covering the construction and operational phases of the development are fully described and assessed in the accompanying Transport Statement. However, the purpose of this statement is to summarise the operational access requirements and design considerations of the scheme.

5.1.2 The facility has been designed to be a passive structure and as such will not require any staff to be permanently present on site. Occasional routine inspections and maintenance will be required, focussed on the flow control structure, embankment and landscaping/ponds. For example, the embankment will require regular grass cutting estimated to be around 6 visits per annum. These inspections and maintenance will be undertaken by EA staff.

5.1.3 Inspections and maintenance of the watercourses will also continue to be required on behalf of the local IDB. These activities are anticipated to be no more frequent than they are currently but still at a very low frequency.

5.1.4 Vehicular access to the site is available via both Lilling Low Lane and an unclassified track off Sheriff Hutton Road. Improvements to these arrangements are proposed as part of the scheme in order to facilitate access for EA and IDB personnel and vehicles as described below.

5.1.5 Adjacent to the eastern end of the embankment a small area of hardstanding will be provided off Lilling Low Lane. This will be gated and locked and is intended only for EA and IDB use, for example, a typical use will be to safely unload and park grass cutting vehicles. An access strip 4m wide from the associated stock fence either side of the embankment will be maintained along the whole length to facilitate access for EA and IDB staff and vehicles.

5.1.6 From the west the existing unclassified track off Sheriff Hutton Road will provide access to the control structure and other features and will be subject to some permanent changes. Permanent improvements to two sections of this track and the creation of an additional section are proposed. In addition new tracks will be created along the western end of the embankment. All this work will allow access to the control structure and embankment even during a maximum flood extent.

5.1.7 Improvements will be made to a section of the existing track for approximately 350m north from the western end of the proposed embankment and involve extending the width of the stone-surfaced track to 4m. From the improved track two new asphalt tracks will also be created, one along the crest of the embankment to afford access to the top of the control structure and one along the eastern toe of the embankment to access the base of the structure.

5.1.8 From the northern end of the improved section of track a new 3m wide crushed stone track will be created along the boundary of the adjacent field to the west which in turn will link to an existing track (to be improved and widened to 3m) affording access to the existing main track. These tracks are detailed in drawing numbers ENV0000381C-CAA-00-00-DR-C-I0500_23 and 26.

5.1.9 During a 1-in-100 flood event access to Lilling Green will be maintained via Ings Lane by raising a portion of the lane above the maximum design height of the flood as described in section 4.

5.1.10 Without the development in place the PRoW running through the site would be impassable at a number of points to users during a 1-in100 year flood event. One of

these would be Ings Lane where access following the raising of the lane will be maintained. However, the other points will still be impassable following the scheme's implementation and in fact longer sections of the track along the site's western boundary will be flooded. The applicant is not able to justify raising the level of these sections above the maximum design flood height on either cost or environmental impact grounds. This is particularly so given that these areas are at the margins of the flood profile and will drain relatively quickly and that under baseline conditions sections of the PRoW would be impassable. The flood extent outline shown on drawing ENV0000381C-CAA-00-00-DR-C-I0500_23 shows the additional section of the PRoW that will be affected.

5.1.11 The above drawing also shows the short length of Lilling Low Lane that will also be inundated during this level of flood event. This section is unlikely to be affected under the baseline flood conditions but again it is considered that the cost and impact of raising this section of the lane cannot be justified. As described in the accompanying Transport Statement there is a convenient diversion via local lanes to avoid this section.

5.1.12 The proposed embankment to the east of the Foss bisects a currently contiguous landholding. In order to facilitate access between the two parts following the development, a wide ramp is proposed to be located at the eastern end of the embankment as described in the previous section, the ramp is illustrated in drawing number ENV0000381C-CAA-00-00-DR-C-I0500_32.

6 Sustainable Design and Energy Statement

6.1 Introduction

6.1.1 The principle of providing a sustainable development has been fundamental to the design of the proposal as it will be its delivery and operation should the application be approved.

6.1.2 The table below summarises those aspects that have been incorporated into the design, mitigation and delivery in order to achieve a sustainable, low energy development. More detail is provided in the other supporting documents such as the Environmental Statement on many of these issues.

6.2 Summary Table

Adapting to Climate Change	
Issue	Response
Reducing the Impact of Flooding	The whole scheme is seeking to significantly reduce the impact of flooding downstream in York. This is at the expense of unavoidable increased flooding locally of additional agricultural land. However, it has been designed in an extreme flood event to avoid any additional impact on residential properties or agricultural buildings.
	The capacity of the scheme to store water has been designed to take account of the predicted effects of climate change up to the year 2080.
Sustainable Drainage	The embankment has been designed, in terms of the construction materials and slope, to minimise the amount of surface water run-off. The embankment's concrete spillway is a large expanse but is constructed from open interlocking grids which allow water to percolate through.
Irrigation	None of the proposed landscaping will require any irrigation beyond the initial establishment period.
Energy Use	
Issue	Response
Design	The basic design of the scheme provides for the minimisation of energy use by using borrow pits to extract the majority of material required for the embankment. Provision has also been made to use the unsuitable material excavated from the pits to be reused on site. This means that there will be no export of fill material.
Construction	The contractor will be required to minimise the level of energy used. Part of their contract will require them to monitor planned and actual whole life carbon emissions associated with the delivery of the project. See also commentary on materials procurement below.
Operation	The facility will operate in a passive fashion requiring no powered mechanical equipment to control the flow. There will be no lighting provided to the site.

Water Pollution	
Issue	Response
Maintenance equipment using site, hardstanding and new tracks	No pollution control measures considered necessary due to very low level of usage.
Natural Environment	
Issue	Response
Biodiversity Gains	Significant improvements in the contribution the site makes to biodiversity are proposed in the scheme. Substantial new wetland areas incorporating 'marginal' vegetation and species habitats are being created which will contribute towards the creation, extension and diversification of a number of wildlife habitats.
Native Species	Native species of trees, shrubs and grasses will be used in all the landscaping proposals. The areas allocated for biodiversity enhancement will be excluded from farming activity and public access and will provide quiet undisturbed areas where wildlife can flourish.
Scheme management	In order to maximise the biodiversity gains of the proposed work the landscaping scheme will require both establishment and management. These commitments are outlined in the accompanying LEMP.
Waste and Recycling	
Issue	Response
Borrow Pit Material	All the material excavated from the borrow pits will be utilised on site whether it is used in the construction of the embankment or not and therefore there will be no waste from the pits exported off-site.
Top Soil	As above
Construction	The applicant requires that contractors implement schemes with the highest regard to sustainability. Construction policies and management plans will ensure that the production of waste from the site is kept to an absolute minimum and that which is generated is re-used or recycled as far as practically possible. The appointed Contractor will be required to agree a Sustainability Plan as part of the pre-start activities which will include a mechanism to ensure that they maximise the: • recovery, reuse and recycling of all resources; • use of recycled aggregates; • quantity, value, source and recycled content of the most frequently used materials; and • embedded water in materials used.
Materials	
Issue	Response
Long Life	The structure has a design life of 100 years plus with the need for maintenance reduced to an absolute minimum. Robust materials such as concrete and galvanised steel will be used in the construction of the flow control structure and spillway to promote longevity. Future flexibility to vary the maximum flow of the river has been built in through the potential to adjust the opening of a steel plate fixed across the wider opening in the concrete headwall.

Procurement	The applicant has policies governing the procurement and use of 35 generic commodities, including materials such as timber and aggregates, for example: • Delivering 'Creating a Better Place' by encouraging a "Greener Business World" and "Wiser Sustainable Use of Natural Resources"; • The whole life cost of a product is taken into account, including factors such as energy use, water use, air emissions etc; and • Social impacts of the product/service are considered.
Economic Benefits	
Issue	Response
Training and apprenticeships	As part of the Sustainability Plan to be agreed with the applicant the contractor will be obliged to consider opportunities for apprenticeships and/or getting people back to work as part of the project.
Sub-Contractor and supplier Policies	Within the Sustainability Plan the contractor will need to consider how the procurement of services or materials can benefit local small and medium sized enterprises.

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