

FOUL AND SURFACE WATER DRAINAGE STRATEGY

FOR

KFC/TACO BELL AT LINCOLNSHIRE GATEWAY BUSINESS PARK, SPALDING

ON BEHALF OF

ERINDALE LIMITED

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Foul and Surface Water Drainage Strategy for KFC/Taco Bell at Lincolnshire Gateway Business Park, Spalding 2176/01r2			
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1.0 INTRODUCTION

1.1 Erindale Limited is proposing to develop a site at Lincolnshire Gateway Business Park, Goodison Road, Spalding, PE12 6FY with a restaurant/ drive thru takeaway. To support the planning application and assist with the appraisal of the site, a Foul and Surface Water Drainage Strategy is required to outline the proposed means of sustainably managing foul effluent and surface water runoff from the development.

1.2 ARP Associates have been appointed to carry out a Foul and Surface Water Drainage Strategy for the development, implement appropriate consultations and prepare a report to satisfy the requirements of the Planning Authority.

1.3 The consultations and site appraisal for this assessment were carried out between March and April 2021. Reference is made to historic consultations and associated planning applications.

1.4 The full planning application is for a proposed KFC/TACO BELL A3/A5 restaurant/drive thru takeaway. Proposed site plans are attached (Appendix E). The proposed development site is within a larger parcel of land which has outline planning permission for 'business park, hotel, public house/restaurant, conference and function centre, petrol filling station, restaurant/cafe with ancillary retail together with associated landscaping, access, highways, parking, drainage, utilities and services and infrastructure works'. As part of this outline permission, the larger parcel of land has been broken up into a number of parcels. The application site is also identified as an allocation within the South East Lincolnshire Local Plan, as a prestige employment site SP002.

1.5 This report draws upon a historic Flood Risk Assessment (FRA), referenced 800/235r4, and drainage strategy prepared in 2014 by ARP as part of the outline planning application for the "wider site", which subsequently received outline planning permission. The 2014 FRA references the "wider site" and this refers to an area of approximately 24.7ha, located towards the south-eastern edge of Spalding Town Centre. The "wider site" is split by the B1173 into

two separate parcels of land. This current drainage strategy is for a parcel of land within the smaller of the two areas that the 2014 FRA refers to.

1.6 The report has been initially prepared for the use and reliance of the Client only. The report shall not be relied upon or transferred to any other parties without the written agreement of ARP Associates. For the avoidance of any doubt, where ARP Associates enters into a letter of reliance for the benefit of a third party, that third party will be permitted to rely on the report. No responsibility will be accepted where this report is used, either in its entirety or in part, by any other party without ARP Associates consent.

1.7 Attention is drawn to the requirements of the Construction Design and Management Regulations 2015, and in particular, the duties and obligations of the Client.

2.0 SITE DESCRIPTION

General

2.1 The site is centred on Ordnance Survey Grid Reference 524274, 319579 and is located off Goodison Road, Spalding, PE12 6FY.

2.2 A site location plan is presented in Appendix A.

2.3 The application site area is approximately 4005m^2 (0.4ha) in size.

Current Use

2.4 The proposed development site is derelict and undeveloped. Land adjacent and close to the site includes an operational Petrol Filling Station (PFS), Subway takeaway and Hotel / Public House, with associated access roads.

Boundaries

2.5 The west and southern physical boundaries are formed by highway embankments, with the A1175 on the south and Barrier Bank on the west. The site is open to former agricultural field land to the north and a Subway takeaway is located on the east of the site.

Topography and Vegetation

2.6 A copy of the topographical survey information for the site is presented in Appendix B. Although the ground is somewhat uneven, the general fall across the site is to the south-west. Levels range from approximately 3.8m Above Ordnance Datum (AOD) in the eastern side to 3.08m AOD in the south-west. There is an indicative gradient across the site of approximately 1 in 50. The site is covered in unkempt grass.

Hydrology

2.7 A ditch is present just outside of the southern site boundary. Currently, it is unknown where this drains to, however it is within the South Holland Internal Drainage Board (SHIDB) area of management. There are a number of similar ditches present to the south and east of the site. SHIDB have been consulted for further details the full response is included in Appendix F for reference purposes and discussed further in Section 3. The response indicates that the watercourse adjacent to the site boundary has not been adopted by the Board and is therefore a riparian watercourse. As discussed within the Foul and Surface Water Drainage Strategy report undertaken by ARP, reference 2176/01r2, the proposed surface water drainage strategy for this development is for proposed surface water to outfall ultimately into this watercourse. The IDB suggest the following:

> *"…works are proposed to alter this watercourse. To enable this proposal consent is required under Section 23 of the Land Drainage Act 1991 (and byelaw 4). Whilst the consenting process as set out under the Land Drainage Act 1991 and the aforementioned Byelaws are separate from planning, the ability to implement a planning permission may be dependent on the granting of these consents."*

2.8 To the west of the site, west of Barrier Bank, the land is within Welland and Deepings IDB area of management, and there are ditches present which drain into the River Welland. The River Welland is located approximately 485m west of the site at its closest point, and is classified as a Main River by the Environment Agency.

Existing Drainage

2.9 There is no known formal drainage system within the application site. Therefore, it is likely that surface water currently falling within the application site would infiltrate to some degree, with the remainder of the surface water following the topographical trend and outfalling into the ditch close to the southern boundary of the site.

2.10 Anglian Water is the Water Authority for the area and was consulted as part of the 2014 FRA. Their records indicate a public water main is present just to the east of the site. ARP prepared an Indicative Drainage Strategy in 2014 which shows the approximate location of water main. It should be noted that the drainage strategy is now superseded and is not considered further within this current assessment. The Water Authority records and superseded drainage strategy are provided in Appendix C for reference purposes.

2.11 As noted above, outline planning permission was granted for the "wider site", and which now comprises separate land parcels subject to individual planning applications. Consequently, recent development works have been undertaken close to this current application site. Notably, access roads have been provided for new developments adjacent to the site, which included provision of new site wide drainage infrastructure and systems. The existing drainage infrastructure arrangement is summarised below:

- Completed engineering works within the vicinity of the current application site include provision of new access roads to serve a petrol filling station, restaurant, takeaway and hotel
- The access roads are drained by road gullies, outfalling into concrete carrier pipes laid underneath the roads.
- Surface water from the new developments outfalls into the same concrete carrier pipes.
- The pipes outfall into a balancing pond, located approximately 150m to the northeast of the current application site.
- The balancing pond is shown to outfall into the adjacent watercourse via a pump station.
- Concrete stub pipes are available for this application site, shown to be 375mm in diameter.
- Between the application site to the balancing pond, the drainage pipes increase in diameter from 375mm to 675mm diameter.

3.0 CONSULTATION

Environment Agency

3.1 A consultation was requested from the Environment Agency, and the response, reference CNN/2021/211980, dated 15 April 2021 is included in Appendix D for reference purposes. Publicly available Environment Agency data has also been reviewed for reference and extracts from relevant online flood risk mapping are also included in Appendix D.

3.2 The Environment Agency flood map for planning show areas of land that could flood from rivers or the sea and are shaded blue. These areas do not take into account defences, as water can overtop them or the defences can fail in extreme conditions. The Zone classifications are:-

3.2.1 Flood Zone 1 - ''Low Probability'' is assessed as having a less than 1 in 1,000 annual probability of river or sea flooding in any year (less than 0.1%).

3.2.2 Flood Zone 2 - ''Medium Probability'' is assessed as having between a 1 in 100 and 1 in 1,000 annual probability of river flooding in any year (1% - 0.1%) and between a 1 in 200 and 1 in 1,000 annual probability of flooding from the sea (0.5% - 0.1%).

3.2.3 Flood Zone 3 - ''High Probability'' is assessed as having a 1 in 100 or greater annual probability of river flooding in any year (greater than 1%) and a 1 in 200 chance or greater annual probability of flooding from the sea (less than 0.5%).

3.3 The Environment Agency flood map shows that the application site is located entirely within Flood Zone 1. The EA confirmed that land within the proposed red line boundary for the site is designated as Flood Zone 1.

3.4 In some locations, such as around the fens and the large coastal floodplains, showing the area at risk of flooding assuming no defences may give a slightly misleading picture in that if there were no flood defences, water would spread out across these large floodplains. This flooding could cover large areas of land but to relatively shallow depths and could leave pockets of locally slightly higher land as isolated dry islands. It is important to understand the actual risk of the flooding to these dry islands, particularly in the event of defence failure.

3.5 The Flood Map also shows the location of formal raised flood defences and flood storage reservoirs. It represents areas at risk of flooding for present day only and does not take account of climate change.

3.6 The Flood Map only indicates the extent and likelihood of flooding from rivers or the sea. It should also be remembered flooding may occur from other sources such as surface water sewers, road drainage, and etcetera.

3.7 The EA provided a copy of the Historic Flood Event Outlines Map showing the extent of previous recorded flooding in the area. This only covers information the EA holds and it is possible recent flooding may have occurred which they are currently investigating, therefore this information may be subject to change. The EA stated that it is possible other flooding may have occurred which other organisations, such as the Lead Local Flood Authority (i.e. top tier council), Local Authority or Internal Drainage Board (where they exist), may have records. The record shows there is no record of flooding in the development site.

3.8 The EA stated that there are no ongoing capital projects to reduce or sustain the current flood risk to this site.

3.9 In respect of fluvial defence information, the existing fluvial defences reducing the risk of flooding to this site consist of Crowland-Cowbit washes and earth embankments. They are in fair condition and reduce the risk of flooding (at the defence) to a 1% (1 in 100) chance of occurring in any year. The EA inspect these defences routinely to ensure potential defects are identified. This proposed development is adjacent to Barrier Bank. This bank is a designated

flood defence, and it is essential that there are no adjustments or alterations to the bank at this location without prior consultation and approval (including relevant planning and permitting) from the Environment Agency.

3.10 The Environment Agency surface water flood map shows areas where surface water only would be expected to flow or pond in England and Wales. The classifications of risk for surface water flooding are as follows:-

3.10.1 Very low - This area has a chance of flooding of less than 1 in 1000 (0.1%) in any given year.

3.10.2 Medium - This area has a chance of flooding between 1 in 100 (1%) and 1 in 30 (3.3%) in any given year.

3.10.3 Low - This area has a chance of flooding between 1 in 1000 (0.1%) and 1 in 100 (1%) in any given year.

3.10.4 High - This area has a chance of flooding greater than 1 in 30 in any given year (annual probability of flooding 3.3%).

3.11 The Environment Agency online risk of surface water flooding map demonstrates that the whole of the site is at a 'very low' risk of flooding from surface water.

3.12 The EA provided further detail including available modelled fluvial flood levels, flow data, flood extents and hazard mapping. This information is discussed in more detailed within the Flood Risk Assessment report undertaken by ARP, reference 2176/01r1a.

3.13 The EA confirmed that the site is not considered to be at risk from tidal flooding.

3.14 The Environment Agency's online Flood Risk from Reservoirs map has also been reviewed as part of this study. This mapping shows the expected inundation area should a reservoir fail

and release its capacity. The site is not located in an area shown to be at risk of flooding from this source.

Water Authority

3.15 Consultation has been undertaken with Anglian Water, which is the Water Authority for this area. As noted earlier in the report, historic consultation with Anglian Water from 2014 is provided in Appendix C for reference purposes. A recent consultation response dated 30th April 2021, reference PPE-0119084 is provided at Appendix E.

3.16 The consultation request advised that the surface water is proposed to discharge to watercourse, therefore the Water Authority response primarily relates to foul water. The response is covered in more detail within detailed within the Foul and Surface Water Drainage Strategy report undertaken by ARP, reference 2176/01r2). A brief summary is provided below.

Assets affected

3.17 It was stated that their records indicate that there are no public water mains/public sewers or other assets owned by Anglian Water within the boundary of your development site. However, it is highly recommended that you carry out a thorough investigation of your proposed working area to establish whether any unmapped public or private sewers and lateral drains are in existence.

3.18 Due to the private sewer transfer in October 2011 many newly adopted public used water assets and their history are not indicated on our records. You also need to be aware that your development site may contain private water mains, drains or other assets not shown on our records. These are private assets and not the responsibility of Anglian Water but that of the landowner.

Water recycling services

3.19 The Water Authority advised that in examining the used water system we assess the ability for your site to connect to the public sewerage network without causing a detriment to the operation of the system. We also assess the receiving water recycling centre and determine whether the water recycling centre can cope with the increased flow and effluent quality arising from your development.

Water recycling centre

3.20 The foul drainage from the proposed development is in the catchment of Spalding Water Recycling Centre, which currently has capacity to treat the flows from the development site. Anglian Water cannot reserve capacity and the available capacity at the water recycling centre can be reduced at any time due to growth, environmental and regulation driven changes.

Used water network

3.21 The foul water assessment has been based on development flows connecting to the nearest foul water sewer of the same size or greater pipe diameter to that required to drain the development site. The infrastructure to convey foul water flows to the receiving sewerage network is assumed to be the responsibility of the developer. Conveyance to the connection point is considered as Onsite Work and includes all work carried out upstream from of the point of connection, including making the connection to our existing network. This connection point has been determined in reference to the calculated discharge flow and on this basis, a 150mm internal diameter pipe is required to drain the development site. The nearest practicable connection is to the 150mm diameter sewer at manhole 1200 in Fen End Lane at National Grid Reference NGR TF2429820143. The cover level is 3.61 and the invert level is 1.88.

3.22 The Authority noted that the intention to utilise an existing pump station in close proximity to the site, and this is not listed as a public asset and as such they are not able to comment in its

suitability. Anglian Water has assessed the impact of a pumped conveyance from the planned development to the public foul sewerage network and confirm that this connection is acceptable as the foul sewerage system, at present, has available capacity for the development site. In line with Sewers for Adoption, the pumped discharge will need to connect via an intermediate manhole and at least 5 metres of an appropriately sized gravity sewer. The pump rate and configuration of the connection will be determined from the detailed design. The developer should submit this detail with the Section 106 new connection application.

3.23 Please note that Anglian Water will request a suitably worded condition at planning application stage to ensure this strategy is implemented to mitigate the risk of flooding.

3.24 It is assumed that the developer will provide the necessary infrastructure to convey flows from the site to the network. Consequently, this report does not include any costs for the conveyance of flows.

Surface water disposal

3.25 The Pre-Planning Application form that a connection to the public surface water sewer network is not required as infiltration and a connection to a watercourse is to be utilised. A new surface water sewer can be used as a mechanism to discharge surface water to a watercourse or as part of a Suds scheme where appropriate.

3.26 Subject to the sewer being designed in accordance with the current version of Sewers For Adoption, the sewer can be put forward for adoption by Anglian Water under Section 104 of the Water Industry Act 1991. If the outfall is to a watercourse, the applicant will be required to obtain consent to discharge via the appropriate body. Therefore a capacity assessment has not been made on the public surface water network. However, should this situation change and it is preferred to have a surface water connection assessment on the local network, then the Water Authority will provide this free of charge if requested within 12 months of this report

and the developer is able to provide the relevant evidence that the original strategy was unviable.

3.27 Anglian Water will consider the adoption of SuDs provided that they meet the criteria outline in their SuDs adoption manual on Anglian Water website. The Water Authority will adopt features located in public open space that are designed and constructed, in conjunction with the Local Authority and Lead Local Flood Authority (LLFA), to the criteria within the SuDs adoption manual. Specifically, developers must be able to demonstrate:

1. Effective upstream source control,
2. Effective exceedance design, and
3. Effective maintenance schedule demonstrating than the assets can be maintained both now and in the future with adequate access.

3.28 If the Developer wishes to look at the adoption of any SuDs then an expression of interest form can be found on the website. As the proposed method of surface water disposal is not relevant to Anglian Water; it is suggested that the Developer contacts the relevant Local Authority, Lead Local Flood Authority, the Environment Agency or the Internal Drainage Board, as appropriate.

Trade Effluent

3.29 The Water Authority note that there are no trade effluent requirements. Should this be required in the future the developer will need the Water Authority written formal consent. This is in accordance with Section 118 of the Water Industry Act (1991).

Used Water Budget Costs

3.30 The development site will be required to pay an infrastructure charge for each new property connecting to the public sewer that benefits from Full planning permission. An infrastructure charge will be required upon connection for each new plot on the development site. The

infrastructure charge are types of charges set out in Section 146(2) of the Water Industry Act 1991.

Internal Drainage Board Authority

3.31 Consultation has been undertaken with South Holland Internal Drainage Board who is the Internal Drainage Board for this area. Their response, dated 26th April 2021 is included in Appendix F for reference purposes. A summary of the response is provided below:

3.31.1 The site is within the Internal Drainage District (IDD) of the South Holland Internal Drainage Board (IDB) and therefore the Board's Byelaws apply. A copy of the Board's Byelaws can be accessed on the website (https://www.wlma.org.uk/uploads/SHIDB_Byelaws.pdf), along with maps of the IDD (https://www.wlma.org.uk/uploads/210-SHIDB_Index.pdf). These maps also show which watercourses have been designated as 'Adopted Watercourses' by the Board. The adoption of a watercourse is an acknowledgement by the Board that the watercourse is of arterial importance to the IDD and as such will normally receive maintenance from the IDB.

3.31.2 To discharge surface water to a watercourse, the proposed development will require land drainage consent in line with the Board's byelaws (specifically byelaw 3).

3.3.3 It was stated that note there is a watercourse which has not been adopted by the Board (a riparian watercourse) adjacent to the site boundary and that works are proposed to alter this watercourse. To enable this proposal consent is required under Section 23 of the Land Drainage Act 1991 (and byelaw 4).

3.31.4 The ability to implement a planning permission may be dependent on the granting of these consents. As such I strongly recommend that the required consent is sought prior to determination of the planning application.

Lead Local Flood Authority

3.32 A consultation response from Lincolnshire County Council, which is the Lead Local Flood Authority (LLFA) for this area, is included in Appendix G for reference purposes (dated 28th April 2021). A summary of the response is provided below:

3.32.1 The County Council, as Local Highway and Lead Local Flood Authority, does not wish to restrict the grant of permission.

3.32.2 The proposed development will be within the western portion of the previously Consented Lincolnshire Gateway Business Park where vehicular access to the highway network and surface water drainage infrastructure are already in place.

3.32.3 Whilst no detailed design of the surface water drainage within the Application Site itself appears to have been provided, it is proposed within the Application that the site will discharge all its surface water run-off into the top end of the existing surface water drainage system that has already been constructed as part of the existing Business Park. That system includes the necessary attenuation and storage of attenuated storm water with a pumped discharge into the watercourse on the north side of the Business Park. The surface water drainage system is also private.

3.32.4 Therefore, having given due regard to the appropriate local and national planning policy guidance (in particular the National Planning Policy Framework), Lincolnshire County Council (as Highway Authority and Lead Local Flood Authority) has concluded that the proposed development would not be expected to have an unacceptable impact upon highway safety, or a severe residual cumulative impact upon the local highway network or increase surface water flood risk and does not wish to object to this planning application.

4.0 CLIMATE CHANGE

4.1 The NPPF and PPG have indicated that the Global sea level will continue to rise, depending on greenhouse gas emissions, and the sensitivity of the climate system and there will be an increase in rainfall across the country. United Kingdom climate change guidance was revised in February 2016 for peak river flows and peak rainfall intensities.

4.2 Impact on River Flooding - With regards to peak river flows, a regionalised approach has now been adopted to climate change impacts based upon the river basin district of the proposed development site, the flood risk vulnerability of the proposed development and the Flood Zone classification.

4.3 The development site is situated within the Anglian river basin district and the proposed building is located in Flood Zone 1. Specific guidance on the application of climate change allowances to Flood Zone 1 is not given by the current climate change guidance, but it is considered reasonable to at least consider the impacts of the "central" climate change scenario in this case. Based on the "central" climate change scenario, peak river flows could be expected to increase by 25% by 2115.

4.4 As the proposed development is located entirely within Flood Zone 1 and will be topographically higher than the present-day flood extents, an increase of 25% on the 1 in 100 year flows in the watercourse is deemed unlikely to affect the proposed development.

4.5 As part of its consultation response, the Environment Agency provided modelled flood data for the 'defended' flood risk scenario during a 1 in 100 year plus 20% climate change allowance event, and a 1 in 1000 year plus 20% climate change allowance event. Although the 1 in 100 year plus 20% allowance is less than the suggested 1 in 100 year plus 25% allowance, as the site remains unaffected in the more onerous 1 in 1000 year plus 20% climate change allowance event it is deemed unlikely that the1 in 100 year plus 25% allowance would affect the proposed development.

4.6 Impact on Rainfall Intensity - In accordance with the revised climate change data, the published figures show that for an expected development life of greater than 50 years, the anticipated increase in rainfall intensity could range from 20% to 40%, subject to the location within the country.

4.7 At this stage, the outline surface water drainage strategy, discussed further below, has been defined with respect to a 30% allowance, as per the anticipated requirements of the regulatory authorities.

5.0 DEVELOPMENT PROPOSALS

5.1 The development proposals for the site are for the construction of a building for a restaurant and drive-thru takeaway, with associated delivery bays and parking. Access will be provided by connecting to the previous constructed "wider site" access roads. The proposals also include landscaped areas around the periphery of the site. The development proposals are illustrated in the Proposed Site Plan in Appendix E.

6.0 SURFACE WATER DRAINAGE

6.1 It is a requirement of the NPPF to ensure that surface water run-off from any proposed development has negligible consequence on downstream areas, either in terms of impact upon downstream sewer capacity or flood risk impacts due to discharge to a watercourse. The existing and proposed surface water run-off regime is considered below.

6.2 This section should be read in conjunction with the ARP Indicative Foul and Surface Water Sustainable Urban Drainage Strategy drawing 2176/01/SK01, which has been prepared to illustrate the proposals.

Existing Surface Water Run-off

6.3 The land is unused and is considered to be essentially derelict with no formal drainage system in place. It is likely that surface water currently falling within the development site would infiltrate to some degree, with the remainder of the surface water following the topographical trend and outfalling into the watercourse to the south of the site.

6.4 The Lead Local Flood Authority (LLFA), Lincolnshire County Council, tend to require surface water discharge to follow the prescribed hierarchy of surface water disposal, with infiltration techniques to be investigated before a connection to any watercourse or sewer is considered. In this instance, as the development site is part of a phased wider development, the LLFA have agreed to the principle of discharging surface water to site wide drainage infrastructure which has already been established.

6.5 However, the principles of sustainable urban drainage systems should be followed and are demonstrated in the ARP Indicative Foul and Surface Water Sustainable Urban Drainage Strategy drawing 2176/01/SK01, which has been prepared to illustrate the proposals.

Proposed Surface Water Runoff Destination

6.6 The proposed means of managing surface water runoff from the proposed development has been considered with respect to the hierarchy set out in Building Regulations Part H (2010).

6.7 Infiltration - Consideration of the proposed means of surface water drainage should firstly be given to infiltration techniques (to ground). In order to determine suitability for use of soakaways, online British Geological Survey mapping has been reviewed. This demonstrates that the site bedrock comprises Oxford Clay Formation of Mudstone, with superficial deposits of Tidal Flat Deposits of Clay And Silt. This is likely to be impermeable and is unsuitable for the use of infiltration.

6.8 In light of the results, disposal of surface water using soakaways is not considered to be viable on the site.

6.9 Watercourse – As infiltration is unfeasible, discharge to a watercourse is considered to be the next most appropriate option. As set out in Section 2, a watercourse is present just outside of the site boundary. Therefore, it is proposed that surface water from the proposed development discharges to the watercourse, as discussed in more detail below.

Proposed Surface Water Drainage

6.10 Previously installed concrete stub pipes are available for the surface water discharge outfall for this proposed development, located in the northeast corner of the application site. These are connected to the "wider site" drainage system, and outfall into a purpose made attenuation pond, with a pumped outfall into the watercourse adjacent to the site. The location of the proposed connection point is labelled "MHS01" on Millward Drainage Layout Plan drawing, reference MA11168-200 revision B, dated 30th March 2021. The downstream pipe from MHS01 is shown to be a concrete pipe, 375mm in diameter. Between the application site to the balancing pond, the drainage pipes increase in diameter from 375mm to 675mm diameter, as shown on drawing Southern Area Drainage Strategy As-Built drawing, prepared by BSP Consulting, reference 14494-240-Z and dated 6th June 2017. It is proposed

that utilising the existing stub connection(s) will be most appropriate method of drainage for the proposals.

6.11 The design drawings indicate the surface water stub is a 375mm diameter concrete pipe laid at a designed gradient of 1 in 317, which would have a theoretical capacity of over 110l/s. The pipes increase in capacity to the balancing pond. Therefore it is proposed that unrestricted surface water discharge from the site is appropriate for this development, in line with the previously constructed drainage infrastructure. However, sustainable urban drainage principles should be incorporated into the design of the system, and this is considered in more detail below. As noted in Section 3 above, the LLFA have agreed that the existing drainage system includes the necessary attenuation and available storage for attenuated storm water from this development. The existing system includes a pumped discharge into the watercourse on the north side of the Business Park.

6.12 It is therefore proposed that surface water be discharged utilising the previously designed/ constructed "wider site" drainage infrastructure, which ultimately discharges to the watercourse adjacent to the site.

6.13 As discussed above, it is proposed that surface water will be discharged at an unrestricted rate, as previous phases of the site wide development have an agreed surface water discharge regime already established. For assessment purposes, an indicative discharge rate from the proposed development has been calculated below.

6.14 The proposed development layout has been assessed as having a proposed impermeable area of 0.31ha, based on the indicative masterplan (Appendix F). This equates to approximately 75% of the site.

6.15 The indicative surface water drainage strategy is shown in ARP drawing 2176/01/SK01. However, detailed calculations and proposals will need to be prepared and submitted to the Planning Authority for approval prior to construction.

6.16 Preliminary assessment of levels confirms that surface water can most likely be discharged to the watercourse by means of a gravity connection, however this will be confirmed at the detailed design stage.

6.17 The strategy above is subject to agreement with the Regulatory Authorities.

6.18 Land Drainage Consent (from the Internal Drainage Board Authority) may be required for construction of any outfall to the watercourse.

Exceedance Flow Routes

6.19 For rainfall events in excess of the design standard (i.e. greater than 1 in 100 year plus climate change event) the capacity of the drainage system is likely to be exceeded. There also remains a residual risk of flows leaving the surface water drainage system in the event of a blockage.

6.20 So that exceedance flows do not adversely affect properties on or off site, site levels should be designed to direct flows away from the building entrances where possible, so that any flooding remains in landscaped areas, car parks, or roads, where the consequences of surface water flooding would be less significant.

6.21 Exceedance flow routes will be reviewed as part of the detailed drainage and levels design, with details provided to the LLFA for review.

Sustainable Drainage Systems (SuDS)

6.22 NPPF requires that SuDS are implemented in 'major development', if feasible. It must be recognised that not all types of SuDS are feasible or appropriate for all development sites, with factors such as available space, ground conditions, and site gradient influencing the feasibility of their use.

6.23 As noted above, infiltration drainage systems are considered unlikely to be suitable for the site. However, SuDS in the form of attenuation of surface water flows within a detention pond are proposed as part of the drainage strategy.

6.24 It is envisaged that it may be feasible to utilise further SuDS components within the surface water drainage network, but the proposals for these will be confirmed at the detailed design stage. Further SuDS opportunities which could be explored include:

6.24.1 Use of under-drained permeable paving in parking bays, to collect flow from parking areas whilst providing attenuation at source and water quality benefits.

6.24.2 Use of rain gardens in proposed landscaped areas, to drain proposed hardstanding areas whilst providing attenuation at source, water quality benefits and amenity benefits.

6.24.3 Use of filter drains, to drain access road or parking areas whilst providing attenuation at source and water quality benefits.

Surface Water Quality

6.25 Appropriate measures will be incorporated in the surface water drainage system to mitigate the risk of contaminated runoff from the site causing adverse impacts on surface water bodies downstream.

6.26 A significant proportion of run-off from the proposed development will be from building roofs and footpaths, which is considered to be 'clean' surface water run-off, and would be expected to have a very low level of potential contamination. On this basis no specific treatment for this run-off is proposed, except for suitable leaf debris traps and silt traps.

6.27 Areas subject to vehicular traffic may contain suspended solids, metals and hydrocarbons. However, the use of trapped gullies in these areas would be expected to adequately mitigate the risk to downstream water quality.

6.28 The surface water drainage systems will be designed in accordance with the risk-based approach outlined in CIRIA C753 The SuDS Manual. For the purpose of this Drainage Strategy, the 'simple index approach' has been used to make a preliminary assessment of the likely pollution hazard and the likely requirements for mitigation.

6.29 Table 26.2 of The SuDS Manual sets out the 'Pollution Hazard Indices' for different proposed land uses. The table below summarises the applicable indices for the proposed development.

Pollution Hazard Indices for Proposed Development

Proposed Land Use	**Pollution Hazard Level**	**Pollution Hazard Index**		
		Total Suspended Solids	**Metals**	**Hydro-carbons**
Non-residential roofs	Low	0.3	0.2	0.05
Commercial yard and delivery areas, non-residential car parks with frequent changeover, and all other roads (except trunk roads and motorways)	Medium	0.7	0.6	0.7

6.30 To achieve appropriate pollution mitigation, the selected SuDS components should have a total 'Mitigation Index' equal to or greater than the 'Pollution Hazard Index' for each contaminant.

6.31 Table 26.3 of The SuDS Manual sets out the 'Mitigation Index' for different SuDS components. The table below summarises the applicable indices for the proposed SuDS components.

Mitigation Indices for Proposed SuDS

Proposed SuDS Component	Mitigation Index		
	Total Suspended Solids	Metals	Hydro-carbons
Filter drain	0.4	0.4	0.4
Bioretention system	0.8	0.8	0.8
Permeable pavement	0.7	0.6	0.7
Detention basin	0.5	0.5	0.6

6.32 From comparison of the above tables, it can be seen that the mitigation index for each type of pollutant is equal to or greater than the hazard indices for the proposed development. On this basis the proposed SuDS strategy is considered to be appropriate in providing mitigation for water quality impacts.

6.33 It is recommended that the requirements for surface water pollution prevention are reviewed at the detailed design stage, with additional treatment components provided if required, including consideration of additional SuDS measures or additional proprietary components, such as grease separators or oil separators if necessary.

6.34 The final strategy for management of surface water quality will be confirmed at the detailed design stage and agreed with Internal Drainage Board and relevant Regulatory Authorities. The suggested arrangement is shown in ARP drawing 2176/01/SK01.

7.0 FOUL DRAINAGE

7.1 This section sets out the proposed means of managing foul discharge from the development.

7.2 Anglian Water has advised that foul water from the proposed development can be discharged to the nearest practicable connection which is to the 150mm diameter sewer at manhole 1200 in Fen End Lane (National Grid Reference NGR TF2429820143). The cover level is 3.61m AOD and the invert level is 1.88m AOD (assumed, based on Water Authority consultation response, shown in Appendix E. The location of this outfall is detailed on Southern Area Drainage Strategy As-Built drawing, prepared by BSP Consulting, reference 14494-240-Z and dated 6th June 2017. To achieve a discharge to this asset, the proposed foul water outfall would be into the 150mm diameter foul water stub pipe, located at the north eastern corner of the development site. The location of the assumed connection point is labelled "MHF01" on Millward Drainage Layout Plan drawing, reference MA11168-200 revision B, dated 30th March 2021.

7.3 The foul water outfall in Fen End Lane is connected to the drainage provided for this development site by previously constructed drainage infrastructure, including privately maintained foul rising main and pump station.

7.4 On the above basis, it is proposed that foul water be discharged utilising the previously designed/ constructed "wider site" drainage infrastructure, which ultimately discharges to the public foul sewer in Fen End Lane at a point north of the site.

7.5 It is reasonable to assume that the previously designed and constructed foul water drainage infrastructure has been designed to accommodate the foul flow from this development. Calculations which accompanied the design of this infrastructure are assumed to be available in the public realm i.e. on the planning portal, as this will have accompanied the granting of planning permission for the "wider site" drainage infrastructure. Anglian Water has assessed the impact of a pumped conveyance from the planned development to the public foul

sewerage network and confirm that this connection is acceptable as the foul sewerage system, at present, has available capacity for the development site.

7.6 Due to the nature of the proposed development grease traps, or suitable alternatives, will be required on any foul drainage outlets from commercial kitchen areas.

7.7 The strategy above is subject to agreement with the Regulatory Authorities.

8.0 MAINTENANCE

8.1 There is a residual risk of flooding from drainage systems in the event of siltation or a blockage occurring. It is therefore essential that drainage systems are subject to periodic inspection and maintenance, so that the design standard is not compromised, and to reduce the risk of blockage.

8.2 It is envisaged that the ongoing inspection and maintenance of the drainage systems is expected to remain the responsibility of the site owner. An appropriate inspection and maintenance plan will be developed at the detailed design stage and implemented thereafter by the site/building owner, using suitably qualified professionals.

9.0 SUMMARY

9.1 The principles of a sustainable surface water management strategy for the proposed development are outlined within the report. It has been proven that infiltration techniques are unfeasible on this particular site, therefore it is proposed that surface water shall be discharged to the existing stub connection(s).

9.2 The LLFA have agreed to the principle of this development having free discharge into the existing system. The existing system outfalls into the adjacent watercourse through an appropriately sized attenuation pond.

9.3 Exceedance flow routes should be reviewed at the detailed design stage to mitigate any potential adverse off-site impacts.

9.4 Foul water should be discharged utilising the previously designed/ constructed "wider site" drainage infrastructure, which ultimately discharges to the public foul sewer in Fen End Lane at a point north of the site. Anglian Water has indicated there is currently sufficient capacity for this.

9.5 The proposed strategy is illustrated in the ARP Indicative Foul and Surface Water Sustainable Urban Drainage Strategy drawing, reference 2176/01/SK01.

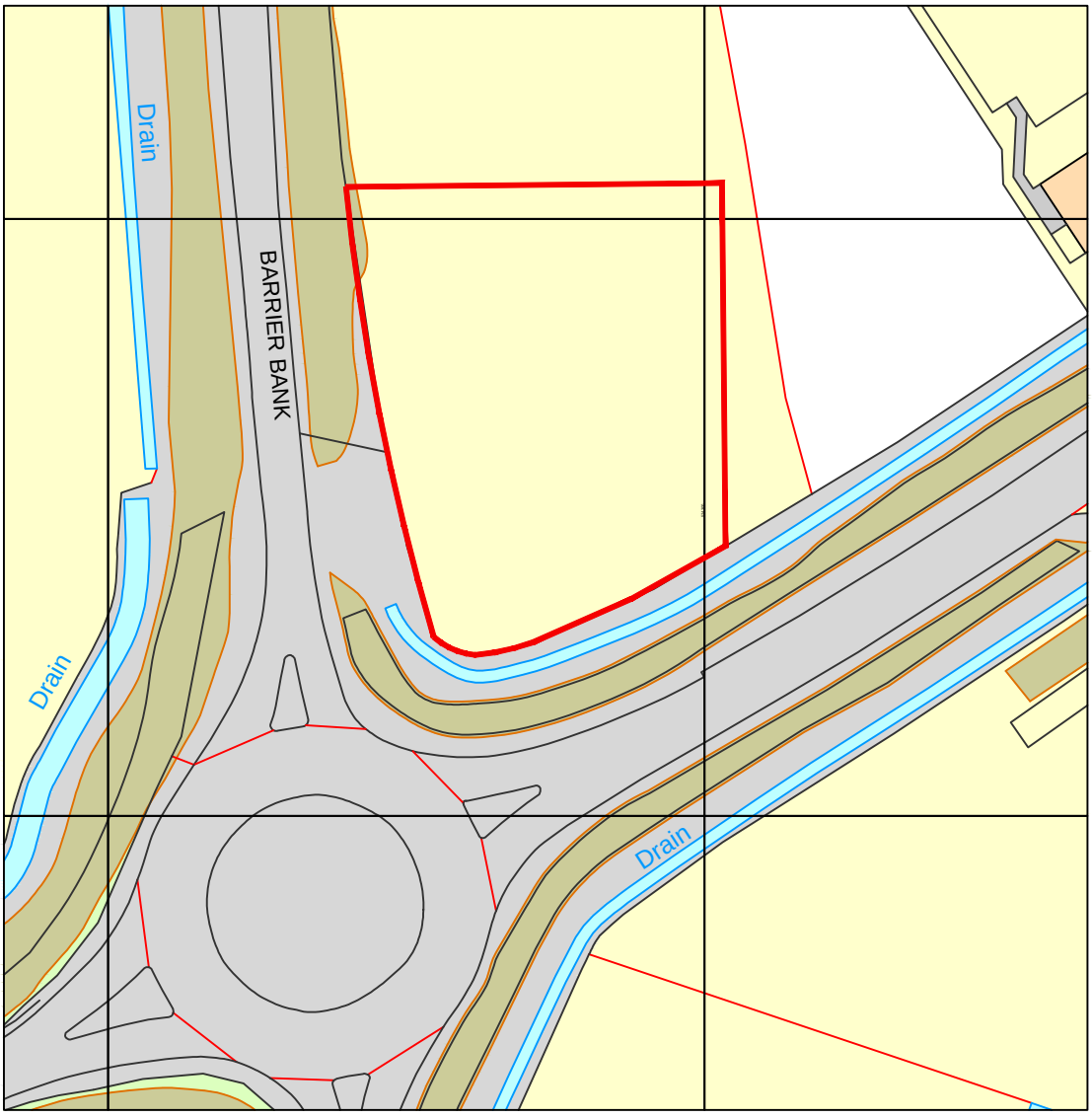
9.6 Suitable maintenance regimes will be required for proposed drainage infrastructure. Details of maintenance plans will be confirmed and agreed at the detailed design stage.

9.7 The findings of this report are subject to the approval of the Regulatory Authorities. The detailed design and calculations shall be submitted to the Planning Authority for approval prior to construction on the development site.

9.8 Subject to compliance with the above, the proposed development can satisfy the requirements of the National Planning Policy Framework and the Planning Practice Guidance in relation to surface water management and foul drainage.

APPENDIX A

SITE LOCATION PLAN



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LOCATION PLAN

scale - 1:1250 @ A4

APPENDIX B

TOPOGRAPHICAL SURVEY

524200 E
524250 E
524300 E
524350 E
319600 N
319550 N
319500 N

ROUGH GROUND
ROUGH GROUND
ROUGH GROUND
ROUGH STONE
DENSE BUSHES
DENSE BUSHES AND TREES
DENSE BUSHES AND TREES
DENSE BUSHES AND TREES
TOP OF BANK
TOP OF BANK
DITCH
DITCH
DITCH
DITCH INACCESSIBLE
WOOD POST AND RAIL FENCE
WOOD POST AND RAIL FENCE
SCAR
GRASS VERGE
DRAINAGE CHANNEL
CONCRETE SLAB
ROAD SIGN
ROAD SIGN
ROAD SIGN
MH (DIS USED)
CL2.19
STNA
E 524230.965
N 319576.594
RL 5.990
STN B
E 524232.289
N 319562.912
RL 6.003
STNC
E 524232.943
N 319514.781
RL 6.392
STND
E 524230.462
N 319524.181
RL 6.336
BT 5.96
Post 5.96
RS 6.16
IC 6.36
LP 6.39
LP 6.17
LP 6.08
LP 6.04
RS 5.90
6.04 LP
6.13 MH
IC 6.25
GV 5.35
GV 5.14
PCL 5.42
PCL 5.75
GV 5.63
GV 5.12
6.04 EP
EP 5.96

NOTES

ALL LEVELS ARE IN METRES RELATED TO ORDNANCE SURVEY LEVEL

ALL CO-ORDINATES ARE IN METRES RELATED TO NATIONAL GRID CO-ORDINATES FIXED BY G P S

ALL SERVICES & MANHOLES SHOWN VISIBLE AT TIME OF SURVEY

ALL DIMENSIONS TO BE CHECKED PRIOR TO COMMENCEMENT OF WORK

Topographical Survey Legend

Bol	Bollard	MP	Mile post
Bin	Litter bin	Pt	Post
BL	Bed level	PM	Parking meter
BS	Bus stop	PP	Power point
BT	British Telecom	RE	Rodding eye
Cam	Security Camera	Ridge	Roof/ridge level
CATV	Cable television cover	RS	Road sign
CL	Cover level	Rwp	Rain water pipe
DR	Drain	SL	Soffit level
Elec	Electrical ic	Slab	Slab level
EC	Electric Cable	Stay	Cable stay
EL	Eaves level	Step	Step level
EP	Elec. pole	SV	Stop valve
ER	Earth rod	Svp	Soil pipe
FP	Flagpole	TL	Traffic light
FA	Fitness Apparatus	ToB	Top of Building
FT	Floodlight	ToW	Top of wall level
GY	Gully	TP	Telegraph pole
GP	Gate post	TS	Traffic Signal
GV	Gas valve	TT	Tac Tile
FH	Hydrant	VP	Vent pipe
FL	Floor level	WL	Water level
IC	Inspection cover	WM	Water meter
IL	Invert level	UTL	Unable to lift
LP	Lamp post	ZCB	Zebra Crossing Beacon
MH	Manhole		
Mkr	Utility marker		

CTES SURVEYING
110 SOUTH ROAD, BRETHERTON
Nr PRESTON LANCS PR26 9AH
TEL No 01772 603663
FAX No 01772 603663
MOBILE No 07973 672057
E MAIL ctesurveys @ yahoo.co.uk

CLIENT

ERINDALE LIMITED

JOB TITLE

PROPOSED KFC TACO BELL
APPLE GRANGE SERVICE STATION
SPALDING (PE12 6FY)

SCALE	DATE	REVISIONS
1:250	MAY 2020	

JOB REF

ER (PROPOSED KFC TACO BELL SPALDING)

APPENDIX C

HISTORIC WATER AUTHORITY CONSULTATION / SUPERSEDED DRAINAGE STRATEGY

800/235

Pre Planning

Assessment Report

Barrier Bank, SPALDING
ARP Associates

Reference Number: 0905/SP100(001)

Anglian Water Services contact:
Sandeep Bains
Growth Planning Advisor
Thorpe Wood House
Thorpe Wood
Peterborough
PE3 6WT
Telephone Number: 01733 414690
Please use the above reference number in all communications

YOUR DEVELOPMENT SITE: Barrier Bank, SPALDING

The information provided within this report has been generated based on the following information provided in your application form:

- The grid reference for the site is TF24602000.
- The site currently does not have planning permission and is located on a Greenfield site.
- The development site will contain 20 commercial units and 2 hotels across 24.7 Hectares.

The comments contained within this report relate to the public water mains and sewers indicated on our records. Your attention is drawn to the disclaimer in the useful information section of this report.

Due to the recent adoption of private sewers in October 2011 many newly adopted public wastewater assets and their history are not indicated on our records. You also need to be aware that your development site may contain private water mains, drains or other assets not shown on our records. These are private assets and not the responsibility of Anglian Water but that of the landowner.

ASSETS AFFECTED

Our records indicate that we have a public water main within the boundary of your development site. Additionally, it is highly recommended that you carry out a thorough investigation of your proposed working area to establish whether any unmapped public or private sewers and lateral drains are in existence.

We are unable to permit development either over or within the easement strip without prior consent. The extent of the easement is provided in the table below. Please be aware that the existing underground assets should be located in highway or open space and not in private gardens. This is to ensure available access for any future maintenance and repair. This should be taken into consideration when planning your site layout.

Water Easement Information	
Pipe Size (inch)	Total Easement Required (m)
3	2.25m either side of the centre line

If it is not possible to avoid our asset then the water main may need to be diverted in accordance with Section 185 of the Water Industry Act (1991). We have a duty to divert our sewerage infrastructure if requested to do so although this would be at your expense. You will need to make a formal application if you would like a diversion to be considered. A copy of the section 185 diversion application form can be found at www.anglianwater.co.uk /developers

WASTEWATER SERVICES

In examining the wastewater system we assess the ability for your site to connect to the public sewerage network without causing a detriment to the operation of the system. We also assess the receiving sewage works and determine whether the sewage works can cope with the increased flow and influent quality arising from your development.

Wastewater Treatment

The foul drainage from this development is in the catchment of Spalding Sewage Treatment Works, which has capacity to treat the flows from your development site. Anglian Water cannot reserve capacity at this sewage works and you are recommended to formally apply for a connection at your earliest convenience. Please note that capacity at the sewage works can be reduced at any time due to increased requirements from existing businesses and houses, from new housing and new commercial developments as well as from environmental and regulation driven changes.

Foul Sewerage Network

As per your request we have assessed a gravity solution to your preferred connection point in Fen End Lane. As you are no doubt aware, the sewers in this area are of a small diameter and designed to serve the current connected properties only, therefore we can confirm that there is insufficient capacity in this sewer to accommodate your site.

Taking into consideration the proposed site usage, we have assessed alternative connection points; unfortunately the nearest point where capacity would be available is some 6.2 kilometres north of the site in West Marsh Road north of Spalding where the sewer increases in diameter to 1050mm. As a river crossing will be required, the flows would need to be pumped and the anticipated connection point would be to manhole 9302 in West Marsh Road at grid reference TF2592124355.

To assist in your budgeting process, we have calculated that the cost of the necessary works to connect flows to the system would be £2,054,225. Please be aware that this is an indicative solution and should planning approval be granted, we would carry out detailed modelling and optioneering under the requisition process in order to provide the most cost effective solution.

The Water Industry Act enables the developer to benefit from any wastewater revenue generated from the commercial site they have built. In simplified terms, future revenue from the new development is offset from the scheme cost. Instead of paying the full contribution the developer pays the difference between their capital contribution and the future revenue. This is calculated on an annual basis for 12 years. The developer has the option of paying this annually (relevant deficit) or upfront as a commuted sum (discounted aggregate deficit). The developer contribution applicable for this site can be provided on submission of firm site usage details.

Surface Water Disposal
The proposed method of surface water disposal is not relevant to Anglian Water; we suggest that you contact the future SuDS Approving Body for the area, the Environment Agency, the Internal Drainage Board.

Trade Effluent
Trade effluent to the public sewerage system will need our written formal consent. This is in accordance with Section 118 of the Water Industry Act (1991). To proceed with the trade effluent application you will need to contact your local Catchment Quality Scientist. The Scientist for this area is Andy Gunn and he is available on 07710608720. You are advised to contact them before any work commences in order to discuss your proposed trade waste process. Please note that it is an offence to discharge a trade effluent without our consent.

Wastewater Budget Costs
It has been assumed that the onsite foul network will be provided under a section 104 Water Industry Act application. It is recommended that you also budget for both infrastructure charges and connection costs. The 2013/14 charges are:

Infrastructure Charge	£337.00 per connection
S104 Supervision and inspection costs	2.5% of estimated construction costs
S104 Surety costs	10% of estimated construction costs

Map of proposed development site

