Eastwood
CONSULTING ENGINEERS



Flood Risk Assessment

LINCS GATEWAY, SPALDING

ALCAN PROPERTIES LTD

02/04/2026

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FLOOD RISK ASSESSMENT

LINCS GATEWAY, SPALDING

FOR

ALCAN PROPERTIES LTD



46934-ECE-XX-XX-RP-C-0001

02 April 2026

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First Issue: 02 April 2026

EXECUTIVE SUMMARY

The project comprises the development of an approximate 18.6-hectare greenfield site for commercial use.

The site is located within Flood Zone 3 (high risk); however, existing flood defences significantly reduce fluvial and tidal flood risk to a low level. Surface water flooding presents a variable risk, with low risk across most of the site but higher risk concentrated in existing field drains, where deeper flooding may occur.

Due to its Flood Zone 3 classification, the site must undergo sequential testing in line with National Planning Policy Framework. Raising FFLs is both impractical due to the level of raising required and unfeasible due to the requirement to provide floodplain compensation in Flood Zone 1. None of the site is designated as Flood Zone 1. Therefore, flood-resilience measures should be incorporated into the design of the ground floor level of the buildings. Additional measures, including a safe place of refuge at first floor level, flood warning registration and a Flood Evacuation Management Plan, are recommended.

Surface water drainage will discharge to the network of field drains around the site at a restricted rate of 1.4 l/s/ha managed via pumped systems due to site levels. Infiltration-based SuDS are not viable because of impermeable clay soils and shallow groundwater; instead, attenuation will be provided through a combination of Type B permeable paving, underground storage, basins, and swales. The proposed discharge rate, infilling and re-alignment of existing field drains has been agreed in principle with the IDB.

Foul drainage will discharge by pumping to the public foul sewer north-west of the site.

The drainage systems will be privately managed.

Overall, with the proposed mitigation and management strategies, the flood risk is considered acceptable for the intended development.

1.0 THE DEVELOPMENT

1.1 Introduction

This Flood Risk Assessment has been prepared in accordance with current National Planning Policy Framework[1] and Planning Practice Guidance 'Flood Risk and Coastal Change'[2] on the instruction of Alcan Properties Ltd. Any other parties using the information in this report do so at their own risk, unless previously approved in writing.

The project comprises the development of an approximate 18.6 hectare greenfield site for commercial use.

1.2 Site Location & Description

The site is located to the south of Spalding town centre in Lincolnshire and is centred on the coordinates 524520, 319920 (Appendix 1).

The site is bounded by the A16 to the east, B1173 to the south-west, residential properties to the north-west and agricultural fields to the north.

The site is currently occupied by agricultural fields. A small area in the western portion of the site is occupied by a grassed horse paddock, mature trees, footpath and former access track. Numerous field drains are present on site generally located along field boundaries and around the site perimeter.

The surrounding area is predominantly comprised of agricultural fields. Lincs Gateway Business Park, including a service station, pub, hotel and office building are located to the south east of the site. Residential properties are located along Fen End Lane to the north-west of the site. The River Welland is located approximately 535 m west of the site.

The site is relatively flat with levels generally ranging between 1.5 and 3.0 mAOD. A 4.5 m high bund is present in the western part of the site. A topographic survey is included in (Appendix 2).

[1] https://www.gov.uk/government/publications/national-planning-policy-framework--2
[2] https://www.gov.uk/guidance/flood-risk-and-coastal-change

Proposals are for the development of four commercial units, with associated loading areas, car parking and access from the B1173 in the south (Appendix 3).

1.3 Environment Agency - Flood Map for Planning

The Environment Agency's Flood Map for Planning (Figure 1 and Appendix 4) shows the site to lie within Zone 3 (high risk). Zone 3 refers to land having a greater than 1 in 100 annual probability of flooding from rivers or sea (>1%) or greater than 1 in 200 annual probability of flooding from the sea (>0.5%).

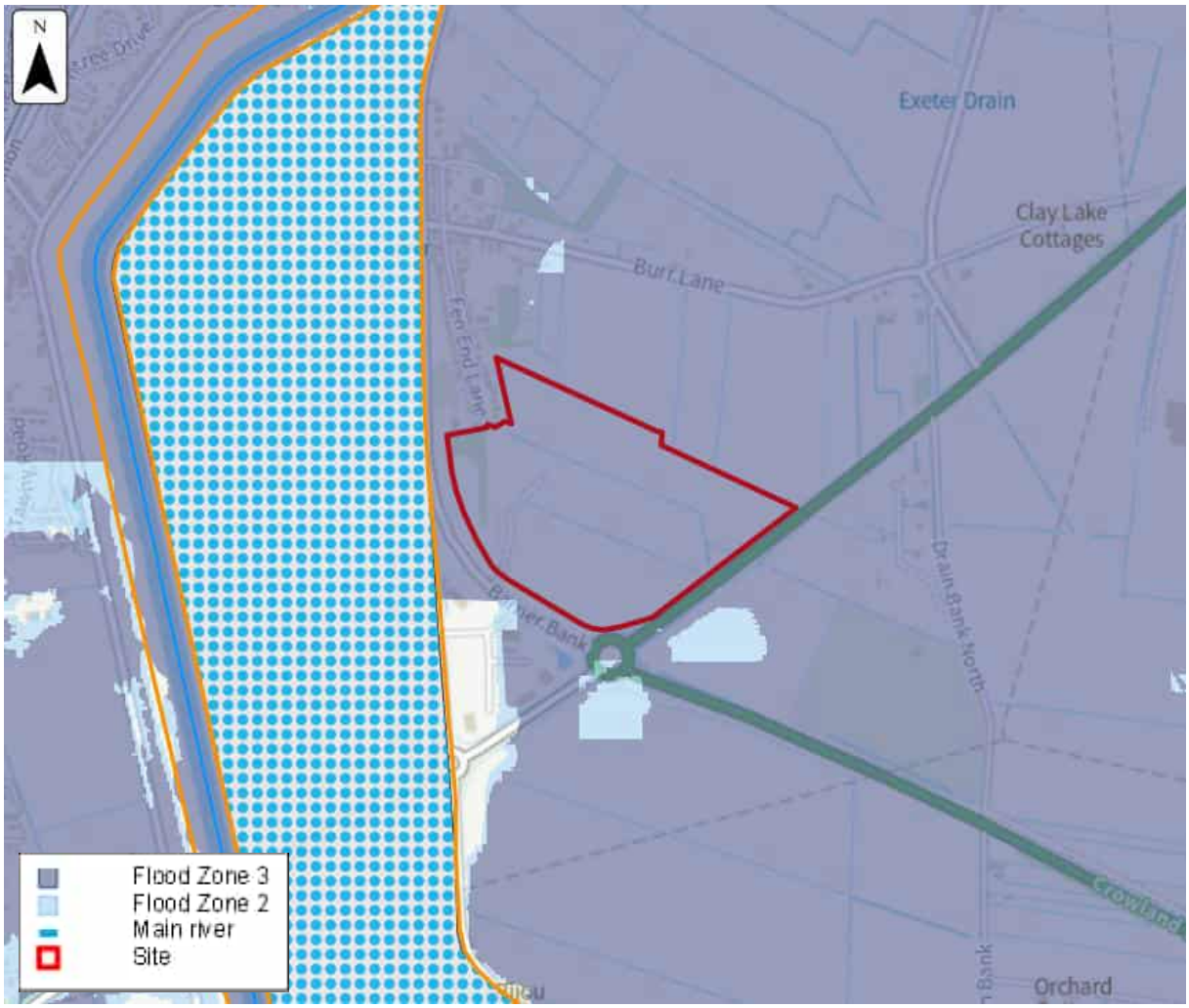


Figure 1: Environment Agency's Flood Map for Planning

1.4 Surface Water

The Environment Agency surface water flood risk maps (Figure 2, 3 and Appendix 4) show the majority of the site to be at a very low risk of surface water flooding for both present day and climate change (2040-2060s) scenarios. For the present-day scenario, there are numerous areas at low (0.1%-1%) to medium (1%-3.3%) or low (0.1%-1%) to high (>1%) risk of surface water flooding across the site. These areas are consistent with topographic depressions as well as the locations of the existing field drains on site. For the climate change (2040-2060s) scenario, these areas are at greater risk of increased flood extent and occurrence.

A very low risk refers to land having less than a 1 in 1,000 annual exceedance probability of flooding (0.1% AEP). Low risk refers to land having between a 1 in 1,000 and 1 in 100 annual exceedance probability of flooding (0.1% - 1% AEP). Medium risk refers to land having between 1 in 100 and 1 in 30 annual exceedance probability of flooding (1% - 3.33% AEP). High risk refers to land having a greater than 1 in 30 annual exceedance probability of flooding (> 3.33% AEP).



Figure 2: Environment Agency – Risk of surface water flooding map (present day scenario)



Figure 3: Environment Agency – Risk of surface water flooding map (2040-2060s, climate change scenario)

1.5 South Holland District Council Strategic Flood Risk Assessment

The South Holland District Council Strategic Flood Risk Assessment does not include a flood zone map.

1.6 Climate Change

An issue emphasised in the Planning Practice Guidance is the requirement to take account of potential climate change effects. New development is generally accepted as having a 100 year design life for flood risk purposes. Climate change allowances for peak rainfall intensity[3] are to be selected based on the assigned values for the relevant Management Catchment and epoch suited to the design life of the development. For the Welland Management Catchment, the Upper End Allowance of 40% should be used to assess attenuation storage requirements.

Climate change allowances for peak river flow[4] are also to be selected based on the assigned values for the relevant Management Catchment assigned to the flood zone and vulnerability

[3] https://environment.data.gov.uk/hydrology/climate-change-allowances/rainfall
[4] https://environment.data.gov.uk/hydrology/climate-change-allowances/river-flow

classification of the development. For “Less Vulnerable” development in Flood Zone 2 and 3[5] within the Welland Management Catchment, the Central Allowance for peak river flows of 17% should be used.

The Environment Agency surface water flood maps (Section 1.4, 2.1.1 and 2.1.2) include a climate change scenario. This is based on the latest UK Climate Projections (UKCP18) from the Met Office using a mid-range allowance (2040-2060s)[6].

[5] https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#peak-river-flow-allowances
[6] https://www.gov.uk/government/publications/flood-risk-maps-for-surface-water-how-to-use-the-map/92c4e96c-c2e0-4545-9c0e-1b410a4a78e9

2.0 FLOOD RISK

2.1 Potential Sources of Flooding

The Environment Agency and Strategic Flood Risk Assessment maps are intended for general guidance on flood risk and it is also necessary to consider other, more detailed, sources in relation to local factors.

2.1.1 Fluvial and Tidal

The Environment Agency do not consider the site to be at risk of tidal flooding (Appendix 4).

There are two unnamed field drains recorded within the site boundary with additional unnamed drains recorded immediately north, east and south of the boundary. The New River Drain, Clay Lake Drain and Soke Dyke are located 80 m west, 250 m north and 500 m west of the site respectively. The nearest main river is the River Welland located approximately 535 m west of the site. The River Welland is defended on both banks with a flood water storage (floodplain) area located east of the river.

The field drains on site form part of the local drainage network and will need to be infilled and diverted as part of the development to maintain drainage routes around the site.

The design flood event for this development is the 1 in 100 year plus 20% climate change event.

River levels

The principal source of flooding is the River Welland. In-channel modelled water levels (mAOD) for varying return periods from the Welland Glen 2016 flood model have been received from the Environment Agency (Appendix 4) and are shown in Table 1 below.

The reference nodes for the River Welland are WELLAND_16224 (750 m north-west of the site), WELLAND_16724 (655 m west of the site) and WELLAND_17224 (675 m south-west of the site).

River Welland – In-channel water level (mAOD)				
Reference node	Return period			
	1 in 20 yr	**1 in 100 yr**	**1 in 100 yr + 20% CC**	**1 in 1000 yr**
WELLAND_16224	4.43	4.53	4.66	4.55
WELLAND_16724	4.44	4.54	4.66	4.55
WELLAND_17224	4.44	4.54	4.66	4.56

Table 1: Welland Glen Modelled In-Channel Water Levels - Environment Agency, 2016

Existing site levels generally range between 1.5 and 3.0 m. The site is around 1.66 to 3.16 m below the 1 in 100 year plus 20% in-channel water level.

Modelled flood extents

The Environment Agency modelled flood extents map for the Welland Glen 2016 modelling defended scenario shows the site falls outside the extent of flooding from all simulated return periods up to and including the 1 in 100 plus 20% climate change and 1 in 1000 year events. Undefended flood extents have not been supplied.

Defence levels

The site is protected from fluvial flooding from the River Welland by the Crowland-Cowbit Washes and embankment. These defences are Environment Agency managed and provide protection against a 1 in 100 year flood event. The Environment Agency inspect these defences regularly to ensure that any potential defects are identified early.

2.1.2 Surface Water (flood origin and depths)

Surface water flooding

The Environment Agency surface water flood risk maps (Appendix 4) and topographic survey (Appendix 2) have been used to determine surface water flow paths. For both the present day and climate change (2040-2060s) scenarios, the majority of the site is very low risk of surface water flooding. For the present-day scenario, there are numerous areas at low (0.1%-1%) to medium (1%-3.3%) or low (0.1%-1%) to high (>1%) risk of surface water flooding across the site. These areas are consistent with topographic depressions as well as the locations of the existing field drains on site. For the climate change (2040-2060s) scenario, these areas are at greater risk of increased flood extent and occurrence.

Surface water flooding depths

The Environment Agency surface water flood risk maps (Appendix 4) show the surface water ponding on site for the present-day scenario to have a low (0.1%-1%) risk of depths reaching 0.2m each year. Flooding contained within the existing field drains is at high (>3.33%) risk of reaching depths of 0.2m and 0.3m. None of the flooding on site during the present-day scenario is at risk of reaching depths of 0.6m.

For the climate change scenario (2040-2060s), the areas of surface water ponding on site are at low (0.1%-1%) to medium (1%-3.33%) risk of reaching depths of 0.2m while the flooding within the existing field drains is at high (>3.33%) risk of reaching depths of 0.2m and 0.3m. Small areas of the existing field drains are at low risk of flooding to depths of 0.6m.

The Environment Agency surface water flood depth maps (Appendix 4) show a smaller extent of flooding than the surface water flood extent maps (Figures 2 and 3). This discrepancy has been raised with the Environment Agency (Appendix 4) and their response notes that the unshaded areas on the flood depth maps are at a very low risk of flooding reaching each specified depth. Based on this information, the surface water flood depths maps have been used to assess the risk of surface water flooding on site given that unshaded areas for the lowest flood depth map are at a very low risk of reaching 200 mm.

2.1.3 Reservoir

The Environment Agency reservoir flood risk map (Figure 5 and Appendix 4) shows the whole site to lie within the extent of flooding from reservoirs (dry day scenario) but outside the extent of flooding from reservoirs when there is also flooding from rivers.

Reservoir flooding is extremely rare but the risk to life and damage to property is likely to be significant and sudden. There has been no loss of life from reservoir flooding in the UK for more than 100 years.



Figure 5: Environment Agency – Risk of reservoir flooding map

2.1.4 Groundwater

Groundwater is a potential flood risk to areas which are low lying and on permeable ground or, occasionally, to areas of higher ground in the vicinity of springs. There is no public record of any flood risk to the site associated with groundwater.

2.1.5 Sewerage

The surrounding public sewer network is owned and maintained by Anglian Water. There is no public record of any flood risk to the site associated with these sewers.

2.1.6 Historical Flooding

The Environment Agency records show the site is not within the historic flood outline. Areas to the west of the site flooded in March 1947 (Appendix 4).



Figure 6: Environment Agency – Historic flood map

2.2 Summary of Flood Risk

The site lies within Flood Zone 3 (high risk). However, when the presence of the existing flood defences are considered, the risk of fluvial and tidal flooding is low.

There is a low to high risk of surface water flooding to existing low spots and field drains on site in both the present day and climate change scenarios. During both scenarios, there is a low risk of flooding to depths up to 0.2m outside the field drains. Flooding contained within the existing field drains is at high risk of reaching depths of 0.2m and 0.3m. Small sections of the field drains are at low risk of flooding to depths of up to 0.6m.

3.0 SEQUENTIAL TESTING AND MITIGATION MEASURES

The National Planning Policy Framework[7] and Planning Practice Guidance 'Flood Risk and Coastal Change' (September 2025)[8] sets out the principles for assessing the suitability of sites for development, in relation to flood risk, as part of the planning process.

3.1 Sequential Test

Initially a Sequential Test is applied to the allocation of land suitable for development. The test is required for any development proposals in areas at risk of flooding, taking into account all sources of flood risk.

Paragraph 175 of the National Planning Policy Framework and Paragraph 027 of the Planning Practice Guidance 'Flood Risk and Coastal Change' notes that a proportionate approach should be taken for Sequential Testing. If it is demonstrated that the proposed layout, design, and mitigation measures would ensure that occupiers and users would remain safe from current and future surface water flood risk for the lifetime of the development without increasing flood risk elsewhere, then the sequential test need not be applied.

The aim of the Sequential Test is to steer new development to areas with the lowest probability of flooding. Development should not be allocated or permitted if there are reasonably available sites, appropriate for the proposed development, in areas with a lower probability of flooding.

Making the site safe from flooding throughout its lifetime and not increasing flooding elsewhere does not exempt it from sequential testing.

The site lies within Flood Zone 3 and is at risk of surface water and reservoir flooding. The planning consultant should contact the planning department at South Holland District Council to sequentially test the site, as this is outside the scope of this report.

3.2 Exception Test

If, following application of the Sequential Test, it is not possible for the development to be located in zones with a lower probability of flooding the Exception Test can be applied if

[7] https://assets.publishing.service.gov.uk/media/67aafe8f3b41f783cca46251/NPPF_December_2024.pdf
[8] https://www.gov.uk/guidance/flood-risk-and-coastal-change

appropriate. Annex 3 of the NPPF [9] and Table 2 of the Planning Policy Guidance "Flood Risk and Coastal Change"[10] list flood risk vulnerability and flood zone compatibility. These tables are used to determine whether the Exception Test is appropriate for the development.

Annex 3 of the NPPF classifies commercial use as "Less Vulnerable".

Table 2 of the Guidance classifies "Less Vulnerable" development as compatible with Flood Zones 1, 2 and 3a with no requirement for the Exception Test.

3.3 Flood Mitigation Measures

The site is protected from fluvial / tidal flooding by existing flood defences. It would be impractical to raise FFLs above the River Welland predicted in-channel water levels which are between 1.66 and 3.16 m higher than site levels. Furthermore, any level raising would technically lead to a loss of floodplain under Environment Agency guidelines and would need to be suitably compensated for by lowering levels in Flood Zone 1. Given that the entire site lies within Flood Zone 3, it will not be possible to provide level for level floodplain compensation within the site boundaries.

Flood resistant design requiring the raising of finished floor levels is not a viable solution, therefore the site must adopt a flood resilient design. Flood resilience measures should be incorporated into the design of the ground floor level of the buildings.

Recommended flood resilience measures are listed below:

- Use flood resistant materials that have low permeability
- Make sure any doors, windows or other openings are flood resilient
- Use flood resilient materials (for example lime-based plaster)
- Raise all sensitive electrical equipment, wiring and sockets
- Make it easy for water to drain away after flooding such as installing a sump and pump
- Make sure there is access to all spaces to enable drying and cleaning
- Ensure soil pipes are protected from back-flow by using non-return valves

[9] https://www.gov.uk/guidance/national-planning-policy-framework/annex-3-flood-risk-vulnerability-classification
[10] https://www.gov.uk/guidance/flood-risk-and-coastal-change#table2

The flood resilience measures will also provide protection from the surface water flood risk on site.

Each building should also have a first floor area suitable for occupants to use as a safe place of refuge in the event of an extreme flood.

Commercial occupiers should sign up for the Flood Warning scheme operated by the Environment Agency.

It is recommended that a Flood Evacuation Management Plan is produced by each business using the site by following the Environment Agency's advice 'Prepare for Flooding[11]': 'Personal Flood Plan[12]', Community Flood plan[13]' or 'Business flood plan[14]' as well as consulting the Emergency Planner at the LPA.

3.4 Residual Flood Risk

Residual flood risks are those which remain following the implementation of the flood mitigation measures set out above. The mitigation measures are intended to address the risk from the 'design flood' which is defined as the 1 in 100 year plus climate change event and therefore any risk that remains from events of a higher magnitude than the design flood is defined as residual.

The site is at residual risk of reservoir flooding.

The site is at residual risk of flooding from the River Welland, River Glen, River Nene and the Wash during combined % fluvial / 0.5% tidal events, 0.1% fluvial and tidal events and when climate change to 2115 is considered on top of these scenarios. Flood mapping from the South Holland District Council Strategic Flood Risk Assessment included in Appendix 5 shows flood depths on site ranging between 0 and 2 m, flood velocities ranging between 0 and 1 m/s and flood hazard ranging between Low (less than 0.75) and Danger for Most (between 1.25 and 2.0).

[11] https://www.gov.uk/prepare-for-flooding
[12] https://www.gov.uk/government/publications/personal-flood-plan/personal-flood-plan
[13] https://www.gov.uk/government/publications/community-flood-plan-template/community-flood-plan
[14] https://www.gov.uk/government/publications/personal-flood-plan/personal-flood-plan

4.0 DRAINAGE STRATEGY

4.1 Existing drainage

Anglian Water sewer records (Appendix 6) show a 150 mm public foul water sewer in Fen End Lane, north-west of the site. There are no public surface water sewers recorded around the site. A 3 inch (75 mm) water main is shown running along the route of the existing footpath in the western part of the site, some of this is shown to have been decommissioned. A rising main is also believed to cross this part of the site from a pumping station at the service station on the opposite side of the B1173. The rising main is believed to connect to the 150 mm public foul sewer in Fen End Lane.

4.2 Consultation with Anglian Water

Pre-planning advice has been received from Anglian Water (Appendix 6); letter reference PPE-0240206 dated 26th March 2026. The main points of the advice are summarised below.

- A 75mm diameter water main runs on the boundary of the development site and may be affected by the proposed development.

Water recycling centre:

- Spalding Water Recycling Centre can accommodate the flows from the proposed growth.

Used water network:

- Foul effluent may discharge to the 150mm diameter foul sewer in Fen End Lane, at manhole MH2100 located at national grid reference TG 24296 20147. The cover level is 3.61 and the invert level is 1.88 mAOD.
- Anglian Water has assessed the local foul sewerage network up to the water recycling centre and determined that the additional foul flow from the proposed development would not create an unacceptable risk of flooding to our existing customers and the environment.
- The pumped discharge will need to connect via an intermediate manhole and within at least 5 m of an appropriately sized gravity sewer.

- The pump rate and configuration of the connection will be determined with detailed design. Details should be submitted with a Section 106 new connection application.

4.3 Consultation with Lincolnshire County Council

Correspondence received from Lincolnshire County Council (2nd July 2022) regarding discharge and attenuation restrictions from site stated the following main points:

- Lincolnshire County Council follow NPPF guidance that sustainable principles must be incorporated into the drainage strategy of all new development, unless it can be demonstrated that SuDS are not appropriate.
- Both balancing lagoons and underground tanks/crates have been employed within new development projects in the county, for the storage of attenuated stormwater.
- Lincolnshire County Council do not however accept lagoons or underground tanks/crates for future maintenance. These would have to be vested with Anglian Water or a Management Company.
- The water table in The Fens region is seasonally managed by the Internal Drainage Boards but is typically not far below ground level so there may need to be engineering solutions to make underground storage work and lagoons may permanently contain water dependent upon their invert level.
- It will be necessary to secure consent from South Holland District Internal Drainage Board to discharge into the local drainage network, either directly or indirectly.
- The pumping capacity of the low-lying land and pumped catchment area is 1.4 litres per second per hectare.

4.4 Consultation with South Holland Internal Drainage Board

South Holland Internal Drainage Board (IDB) issued a Notice of Intention to Grant Consent to discharge surface water run-off into a watercourse, for the alteration of a watercourse and for the diversion of a watercourse for the site on 4th February 2026 (Ref: 25_33102_C, 25_33104_C, 25_33105_C). The Notice is included Appendix 7.

4.5 Ground conditions

The British Geological Survey maps show the site to be underlain by clay and silt tidal flat deposits. The bedrock geology is recorded to comprise mudstone of the Oxford Clay Formation.

A historical borehole log (Ref: TF21NW3) located approximately 115 m south-west of the site records 0.5 m clayey topsoil, 5.1 m clay, 9.45 m sand over clay. Groundwater was not recorded in this borehole log.

A Phase 2 Site Investigation undertaken by Eastwood CE in July 2022 (Ref: 46934-003) records 0.35 m topsoil and 0.8 - 1.8 m clay. Sand was typically found between 6 and 7 m below ground level (bgl). The Oxford Clay Formation was encountered from around 16.2 m bgl. Groundwater monitoring identified levels from 1.07 and 2.04 m bgl in May 2022, 1.28 and 2.73 m bgl in June 2022 and 1.28 and 2.77 m bgl in July 2022. During the wetter months of the year, it is generally expected that the groundwater table would lie within the upper 1 m bgl.

4.6 Drainage hierarchy

Surface water disposal should be in accordance with the drainage hierarchy in Building Regulations Part H 2015[15] and Planning Practice Guidance 'Reducing the causes and impacts of flooding', paragraph 080. Disposal via SuDS methods should be considered as the first option. Disposal to the public sewer should be considered only when SuDS methods and disposal to the watercourse are shown to be unsuitable.

4.6.1 Sustainable Drainage Systems (SuDS)

SuDS methods include water infiltration systems such as soakaways, basins and filter strips, together with swales, pervious pavements, detention basins, ponds and other wetland solutions. The various methods are considered in detail in The SuDS Manual (CIRIA C753).

Soakaway tests were conducted by Eastwood CE in July 2022 (Ref: 46934-003) in four trial pits. Infiltration rates in the two deeper tests were negligible and infiltration rates in the two shallower tests were low (4.5×10^{-6} m/s and 2.2×10^{-6} m/s).

[15]https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/442889/BR_PDF_AD_H_2015.pdf

Infiltration type SuDS such as soakaways are not considered to be viable on the site due to the presence of impermeable clay soil and shallow groundwater.

Permeable paving (Type B), swales, and attenuation basins are proposed as part of the site drainage strategy. These are shown on the drainage layout (46934-ECE-XX-00-DR-C-0012-P02) in Appendix 8.

4.6.2 Watercourse

There are two unnamed field drains recorded within the site boundary with additional unnamed drains recorded immediately north, east and south of the boundary.

The field drains within the site boundary will need to be backfilled as part of the development, therefore discharge to these watercourses is not viable. Drains around the perimeter of the site will be realigned to suit the proposed layout. The infilling and realignment of the existing drains has been agreed in principle with the IDB.

Discharge to the existing drains has also been agreed with the IDB.

See Section 4.4 for IDB correspondence.

4.6.3 Public sewer

There are no public surface water sewers within the vicinity of the site.

4.7 Proposals for surface water disposal

Discharge rate

It is proposed that surface water discharge from the whole development is to be restricted to a maximum rate of 1.4 litres/second/hectare to the surrounding network of field drains, based upon the area of new surfacings being positively drained. Landscaped areas are not included in the calculation of the discharge rate. The overall development has a positively drained surface area of 11.015 Hectares, as shown on the appended Drg. No. 46934-ECE-XX-00-DR-C-0011_P01, giving a permitted discharge rate of 15.4 litres/second (11.015 x 1.4).

The development is to be divided into five discreet areas, referred to as Unit 100, Unit 200, Unit 300, Unit 400 & Road. Discharge rates for each of these areas has been allocated as follows:

- Unit 100 - 3.0 litres/second
- Unit 200 - 3.4 litres/second
- Unit 300 - 3.0 litres/second
- Unit 400 - 3.0 litres/second
- Road - 3.0 litres/second

Due to the site topography, individual pumping stations for each of the five systems are to be provided in order to raise the run-off into the existing field drain network. By using pumps, and the potential for surcharged outfalls, the discharge rates are regulated by the pump controls by monitoring the discharge volume over each 24 hour period.

Storage

Attenuation storage will be provided for events up to and including the 1 in 100 year plus 40% climate change within a combination of permeable paving with voided stone sub-base, proprietary below ground voided storage units, detention basins and swales as shown on the drainage layout in Appendix 8. Causeway Flow drainage modelling outputs are also included in Appendix 8.

On-site ponding within loading docks

The drainage modelling predicts that there will be some surface ponding during the 1 in 30 year plus 40% climate change 15 minute & 30 minute events within the loading dock ramp areas of Units 100, 200, 300 & 400. The appended Drg. No. 46934-ECE-XX-00-DR-C-0017_P01 shows plans and sections through the four loading docks with the extent of the short-term ponding indicated on each. The maximum predicted depth of ponding is 151mm at the drainage channel. These depths will not prevent normal HGV loading/offloading operations.

The drainage modelling also predicts that there will be some surface ponding during various duration 1 in 100 year plus 40% climate change events within the loading dock ramp areas of Units 100, 200, 300 & 400. The base of the loading docks are all 1.2m below floor level for each building that they serve. The approximate depths of ponding within the loading docks for the four systems are as follows :-

- Unit 100 – 0.38m
- Unit 200 – 0.39m
- Unit 300 – 0.35m
- Unit 400 – 0.42m

Whilst these depths may prevent pedestrian access into the base of the loading dock, this will not prevent normal HGV loading/offloading operations.

Exceedance flood routing

For each of the drainage systems associated with the four Units, should a rainfall event occur which exceeds the worst-case design scenario, or should there be a failure of both the duty and standby pumps, surface water will collect within the loading dock ramp areas. Standing water depths will then increase, up to a maximum of 550mm at the base of the loading docks, to a level where it then spreads onto the service yards. Water levels will rise within the below ground drainage systems until such a time as the swales/detention basins are completely full. From this time onwards, above ground flooding will occur along the exceedance routes indicated on Drg. No. 46934-ECE-XX-00-DR-C-0012_P02 (Appendix 8), flowing into either the existing field drain system close to the southern boundary and some of the eastern boundary or the diverted field drain system close to the northern boundary and some of the eastern

boundary. The ground levels adjacent to the field drians are at least 0.6 m below the proposed building floor levels.

For the road drainage system, should a rainfall event occur which exceeds the worst-case design scenario, or should there be a failure of both the duty and standby pumps, surface water will collect at the lowest point of the catchment, which is near the junction with the B1173. Some shallow surface ponding will occur, up to 150mm deep locally to the lowest road gully, before overtopping the road kerb/footway and flowing onto the adjacent soft landscaping. Proposed levels in this area are to be set to fall towards the existing field drain system close to the southern boundary.

Surcharged outfall

The IDB have requested that consideration be given to the effects on the proposed site drainage systems in the event that the water level in the receiving field drain network is above the proposed outfalls i.e. a surcharged outfall condition.

All of the outfalls are pumped and the pump manufacturer has confirmed that the flow rates proposed can be maintained when the outfall is surcharged, ensuring that the five on-site systems continue to operate as designed.

During normal operating conditions, when the outfall is not surcharged, then the pumps could discharge at a slightly higher rate. In order to prevent the additional volume of discharge which would occur in this scenario, an “inhibitor” is to be included within the pump controls. This regulates the total discharge volume over a 24 hour period (by restricting operating times) to ensure that the equivalent volume is not exceeded when compared to the discharge rates proposed in line with the 1.4 l/s/ha limit.

4.8 SuDS Maintenance

It is expected that the drainage systems will be privately managed. Maintenance of the SuDS systems for this site should be in accordance with the recommendations within The SuDS Manual (CIRIA C753, 2015) as stipulated in Table 2, along with any recommendations provided by suppliers and product specifications. Appropriate maintenance routes have been provided around each SuDS feature, as shown on Drg. No. 46934-ECE-XX-00-DR-C-0012_P02 (Appendix 8).

SuDS System	ACTION	FREQUENCY
Permeable Paving	Initial inspection of porous pavement	Monthly for three months after installation
	General removal of litter and debris. Brush regularly.	Monthly (or more frequently if required)
	Inspect porous pavements for evidence of poor operation and/or weed growth – if required, take remedial action	Three-monthly, 48 hours after large storms for first six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Brushing and vacuuming of porous pavements (standard cosmetic sweep over whole surface)	Annually, after autumn leaf fall
	Removal of weeds from porous pavements or management using glyphosate applied direction into the weeds by an applicator rather than spraying	Annually (or more frequently if necessary)
	Remedial work to any depressions, rutting and cracks of the permeable pavement considered detrimental to the structural performance or a hazard to users, and replace lost jointing material	As required
	Rehabilitation of surface and upper substructure of the permeable pavement by remedial sweeping	Every 15 years or as required
Swale / ditches	Remove litter and debris	Monthly, or as required
	Cut grass – retain grass height within the specified range	Monthly (during growing season), or as required
	Manage other vegetation and remove nuisance plants	Monthly at start, then as required

	Inspect inlets, outlets and overflows for blockages and clear if required	Monthly
	Inspect infiltration surfaces for ponding, compaction, silt accumulation, record areas where water is ponding for > 48 hours	Monthly, or when required
	Inspect vegetation coverage	Monthly for 6 months, quarterly for 2 years, then half yearly
	Inspect inlets and facility surface for silt accumulation, establish appropriate silt removal frequencies	Half yearly
	Reseed area of poor vegetation growth, alter plant types to better suit conditions, if required	As required or if bare soil is exposed over 10% or more of the swale treatment area
	Repair erosion or other damage by re-turfing or reseeding	As required
	Relevel uneven surfaces and reinstate design levels	As required
	Scarify and spike topsoil layer to improve infiltration performance, break up silt deposits and prevent compaction of the soil surface	As required
	Remove build-up of sediment on upstream gravel trench, flow spreader or at top of filter strip	As required
	Remove and dispose of oils or petrol residues using safe standard practices	As required
Sub-surface storage	Remove debris from catchment surface where it may affect performance	Monthly
	If the system allows rainfall infiltration from above, check filter surface for blockages. Remove and replace infiltration material if deemed necessary.	Annually
	Remove sediment from pre-treatment structures	Annually or as required
	Inspect inlets, outlets, vents and overflows to ensure they are operating as designed	Annually
	Remedial work to repair inlets, outlets, overflows and vents	As required
	Survey inside of storage area for sediment build up. Remove sediment if required.	As required

Detention basin	Inspect surface inlet/ outlet structures removing obstructions and silt as necessary. Check there is no physical damage.	Monthly
	Mow grass access paths and verges surrounding basins at 35 to 50 mm minimum and 75 mm or as specified to provide a cared for appearance and allow pedestrian access.	Monthly or as required.
	Remove litter and debris	Monthly or as required.
	Manage other vegetation and remove nuisance plants	Monthly (at start, then as required).
	Inspect banksides, structures, pipework etc for evidence of physical damage.	Monthly
	Tidy all dead growth before start of growing season	Annually
	Reseed areas of poor vegetation growth	As required
	Confirm whether a liner is present to hold water or prevent pollution of groundwater to protect.	Annually or every 3 years as required
	Where silt accumulated on apron or around inlet/ outlet, then remove.	Annually or every 3 years as required
	Retain as much existing vegetation as possible to ensure rapid re-colonisation of open areas.	Annually or every 3 years as required
	Undertake silt removal during September-October to minimise damage to protected wildlife and ensure re-growth of aquatic vegetation before winter.	Annually or every 3 years as required
	Repair erosion or other damage by reseeding or re-turfing.	As required
	Repair/ rehabilitation of inlets and outlets.	As required
	Relevel uneven surfaces and reinstate design levels.	As required

Table 2: SuDS Maintenance

4.9 Proposals for foul water disposal

Foul effluent will discharge via pumping to the 150mm diameter foul sewer in Fen End Lane, north-west of the site, at manhole MH2100 located at national grid reference TG 24296 20147, as stipulated by Anglian Water.

The foul water discharge rate is to be set by Anglian Water, with associated emergency storage determined, at the detailed design stage as stipulated by Anglian Water.

It is expected that the foul drainage system will be privately managed.

5.0 CONCLUSIONS

1. The site lies within Flood Zone 3 (high risk). However, when the presence of the existing flood defences are considered, the risk of fluvial and tidal flooding is low.

2. There is a low to high risk of surface water flooding to existing low spots and field drains on site in both the present day and climate change scenarios. During both scenarios, there is a low risk of flooding to depths up to 0.2m outside the field drains. Flooding contained within the existing field drains is at high risk of reaching depths of 0.2m and 0.3m. Small sections of the field drains are at low risk of flooding to depths of up to 0.6m.

3. In accordance with current National Planning Policy Framework and Planning Practice Guidance 'Flood Risk and Coastal Change', sequential testing should be considered. The planning consultant should contact the planning department at South Holland District Council to sequentially test the site.

4. Given that the entire site lies within Flood Zone 3, it is not be possible to provide level for level floodplain compensation within the site boundaries. Flood resistant design requiring the raising of finished floor levels is not a viable solution, therefore the site must adopt a flood resilient design. Flood resilience measures should be incorporated into the design of the ground floor level of the buildings.

5. Each building should also have a first floor area suitable for occupants to use as a safe place of refuge in the event of an extreme flood.

6. Commercial occupiers should sign up for the Flood Warning scheme operated by the Environment Agency.

7. It is recommended that a Flood Evacuation Management Plan is produced by each business using the site by following the Environment Agency's advice 'Prepare for Flooding[16]': 'Personal Flood Plan[17]', Community Flood plan[18]' or 'Business flood plan[19]' as well as consulting the Emergency Planner at the LPA.

[16] https://www.gov.uk/prepare-for-flooding
[17] https://www.gov.uk/government/publications/personal-flood-plan/personal-flood-plan
[18] https://www.gov.uk/government/publications/community-flood-plan-template/community-flood-plan
[19] https://www.gov.uk/government/publications/personal-flood-plan/personal-flood-plan

8. Surface water disposal is considered in accordance with the drainage hierarchy in Building Regulations Part H 2015 and Planning Practice Guidance 'Reducing the causes and impacts of flooding'.

9. Soakaway testing has been carried out on site. Due to the impermeable clay soil, shallow groundwater and low infiltration rates measured, infiltration type SuDS such as soakaways are not considered to be viable.

10. Surface water will discharge from the whole development is to be restricted to a maximum rate of 1.4 litres/second/hectare to the surrounding network of field drains, as agreed with the IDB. Due to the site topography, surface water will be discharged by pumping.

11. Attenuation storage will be provided for events up to and including the 1 in 100 year plus 40% climate change within a combination of permeable paving with voided stone sub-base, proprietary below ground voided storage units, detention basins and swales.

12. The IDB have provided an agreement in principle to the proposed infilling and re-alignment of existing field drains on site.

13. Foul effluent will discharge via pumping to the 150mm diameter foul sewer in Fen End Lane, north-west of the site at manhole MH2100 as stipulated by Anglian Water.

14. The drainage systems will be privately managed.

15. The level of risk and safeguards available are considered appropriate to this class of development.

Eastwood
CONSULTING ENGINEERS

APPENDICES

APPENDIX 1

- Dimensions are in millimeters, unless stated otherwise.
- Scaling of this drawing is not recommended.
- It is the recipients responsibility to print this document to the correct scale.
- All relevant drawings and specifications should be read in conjunction with this drawing.

N

Planning Application Boundary
46.01acres (18.62 acres)

Fen End Lane

B1173

A16

A1175

Cowbit Road

Pond

25m SCALE 1:1250

rev	amendments	by	ckd	date
P.01	Initial Issue	RS	DEB	24.04.22

Lincs Gateway, Spalding, Lincolnshire

Site Location Plan

Information Container LOD:	LOD 100

Alcan Properties Ltd

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Newark Beacon, Cafferata Way, Newark, Nottinghamshire NG24 2TN
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RIBA PoW Stage:	1 - Preparation & Brief
Document Suitability:	S1
Drawn / Checked:	RS / DEB
Date:	22/04/2022
Scale:	1:1250 A1
UMC Project Number:	22119

Document Reference:	Drawing no:	Revision:
22119 - UMC - XXXX - SI - DR - A	0501	P03

APPENDIX 2

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MH CL 4.19
MH CL 4.37
MH CL 4.23
MH CL 4.16
MH CL 3.84
MH CL 3.96
MH CL 3.76
MH CL 3.57
MH CL 3.59
MH CL 3.44

4.38 4.16 4.10 4.12 4.07 3.86 3.93 3.72 3.60 3.46

HEADWALL
TOP 2.47
300Ø PLASTIC TWINWALL
PIPE INVERT 1.49

DITCH OVERGROWN LIMITED ACCESS
HEDGE 1.6m
POSTS
PIPE IL 1.735
AREA OVERGROWN UNABLE TO GAIN ACCESS
Ridge 12.077
Eaves 8.587
Ridge 8.471
Eaves 6.197

NOTES

ABBREVIATIONS & SYMBOLS

AV	AIR VALVE	OHC	OVERHEAD CABLE
BH	BORE HOLE	PB	POST BOX
BOL	BOLLARD	PINV	PIPE INVERT LEVEL
CATV	CABLE TV MH	PM	PARKING METER
CCTV	SECURITY CAM	PO	POST
CL	COVER LEVEL	PT	PIPE TOP LEVEL
CH	CHANNEL	P/R	POST & RAIL FENCE
COL	COLUMN	P/W	POST & WIRE FENCE
DC	CABLE TV LID	RD	EDGE OF ROAD/NO KERB
DP	DOWN PIPE	RE	RODDING EYE/POINT
DR	DRAIN	RL	RIDGE LEVEL
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IC	INSPECTION COVER	TOW	TOP OF WALL LEVEL
IL	I NVERT LEVEL	TP	TELEGRAPH POLE
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KO	KERB OFFLET	UTL	UNABLE TO LIFT
KT	KERB TOP	VP	VENT PIPE
LP	LAMP POST	WL	WATER LEVEL
LC	LIGHT COLUMN	WLVL	WATER LEVEL
MH	MANHOLE	WM	WATER METER
MP	MARKER POST	WO	WASH OUT POINT

FENCE, HEDGE, ELECTRIC, BANK EDGE, STORM LINE, FOUL LINE, TELECOM LINE, GAS LINE, LARSON PILES, CHANNELS, WATER MAIN

TREE, BOREHOLE, STATION, TBM, MANHOLE, GULLY, BATTER, WATER LVL, GATE

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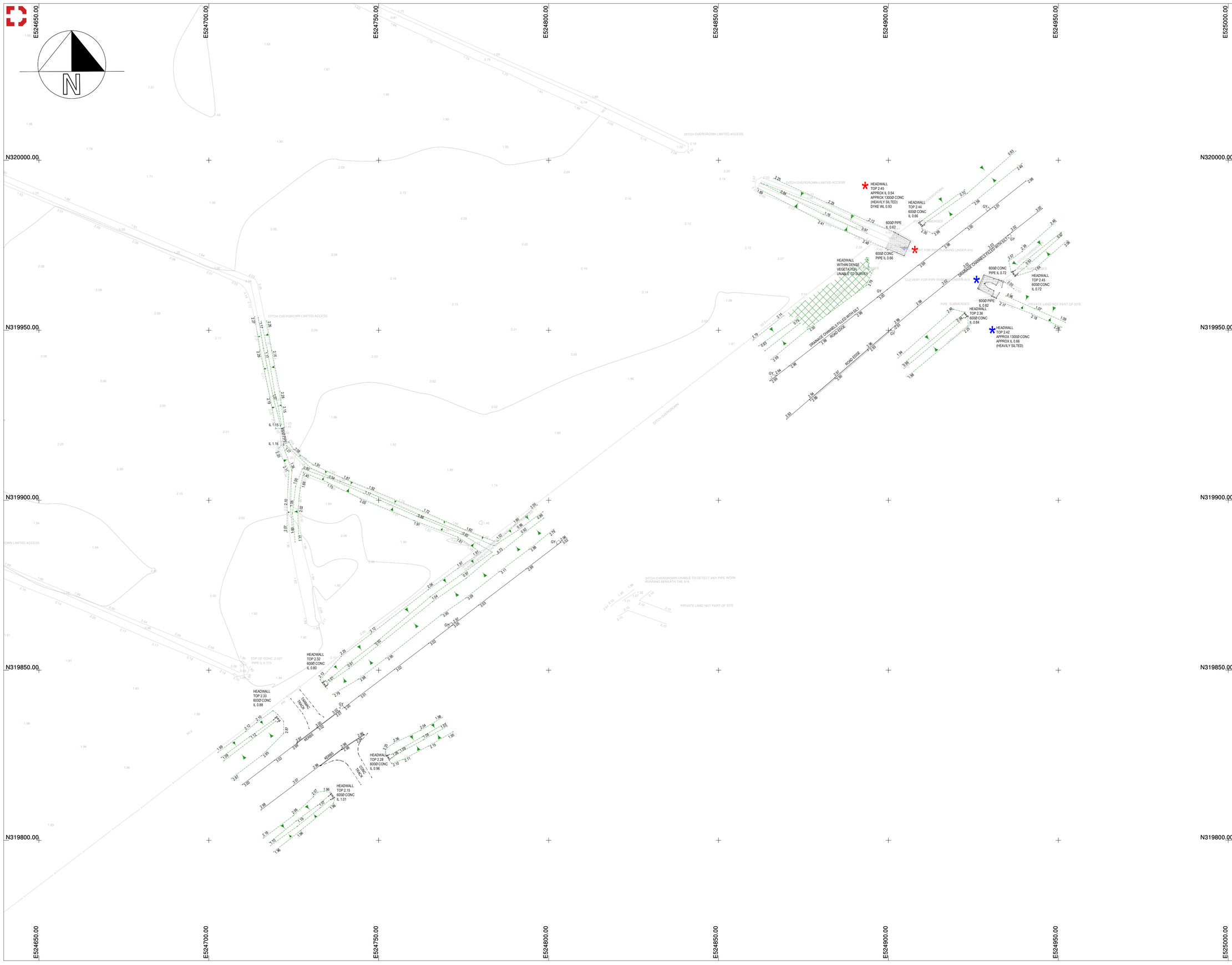
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Project Title: LINCS GATEWAY - SPALDING

Drawing Title: TOPOGRAPHICAL SURVEY
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NOTES

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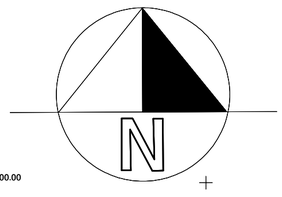
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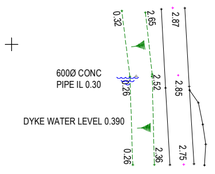
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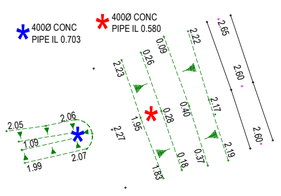
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Client:
EASTWOOD

Project Title:
LINCS GATEWAY - SPALDING

Drawing Title:
TOPOGRAPHICAL SURVEY
PAGE 3 OF 4

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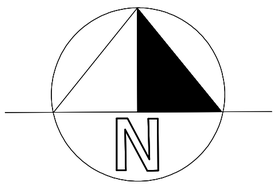
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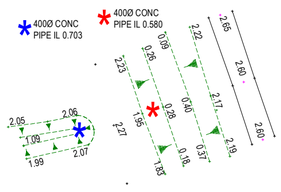
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Drawn By:	Checked By:
MDH	MJW

DANIEL CHARLES SURVEYS
Land Surveying & Engineering Services
Honeywood Barn | Honeyholes Lane
Dunholme | Lincoln | LN2 3SU | 01673 860444
Surveys@daniel-charles.co.uk
www.daniel-charles.co.uk

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N319700.00 N319700.00

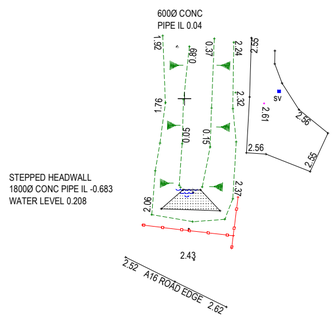
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N319400.00 N319400.00

E525150.00 E525200.00 E525250.00 E525300.00

NOTES

ABBREVIATIONS & SYMBOLS

AV	AIR VALVE	OHC	OVERHEAD CABLE
BH	BORE HOLE	PB	POST BOX
BOL	BOLLARD	PINV	PIPE INVERT LEVEL
CATV	CABLE TV MH	PM	PARKING METER
CCTV	SECURITY CAM	PO	POST
CL	COVER LEVEL	PT	PIPE TOP LEVEL
CH	CHANNEL	P/R	POST & RAIL FENCE
COL	COLUMN	P/W	POST & WIRE FENCE
DC	CABLE TV LID	RD	EDGE OF ROAD/NO KERB
DP	DOWN PIPE	RE	RODDING EYE/POINT
DR	DRAIN	RL	RIDGE LEVEL
EL	EAVES LEVEL	RP	REFLECTIVE POST
EP	ELECTRIC POLE	RS	ROAD SIGN
ER	EARTH ROD	SLVL	STONE LEVEL
FB	FLOWER BED	SOFF	SOFFIT LEVEL
FH	FIRE HYDRANT	SV	VALVE
FFL	FINISHED FLOOR LEVEL	SW	SURFACE WATER
FP	FLAG POLE	Tac	TACTILE PAVING
FW	FOUL WATER	TH	TRIAL HOLE
GV	GAS VALVE	TL	TRAFFIC LIGHTS
HW	HEADWALL	TLVL	TARMAC LEVEL
IC	INSPECTION COVER	TOW	TOP OF WALL LEVEL
IL	I NVERT LEVEL	TP	TELEGRAPH POLE
KB	KERB BOTTOM	TRK	TRACK
KO	KERB OFFLET	UTL	UNABLE TO LIFT
KT	KERB TOP	VP	VENT PIPE
LP	LAMP POST	WL	WATER LEVEL
LC	LIGHT COLUMN	WLVL	WATER LEVEL
MH	MANHOLE	WM	WATER METER
MP	MARKER POST	WO	WASH OUT POINT

FENCE
HEDGE
ELECTRIC
BANK EDGE
STORM LINE
FOUL LINE
TELECOM LINE
GAS LINE
LARSON PILES
CHANNELS
WATER MAIN

TREE
BOREHOLE
STATION
TBM
MANHOLE
GULLY
BATTER
WATER LVL
GATE

1. THE POSITION OF THIS SURVEY IS BASED ON GPS OSTN15 GRID.
2. ALL LEVELS RELATE TO GPS DATA ACQUIRED WITH TRIMBLE VRS.
3. TREES SPREADS ARE DRAWN TO SCALE AND SHOW THE GENERAL/AVERAGE CANOPY SPREAD.
4. ALL BELOW GROUND LEVEL INFORMATION INCLUDING VOIDS, DRAINAGE & SERVICES HAVE BEEN IDENTIFIED FROM THE SURFACE LEVEL ONLY, THEREFORE PIPE SIZES ETC ARE ESTIMATIONS ONLY. ALL CRITICAL DIMENSIONS SHOULD BE CHECKED PRIOR TO THE COMMENCEMENT OF ANY SITE WORKS
5. EVERY EFFORT HAS BEEN MADE TO LOCATE AND SURVEY ALL VISIBLE FEATURES. IT SHOULD BE NOTED THAT SOME ITEMS MAY HAVE BEEN OBSCURED AT THE TIME OF THE SURVEY AND THEREFORE NOT SHOWN ON THIS DRAWING.
6. PHYSICAL BOUNDARY FEATURES SHOWN ON THIS DRAWING DO NOT NECESSARILY REPRESENT THE ACTUAL LEGAL BOUNDARIES. THIS INFORMATION SHOULD BE CONFIRMED WITH THE RELEVANT DOCUMENTATION.
7. THE CONTRACTOR MUST CHECK AND VERIFY ALL SITE LEVELS, DIMENSIONS, UTILITIES AND DRAINAGE DETAILS PRIOR TO THE COMMENCEMENT OF ANY SITE WORKS. ANY DISCREPANCIES MUST BE NOTIFIED TO DANIEL CHARLES SURVEYS LTD.
8. ALL SURVEY STATION CONTROL POINTS MUST BE CHECKED BY THE CONTRACTOR PRIOR TO STARTING ANY SITE WORKS.

SURVEY DATE	JUNE 2025	INITIALS	MDH

REV	AMENDMENTS	DRN	DATE

Client:
EASTWOOD

Project Title:
LINCS GATEWAY - SPALDING

Drawing Title:
TOPOGRAPHICAL SURVEY
PAGE 4 OF 4

Scale @ A1: 1:500	Date: 01/07/25
Drawing No: 25-83-04	Rev:
C.A.D.Title: \jobs\eastwood - lincs gateway - spalding\1. magnet master files\mastertopo (25-83-01+02+03+04).mjo	
Drawn By: MDH	Checked By: MJW

DANIEL CHARLES SURVEYS
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APPENDIX 3



- Dimensions are in millimeters, unless stated otherwise.
- Scaling of this drawing is not recommended.
- It is the recipients responsibility to print this document to the correct scale.
- All relevant drawings and specifications should be read in conjunction with this drawing.

Schedule of Accommodation

Total GIA	-	**673,991 ft²**	**(62,615 m²)**
Site Area	-	46.02 ha	18.62 ha
Site Density GIA	-		33.62%
Unit 100			
Warehouse Area	-	118,776 ft²	(11,035 m²)
Office Area (incl. GF core)	-	6,212 ft²	(577 m²)
Transport Office	-	2,500 ft²	(232 m²)
Unit 100 GIA	-	**127,488 ft²**	**(11,844 m²)**
Unit 200			
Warehouse Area	-	374,467 ft²	(34,789 m²)
Office Area (incl. GF core)	-	19,708 ft²	(1,831 m²)
Transport Office	-	2,500 ft²	(232 m²)
Gatehouse	-	300 ft²	(28 m²)
Unit 200 GIA	-	**396,975 ft²**	**(36,880 m²)**
Unit 300			
Warehouse Area	-	138,792 ft²	(12,894 m²)
Office Area (incl. GF core)	-	8,236 ft²	(765 m²)
Transport Office	-	2,500 ft²	(232 m²)
Unit 300 GIA	-	**149,528 ft²**	**(13,891 m²)**

rev	amendments	by	ckd	date
P.01	Initial Issue	JMB	CA	14.02.23

Lincs Gateway, Spalding, Lincolnshire

Masterplan

Information Container LOD:	LOD 100

Alcan Properties Ltd

umc architects
Newark Beacon, Cafferata Way, Newark, Nottinghamshire NG24 2TN
t: +44 (0)1636 653027 e: info@umcarchitects.com

RIBA PoW Stage:	1 - Preparation & Brief
Document Suitability:	S1
Drawn / Checked:	JMB / CA
Date:	24/03/2023
Scale:	1:1000 A1
UMC Project Number:	22119
Document Reference:	Drawing no: Revision:
22119 - UMC - ZZZZ - SI - DR - A	0010 P03

APPENDIX 4

Flood map for planning

Your reference	Location (easting/northing)	Created
Unspecified	**524512/319979**	**30 March 2026 14:33**

Your selected location is in flood zone 3, an area with a high probability of flooding.

This means:

- you must complete a flood risk assessment for development in this area
- you should follow the Environment Agency's standing advice for carrying out a flood risk assessment (see https://www.gov.uk/guidance/flood-risk-assessment-standing-advice)

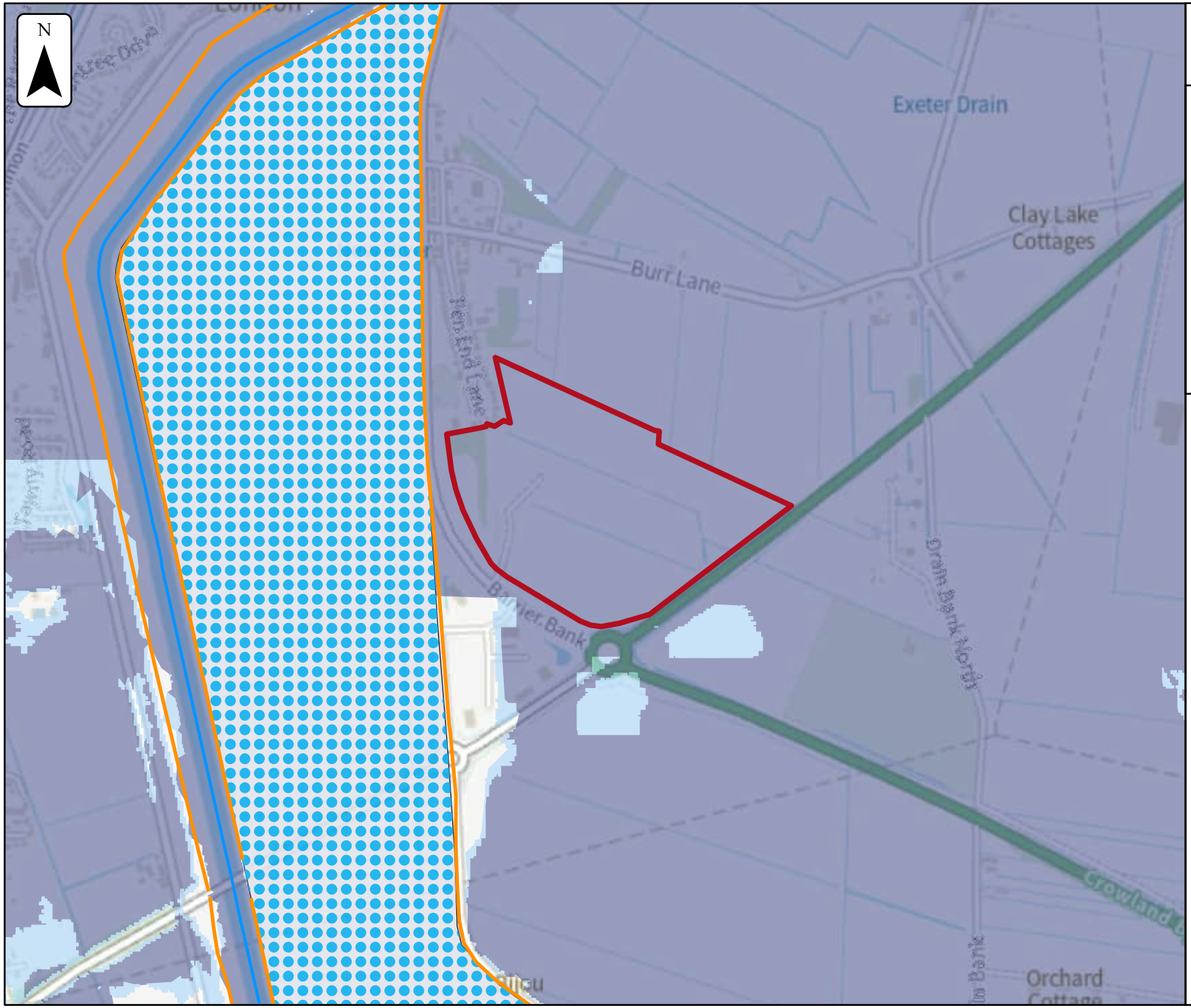
Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

Flood risk data is covered by the Open Government Licence which sets out the terms and conditions for using government data. https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3

Use of the address and mapping data is subject to Ordnance Survey public viewing terms under Crown copyright and database rights 2026 AC0000807064. https://flood-map-for-planning.service.gov.uk/os-terms



Environment Agency

Flood map for planning

Your reference
Unspecified

Location (easting/northing)
524512/319979

Scale
1:10,000

Created
30 Mar 2026 14:33

- Selected area
- Flood zone 3
- Flood zone 2
- Flood zone 1
- Flood defence
- Main river
- Water storage area

0 100 200 300m

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Jessica Steels-Crotty
Jessica.steels-crotty@eastwoodce.com

Our ref: EIR2025/48758

Date: 21/01/2026

Dear Jessica,

Flood Risk Information for Land North of A16, Spalding

The flood risk information for the above site is set out below and attached. It is important you read any contextual notes on the maps provided.

If you are preparing a Flood Risk Assessment (FRA) for this site, please note this information may not be sufficient by itself to produce an adequate FRA to demonstrate the development is safe over its lifetime. Additional information may be required to carry out an appropriate assessment of all risks, such as the consequences of a breach in the flood defences.

We aim to review our information on a regular basis, so if you are using this data more than twelve months from the date of this letter, please contact us again to check it is still valid.

Please read the letter in full as the information covered has been updated in **August 2025.**

1. Flood Map for Planning

The attached map includes the current Flood Map for Planning for your area. The map indicates the Area at Risk of Flooding (Flood Zone 3) and the Extreme Flood Outline (Flood Zone 2) **assuming no flood defences exist.**

The Area at Risk of Flooding shows the land that could be impacted from a flood with a 0.5% or greater chance of occurring in any year for flooding from the sea, or a 1% or greater chance of occurring in any year for fluvial (river) flooding.

The Extreme Flood Outline shows the land that could be impacted from a flood which has between a 1% and 0.1% chance of occurring in any year for fluvial (river) flooding, or between a 0.5% and 0.1% annual probability of sea flooding, or the highest recorded historic extent if greater.

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.

The Flood Map for Planning 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.

The Flood Map for Planning 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, etc.

2. Recorded Flood Outlines

The area was previously known to have flooded in March 1947.

A copy of the Recorded Flood Outlines Map showing the extent of previous recorded flooding in your area is attached. This only covers information we hold and it is possible recent flooding may have occurred which we are currently investigating, therefore this information may be subject to change. It is possible other flooding may have occurred which other organisations, such as the Lead Local Flood Authority (ie top tier council), Local Authority or Internal Drainage Board (where they exist), may have records.

3. Schemes in the area

There are no ongoing capital projects to reduce or sustain the current flood risk to this area.

4. Fluvial Flood Risk Information

This site is considered to be at risk of flooding from main rivers.

The site may also be at risk from local ordinary watercourses for which other risk management authorities, such as the Lead Local Flood Authority (i.e. top tier council) or Internal Drainage Board (where they exist) have responsibility.

4.1 Fluvial Defence Information

The existing fluvial defences reducing the risk of flooding to this site consist of Crowland-Cowbit Washes and embankment. They are in fair condition and provide protection against a flood event with a 1% chance of occurring in any year (1 in 100). We inspect these defences regularly to ensure that any potential defects are identified early.

4.2 Fluvial Modelled Levels and Flows

Available modelled fluvial flood levels and flows for the model nodes shown on the attached map are set out in the data table attached. This data is taken from the model named on the data table, which is the most up-to-date model currently available.

Please note these levels are “in-channel” levels and therefore may not represent the flood level on the floodplain, particularly where the channel is embanked or has raised defences.

Our models may not have the most up to date climate change allowances. In time we will update our models for the latest allowances. You should refer to 'Flood risk assessments: climate change allowances' to check if the allowances modelled are appropriate for the type of development you are proposing and its location. You may need to undertake further assessment of future flood risk using different allowances to ensure your assessment of future flood risk is based on best available evidence.

4.3 Fluvial Modelled Flood Extents

Please find attached a map showing available modelled flood extents, taking into account flood defences, for your area. This data is taken from the model named on the map, which is the most up-to-date model currently available.

In some cases the flood extents shown may not be from main river, but may be from other sources such as IDB lowland drainage networks.

4.4 Fluvial Hazard Mapping

For certain locations we have carried out modelling to map the maximum values of flood depth, velocity and hazard rating (danger to people) resulting from overtopping and / or breaching of defences at specific locations for a number of scenarios.

At present this information is available for fluvial flood risk in Northampton, Lincoln, Wainfleet and some isolated rural locations.

The number of locations we have this information for is expected to increase in time.

At present this site is not covered by any Environment Agency hazard mapping.

Detailed Hazard Mapping is available within the 2017 Update of South Holland Strategic Flood Risk Assessment. This can be downloaded via the following link: http://www.southeastlincslocalplan.org/water/

5. Tidal Flood Risk Information

This site is not considered to be at risk from tidal flooding.

6. Development Planning

If you would like local guidance on preparing a flood risk assessment for a planning application, please contact our Sustainable Places team at LNplanning@environment-agency.gov.uk. It will help if you mention this data request and attach your site location plan.

We provide free preliminary advice; additional/detailed advice, review of draft FRAs and meetings are chargeable at a rate set to cover our costs, currently £115 (plus VAT) per hour of staff time. Further details are available on our website at https://www.gov.uk/guidance/developers-get-environmental-advice-on-your-planning-proposals.

General advice on flood risk assessment for planning applications can be found on GOV.UK at https://www.gov.uk/guidance/flood-risk-assessment-for-planning-applications

We have provided information on risk of breach where it is available. If you are intending on using this information to prepare a Flood Risk Assessment you will need to check if the data meets your requirements. You may need to carry out further assessment (or modelling) for sites that are at residual risk (including from breach of defences), or additional locations or scenarios.

Climate change will increase flood risk due to overtopping of defences. Please note, unless specified otherwise, the climate change data included has an allowance for 20% increase in flow. Updated guidance on how climate change could affect flood risk to new development - 'Flood risk assessments: climate change allowances' was published on GOV.UK in **July 2021**. The appropriate updated climate change allowance should be applied in a Flood Risk Assessment.

You should also consult the Strategic Flood Risk Assessment produced by your local planning authority.

7. Permitting Information

Under the Environmental Permitting (England and Wales) Regulations 2016, permission must be obtained from the Environment Agency for any proposed activities which will take place:

- in, over, under or within 8 metres of a main river (16 metres if tidal)
- on or within 8 metres of a flood defence structure or culvert (16 metres if tidal)
- on or within 16 metres of a sea defence
- within 16 metres of any main river, flood defence (including a remote defence) or culvert for quarrying or excavation
- in a flood plain more than 8 metres from the river bank, culvert or flood defence structure (16 metres if tidal) if planning permission has not already been granted for the works

For further guidance and advice please visit our website: https://www.gov.uk/guidance/flood-risk-activities-environmental-permits or contact our local Partnerships and Strategic Overview team by email at psown@environment-agency.gov.uk. The team will be able to advise if an environmental permit or exemption registration is required and the fee applicable.

Please note that a permit is separate to and in addition to any planning permission granted. The applicant should not assume that such a permit will automatically be forthcoming once planning permission has been granted, and we would advise them to consult with us at the earliest opportunity.

8. Data Licence and Other Supporting Information

We respond to requests for recorded information we hold under the Freedom of Information Act 2000 (FOIA) and the associated Environmental Information Regulations 2004 (EIR).

This information is provided in accordance with the Open Government Licence which can be found here: http://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/

Further information on flood risk can be found on the GOV.UK website at: https://www.gov.uk/browse/environment-countryside/flooding-extreme-weather

Rights of appeal

If you are not satisfied with our decision, you can contact us within two calendar months to ask for the decision to be reviewed. We will then conduct an internal review of our response to your request and give you our decision in writing within 40 working days.

If you are not satisfied with the outcome of the internal review, you can then make an appeal to the Information Commissioner Office, the statutory regulator for EIR and the Freedom of Information Act 2002. The address is: Information Commissioner's Office, Wycliffe House, Water Lane, Wilmslow, Cheshire. SK9 5AF.

Tel: 0303 123 1113 (local rate) or 01625 545 745 (national rate) | Fax: 01625 524 510
Email: casework@ico.org.uk | Website: www.ico.org.uk

9. Other Flood Risk Management Authorities

The information provided with this letter relates to flood risk from main river or the sea. The Flood Map for Surface Water can be viewed at https://www.gov.uk/check-long-term-flood-risk

Additional information may be available from other risk management authorities, such as the Lead Local Flood Authority (ie top tier council) or Internal Drainage Board (where they exist).

I hope we have correctly interpreted your request. If you have any queries or would like to discuss the content of this letter further, please contact Christopher using the email address below and quoting our EIR reference number above.

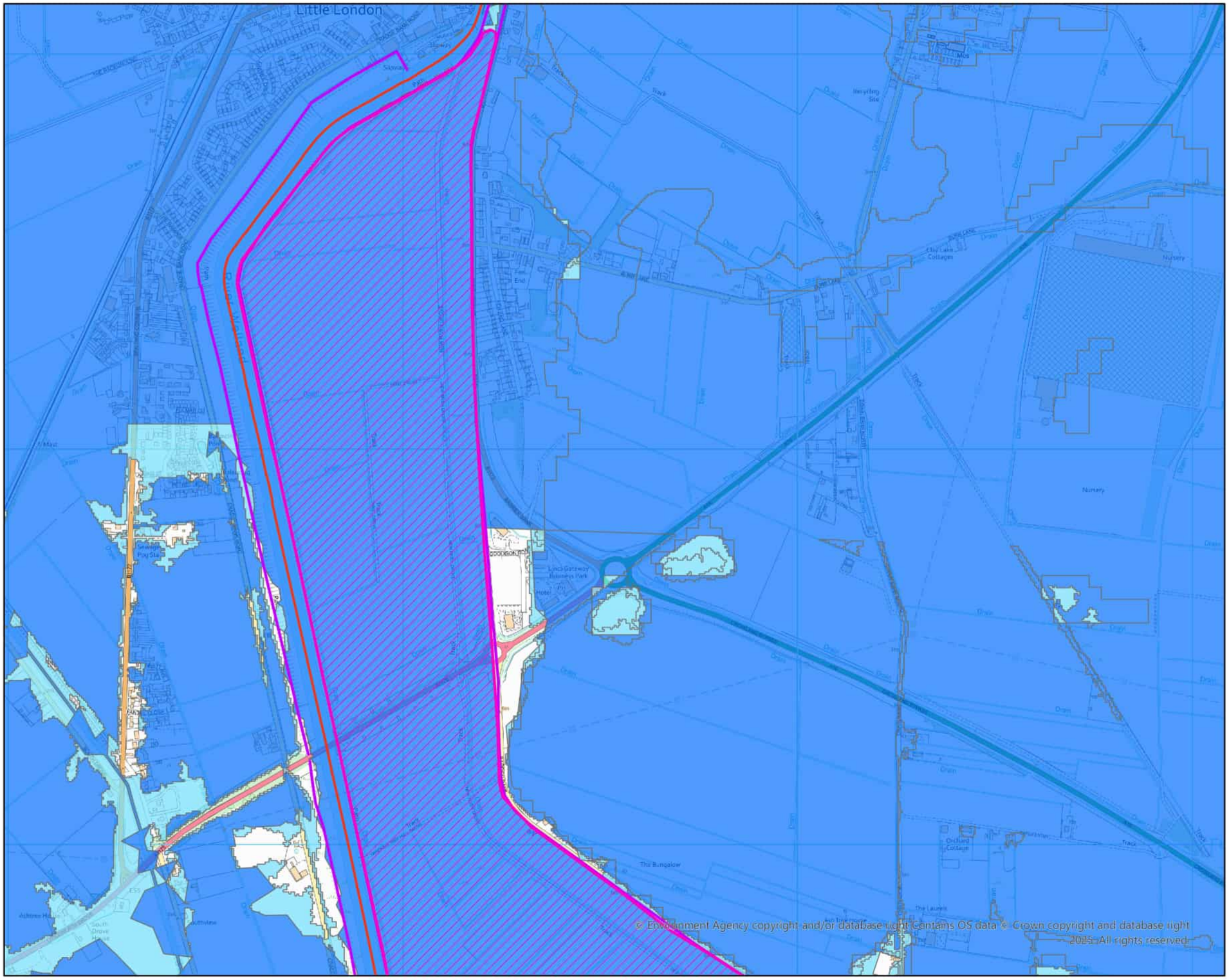
Yours sincerely,

Christopher Hill

for John O'Neill
Welland and Nene Partnerships and Strategic Overview Team Leader
e-mail PSOWN@environment-agency.gov.uk

Enc.
Flood Map for Planning
Recorded Flood Event Outlines Map
Modelled Node Points Map
Modelled Fluvial Levels and Flows Data Sheet
Modelled Flood Extent Maps

Flood Map centred on TF 24535 19898 - created January 2026 [Ref: EIR2025/48758]



Environment Agency

Scale 1:10,000

N

Legend

- Statutory Main Rivers
- Flood Storage Areas
- Raised Defences

Flood Zones 2 and 3 Rivers and Sea

Flood Zone

- Flood Zone 2
- Flood Zone 3

Dark blue shows the area that could be affected by flooding, either from rivers or the sea, if there were no flood defences. This represents land that could be impacted by a flood which has a 1% (1 in 100) or greater chance of occurring in any year from rivers or 0.5% (1 in 200) or greater annual probability of flooding from the sea.

Light blue shows the extent of the Extreme Flood Outline. This represents land that could be impacted by a flood which has between a 1% and 0.1% (1 in 100 to 1 in 1000) chance of occurring in any year from rivers or between 0.5% and 0.1% (1 in 200 to 1 in 1000) annual probability of flooding from the sea, or the highest recorded historic extent if greater.

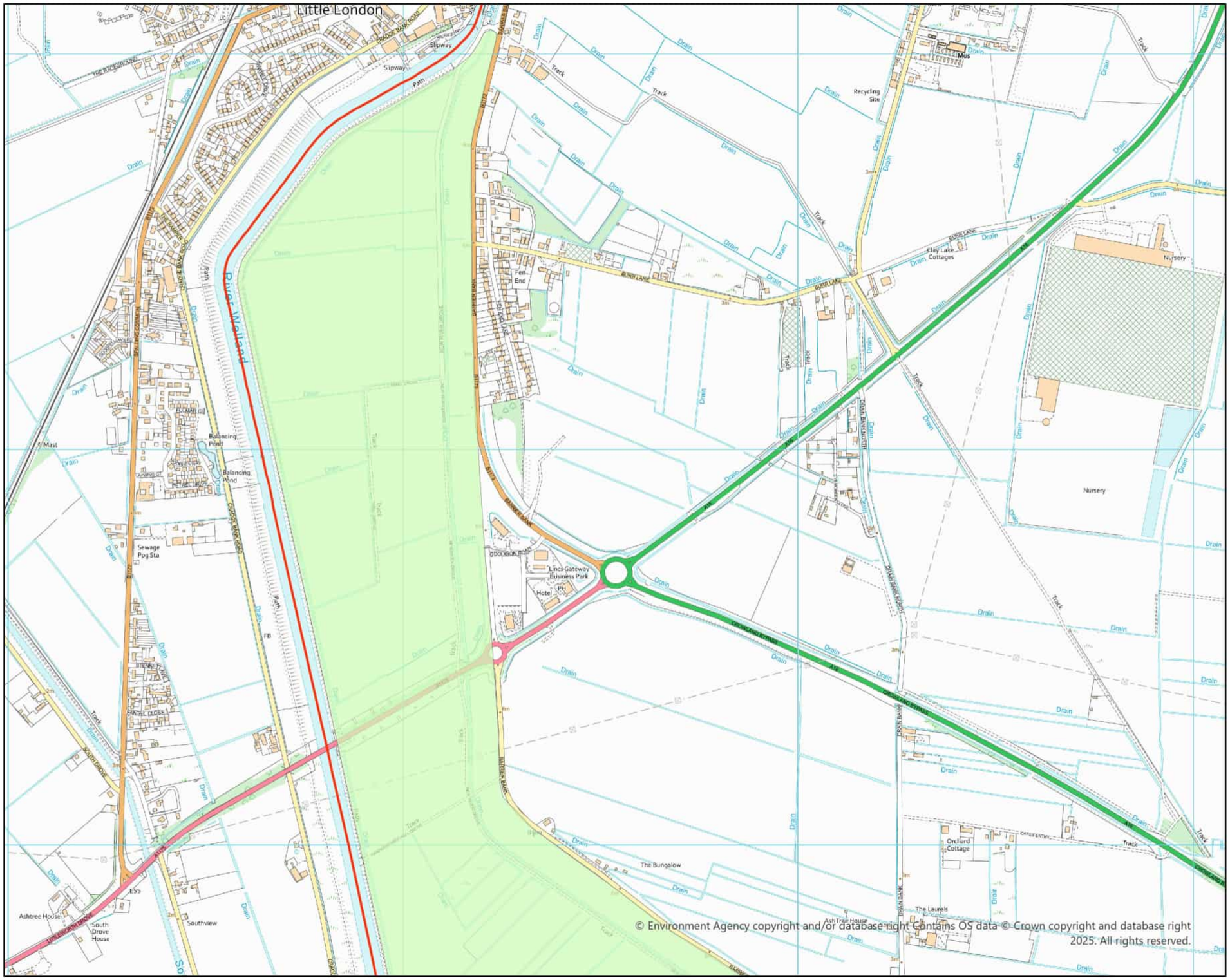
These two colours show the extent of the natural floodplain if there were no flood defences or certain other manmade structures and channel improvements. Sites outside the two extents, but behind raised defences, may be affected by flooding if the defences are overtopped or fail.

Created by the Partnerships and Strategic Overview Team, Kettering

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Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

Historic Flood Map centred on TF 24535 19898 - created January 2026 [Ref: EIR2025/48758]



Environment Agency

Scale 1:10,000

N

Legend

Statutory Main Rivers

Recorded Flood Outlines

Event name

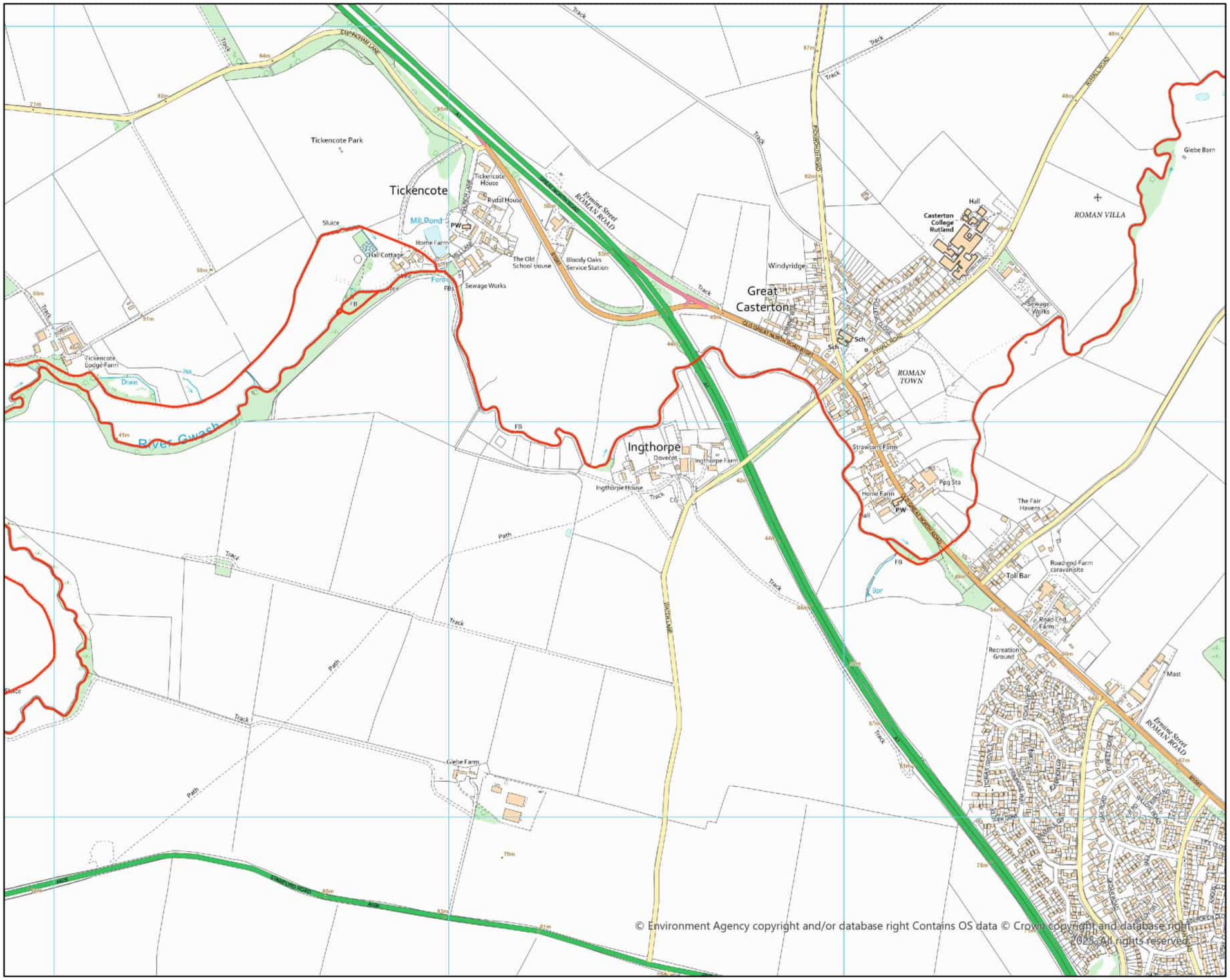
LNA_1947_March_River Welland_Crowland

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Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

Modelled Levels and Flows Model: Welland Glen (2016) centred on TF 24535 19898 - created January 2026 [Ref: EIR2025/48758]



Environment Agency

Scale 1:10,000

N

Legend

- Statutory Main Rivers
- Modelled Levels
- Modelled Flows

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Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

Fluvial Flood Levels (mODN)

The fluvial flood levels for the model nodes shown on the attached map are set out in the table below. They are measured in metres above Ordnance Datum Newlyn (mODN).

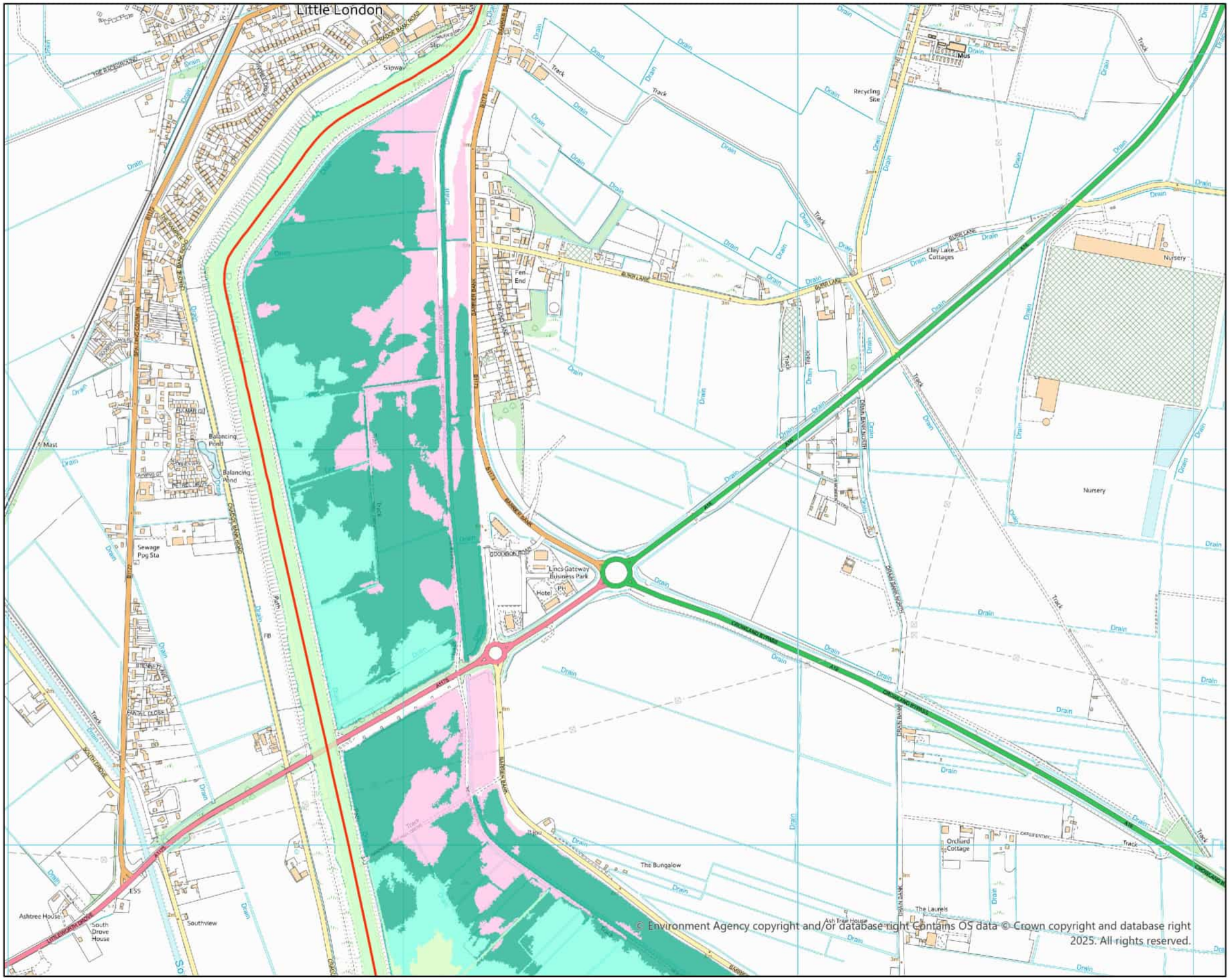
			Annual Exceedance Probability - Maximum Water Levels (mODN)											
Node Label	**Easting**	**Northing**	**50% (1 in 2)**	**20% (1 in 5)**	**10% (1 in 10)**	**5% (1 in 20)**	**3.33% (1in 30)**	**2% (1 in 50)**	**1.33% (1 in 75)**	**1% (1 in 100)**	**1% (1 in 100) inc 20% Climate Change**	**0.5% (1 in 200)**	**0.1% (1 in 1000)**	**0.1% (1 in 1000) inc 20% Climate Change**
WELLAND 16224	523562	320451	3.70	3.98	4.18	4.43	4.50	4.52	4.53	4.53	4.66	4.53	4.55	4.66
WELLAND 16724	523630	319964	3.70	3.99	4.19	4.44	4.51	4.53	4.53	4.54	4.66	4.54	4.55	4.66
WELLAND 17224	523742	319477	3.70	4.00	4.20	4.44	4.51	4.53	4.54	4.54	4.66	4.54	4.56	4.66

Fluvial Flood Flows (m^3/s)

The fluvial flood flows for the model nodes shown on the attached map are set out in the table below. They are measured in metres cubed per second (m^3/s).

			Annual Exceedance Probability - Maximum Flows (m^3/s)											
Node Label	**Easting**	**Northing**	**50% (1 in 2)**	**20% (1 in 5)**	**10% (1 in 10)**	**5% (1 in 20)**	**3.33% (1in 30)**	**2% (1 in 50)**	**1.33% (1 in 75)**	**1% (1 in 100)**	**1% (1 in 100) inc 20% Climate Change**	**0.5% (1 in 200)**	**0.1% (1 in 1000)**	**0.1% (1 in 1000) inc 20% Climate Change**
WELLAND 16474	523577	320209	60.03	75.84	86.75	100.18	106.29	111.79	112.99	114.34	113.83	114.57	113.66	113.63
WELLAND 16974	523686	319721	59.28	75.10	85.95	99.45	106.32	111.74	112.95	114.31	113.94	114.87	113.65	113.62
WELLAND 17474	523794	319233	58.53	74.34	85.12	98.71	106.38	111.70	112.91	114.28	114.08	115.18	113.65	113.62

Modelled Flood Extents (with defences) Model: Welland Glen (2016) centred on TF 24535 19898 - created January 2026 [Ref: EIR2025/48758]



Environment Agency

Scale 1:10,000

N

Legend

- Statutory Main Rivers
- 3.33% (1 in 30) fluvial event
- 1% (1 in 100) fluvial event
- 1% (1 in 100) inc 20% climate change fluvial event
- 0.1% (1 in 1000) fluvial event
- 0.1% (1 in 1000) inc 20% climate change fluvial event

Created by the Partnerships and Strategic Overview Team, Kettering

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Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk



Environment Agency - Flood Map for Planning



Environment Agency - Risk of Surface Water Flooding (Present Day)



Environment Agency - Risk of Surface Water Flood Depths reaching 0.2m (Present Day)



Environment Agency - Risk of Surface Water Flood Depths reaching 0.3m (Present Day)



Environment Agency - Risk of Surface Water Flood Depths reaching 0.6m (Present Day)



Environment Agency - Risk of Surface Water Flooding (Climate Change: 2040-2060s)



Environment Agency - Risk of Surface Water Flood Depths reaching 0.2m (Climate Change: 2040-2060s)



Environment Agency - Risk of Surface Water Flood Depths reaching 0.3m (Climate Change: 2040-2060s)



Environment Agency - Risk of Surface Water Flood Depths reaching 0.6m (Climate Change: 2040-2060s)



Environment Agency - Risk of Reservoir Flooding



Environment Agency - Historic Flood Map

Jessica Stevenson-Steels

From: Enquiries, Unit <enquiries@environment-agency.gov.uk> on behalf of Enquiries, Unit
Sent: 29 May 2025 17:31
To: 'jessica.stevenson-steels@eastwoodce.com'
Subject: 250529/CLW08 - FW: EA surface water flood maps

Hi Jessica,

The flood risk extents shown for the main Risk of Flooding from Rivers and Sea and Risk of Flooding from Surface Water datasets is the chance that any flooding could occur, regardless of depth.
The depth information for these datasets shows the chance that flooding will reach a given depth (e.g. chance of flooding of 20cm depth or greater).
In any location, the chance of flooding to a given depth decreases as the depth increases.
As an example, a location that has a low chance of flooding to a depth of 10cm would be shown at risk on the extent maps. But it might have a very low chance of deeper flooding to a depth of 20cm and so would not be shown at risk on the 20cm depth maps.

Kind regards

Clare Williamson
Job Title: Customer Service Adviser
Environment Agency: Contact Centre Services - Part of Strategy, Transformation & Assurance (STA)
Phone: 03708 506506
Working hours: Monday – Friday 10.00 – 18.00

From: Jessica Stevenson-Steels <jessica.stevenson-steels@eastwoodce.com>
Sent: 27 May 2025 14:08
To: Enquiries, Unit <enquiries@environment-agency.gov.uk>
Subject: EA surface water flood maps

Good afternoon,

I am currently reviewing surface water flood maps for a site centred on 456605E, 519410N (location plan attached).

It is noted that some areas are highlighted to be at risk of surface water flooding (attachment 1), but are not shown on the flood depth map (attachment 2) despite the lowest depth category being 'up to 20 cm', which I would have expected to cover all areas at risk of surface water flooding.

I have noticed this on multiple occasions for different sites, so this discrepancy is not just specific to this one location.

Please can you advise why all areas shown on the surface water flood extents map may not appear on the surface water flood depths map.

Kind regards,

Jessica Stevenson-Steels BSc MCIWEM
Environmental Engineer
DD: 0114 399 4504
T: 0114 255 4554
www.eastwoodce.com

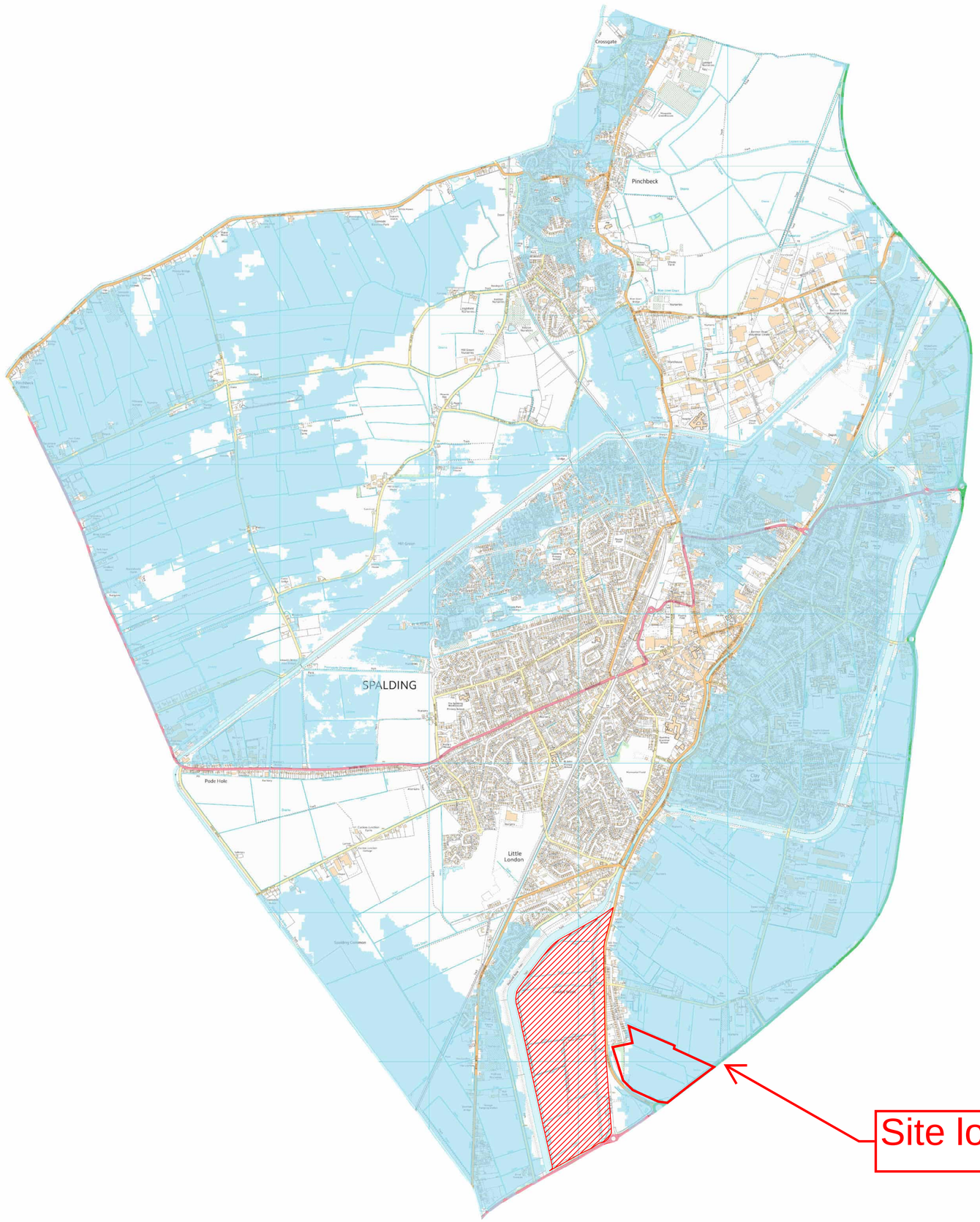
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APPENDIX 5

N



NOTES

1. The potential flooding consequences shown on this map primarily relate to flooding from the sea and main rivers taking into account the presence of current flood risk management measures such as flood defences.

2. This update only included new flood risk information from River Welland (Fluvial), River Glen (Fluvial) and Tidal hazard mapping (River Welland, River Nene and the Wash sea defences). No new information from the Internal Drainage Boards and associated systems was used for this update.

3. In addition to the potential flood extents shown on this map, there may be shallow flooding in low-lying rural areas

4. The consequences designated as being a Residual Risk arise from direct overtopping of defences, where this would occur, together with breach failure which is assumed could occur at any point along the defences.

5. The potential flooding consequences relate to flood probability bandings as follows:

Probability Band	Annual probability of Flooding	
	from a river (fluvial)	from the sea (tidal)
Low	<0.1%	<0.1%
Medium	1%-0.1%	0.5%-0.1%
High	>1%	>0.5%

6. Functional Floodplain encompasses areas where water is intended to flow or be stored in times of flood.

7. Land outside South Holland District is not considered.

8. This map shows the extents only of the flooding probability bands relevant to the map Title

Map Legend

Flooding Probability bands :

- High
- Low or medium, but reliant on protection by flood defences for this standard
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- South Holland District Boundary

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1	Dec 16	Modelling and Mapping Update

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UPDATE OF STRATEGIC FLOOD RISK ASSESSMENT

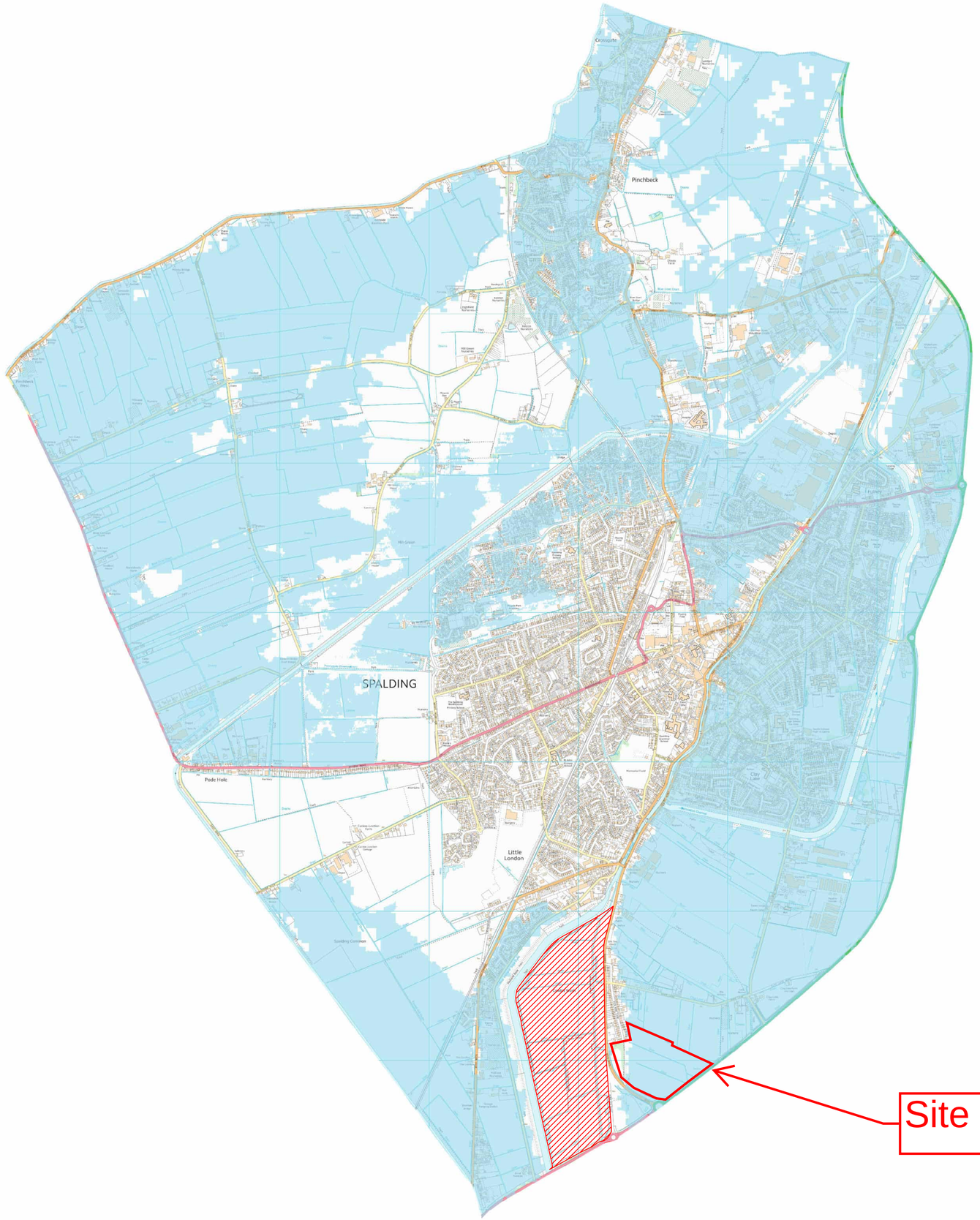
Residual Risk Extent
Spalding - Present Day
1% Fluvial / 0.5% Tidal Event Probability

DATE OF ISSUE: Feb 2017 **REV NO:** 2

SCALE: 1 : 15,000 @ A1

MAP NO:

N



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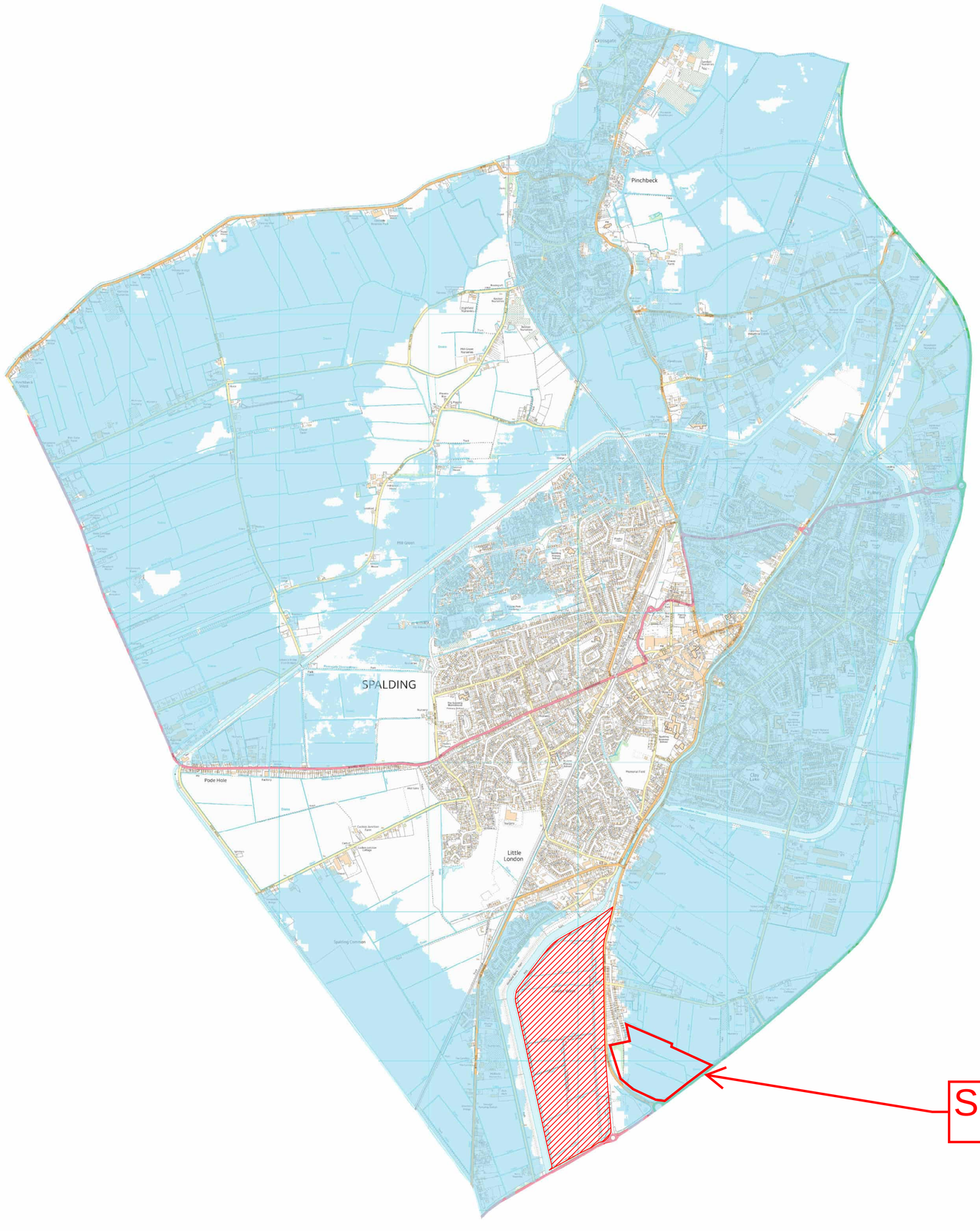
Residual Risk Extent
Spalding - Present Day
0.1% Event Probability

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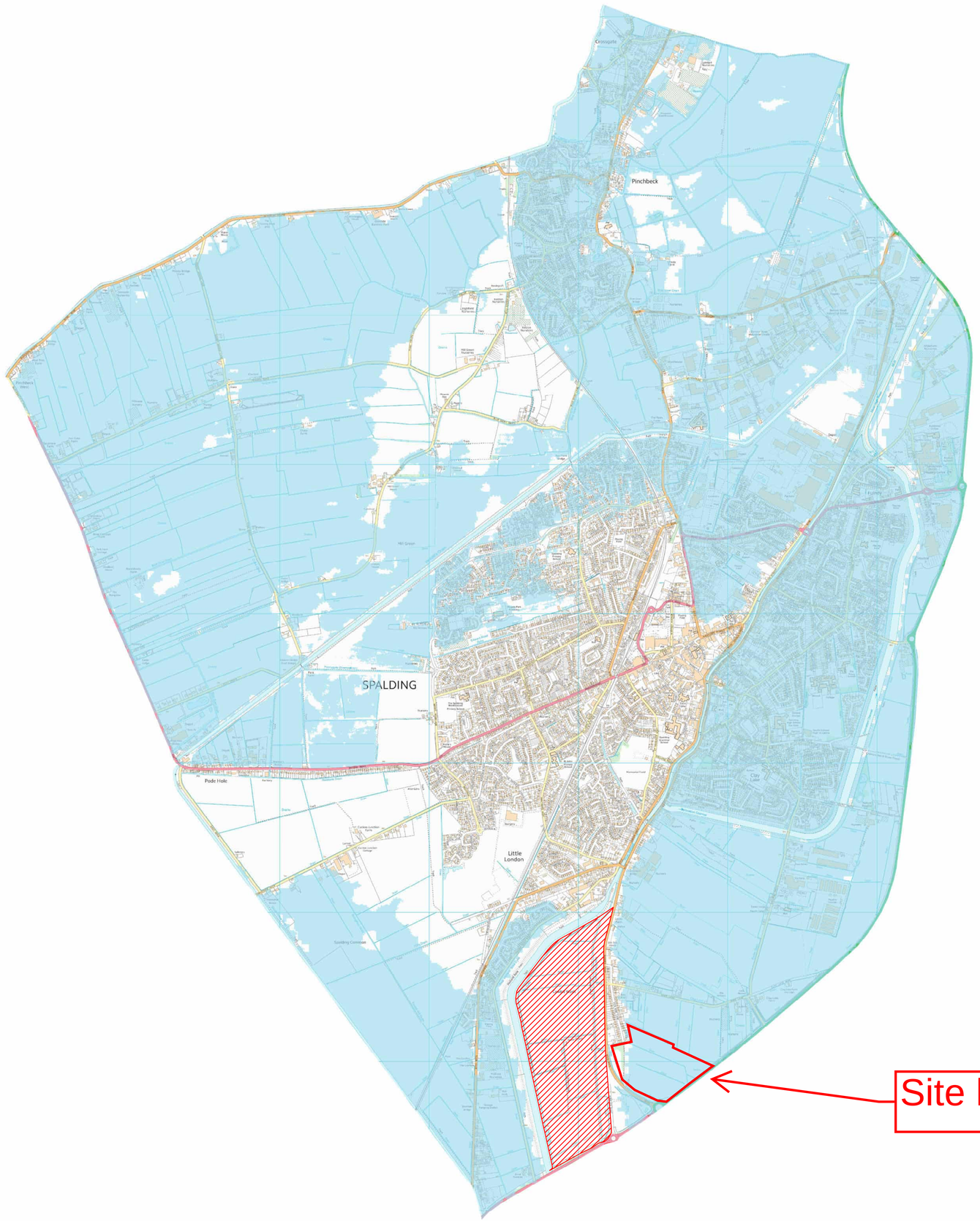
Residual Risk Extent
Spalding - Year 2115
1% Fluvial / 0.5% Tidal Event Probability

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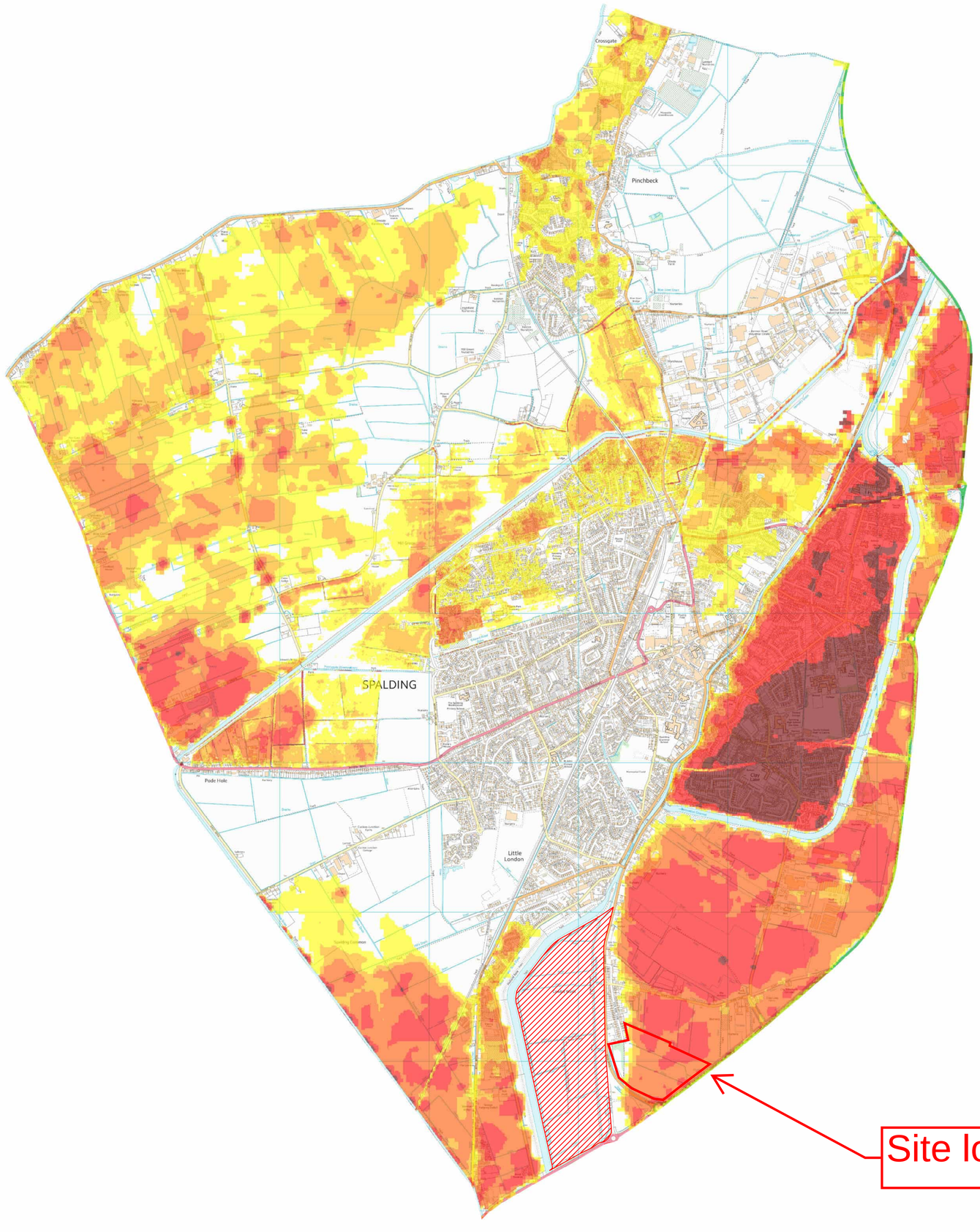
Residual Risk Extent
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Peak Depth

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- 0m - 0.25m
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- 0.5m - 1m
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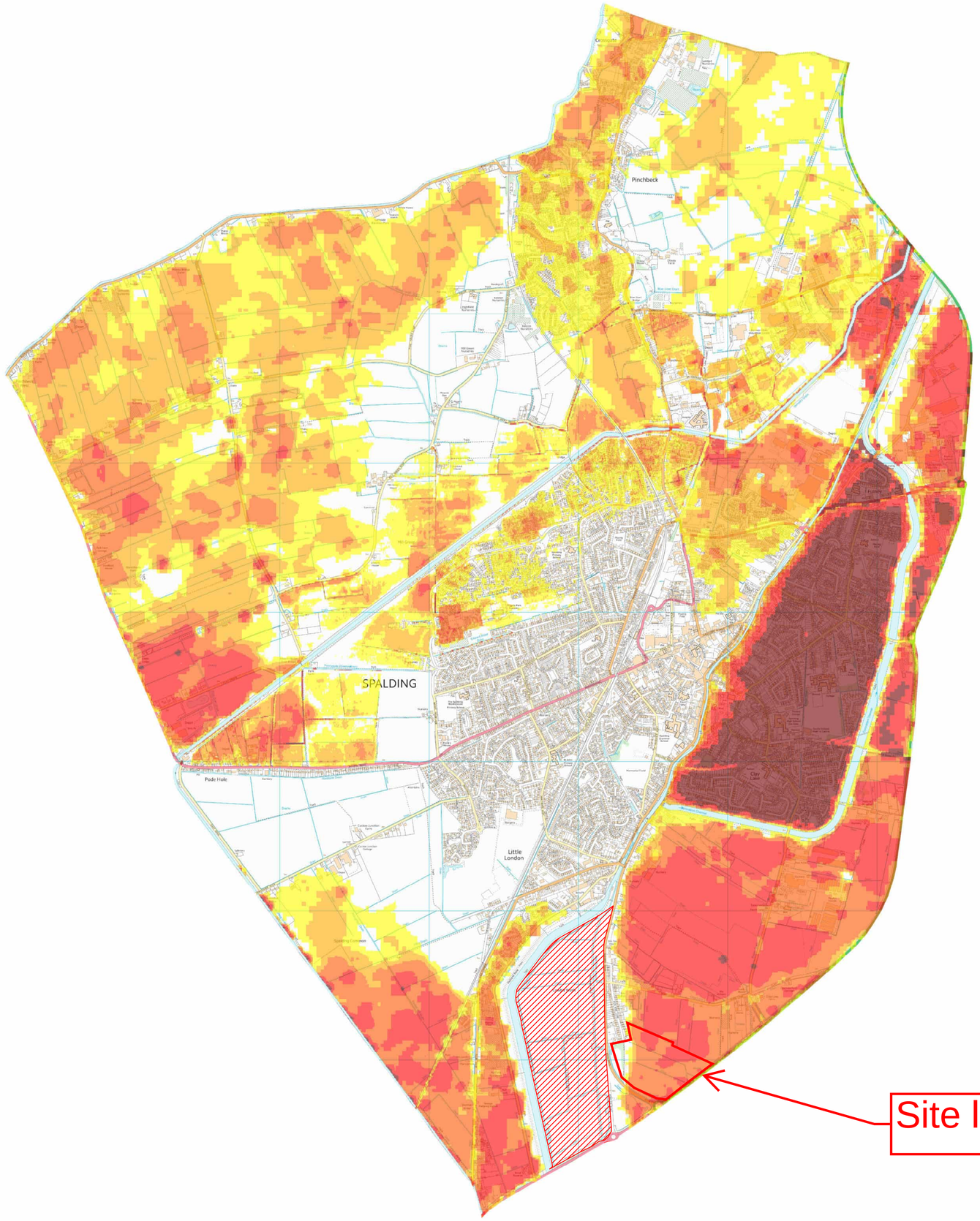
Residual Peak Depth
Spalding - Present Day
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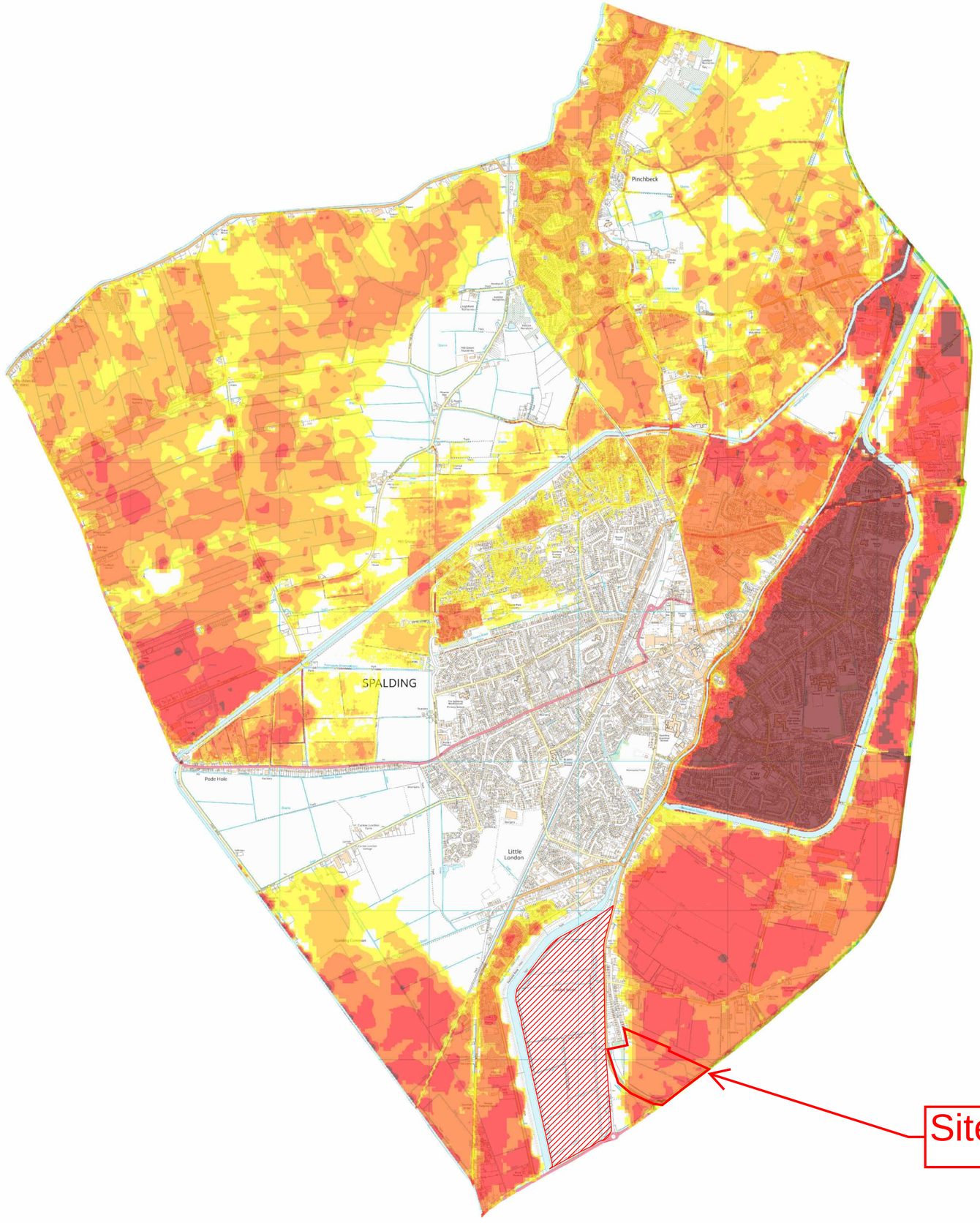
Residual Peak Depth
Spalding - Present Day
0.1% Event Probability

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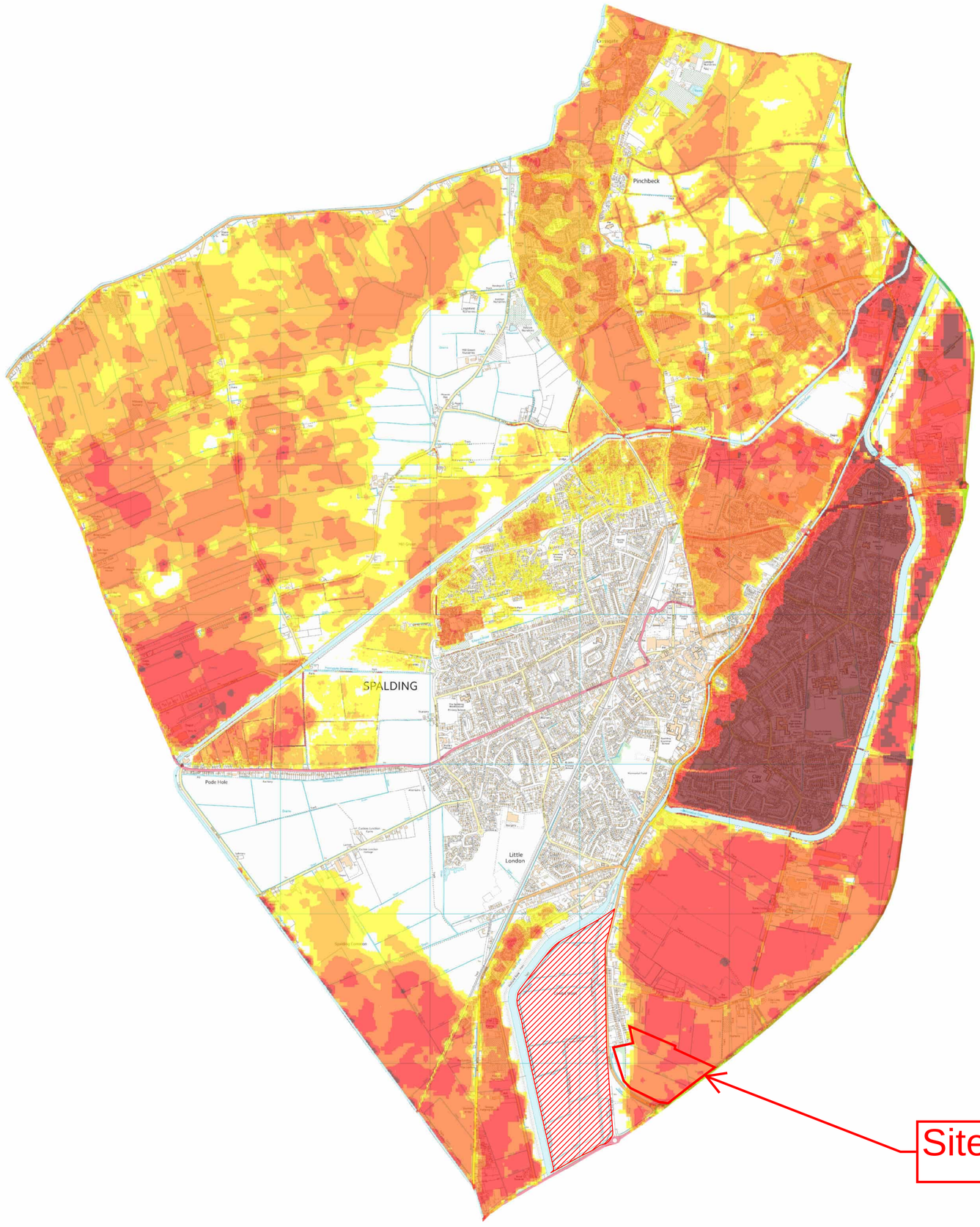
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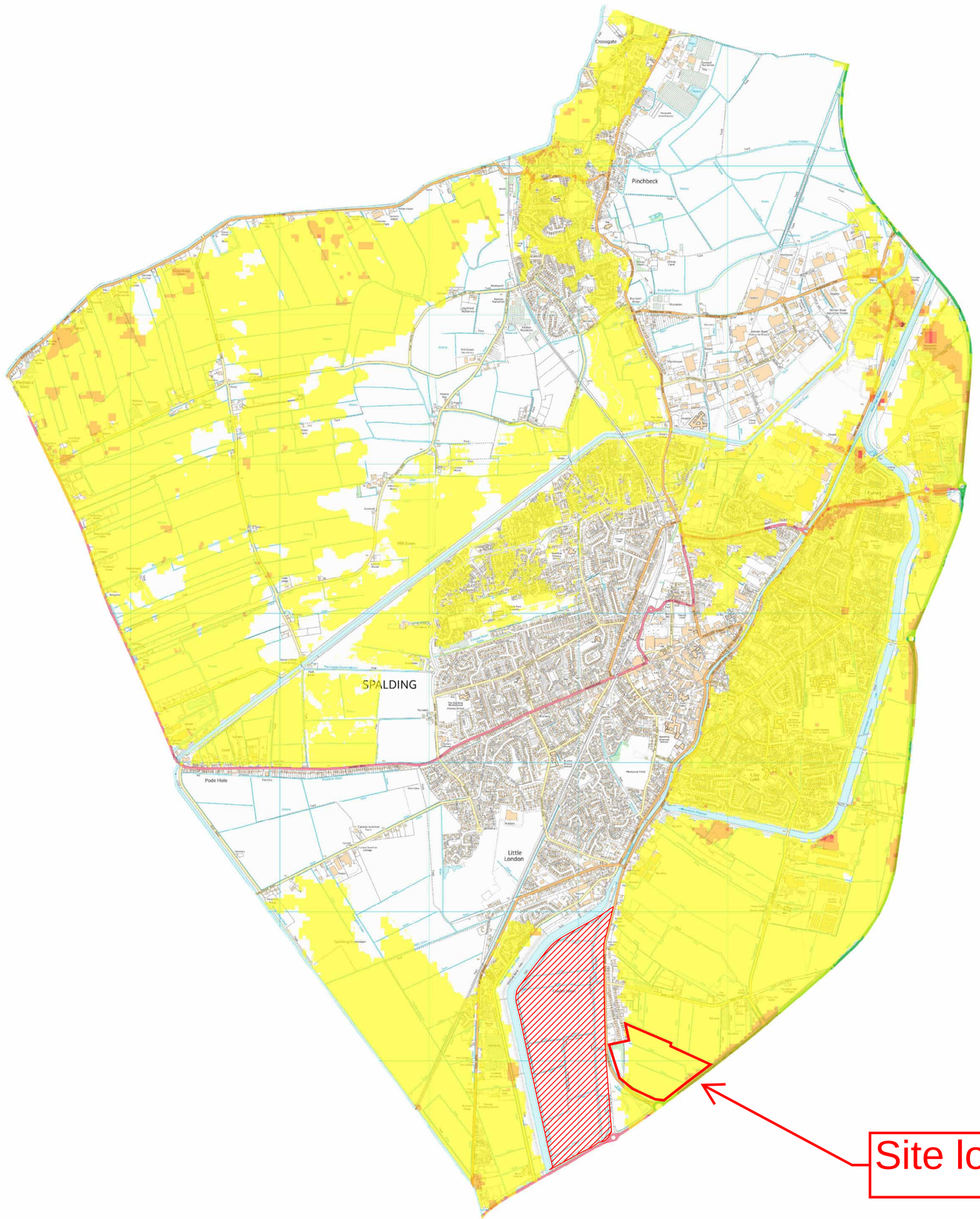
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Peak Velocity (metres per second)

- 0 - 0.3
- 0.3 - 1
- 1 - 1.5
- 1.5 - 2.5
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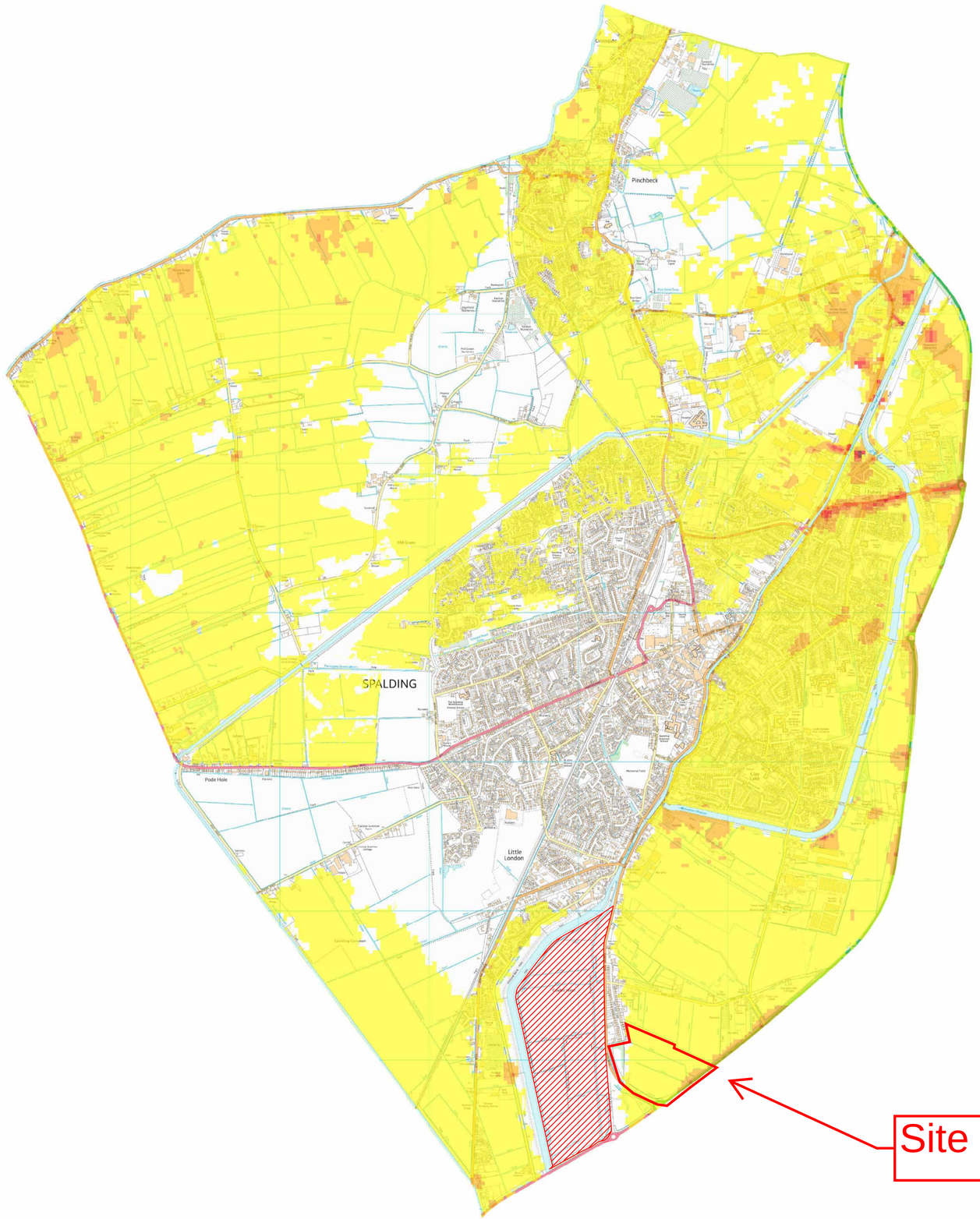
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Spalding - Present Day
1% Fluvial / 0.5% Tidal Event Probability

DATE OF ISSUE: Feb 2017 **REV NO:** 2

SCALE: 1 : 16,000 @ A1

MAP NO:

N



NOTES

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5. Functional Floodplain encompasses areas where water is intended to flow or be stored in times of flood.

6. Land outside South Holland District is not considered.

7. This map shows the extents only of the flooding probability bands relevant to the map Title

Map Legend

Peak Velocity (metres per second)

- 0 - 0.3
- 0.3 - 1
- 1 - 1.5
- 1.5 - 2.5
- 2.5 +
- Functional Floodplain
- South Holland District Boundary

REV	DATE	REMARKS
2	Feb 17	Modelling and Mapping Update
1	Dec 16	Modelling and Mapping Update

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UPDATE OF STRATEGIC FLOOD RISK ASSESSMENT

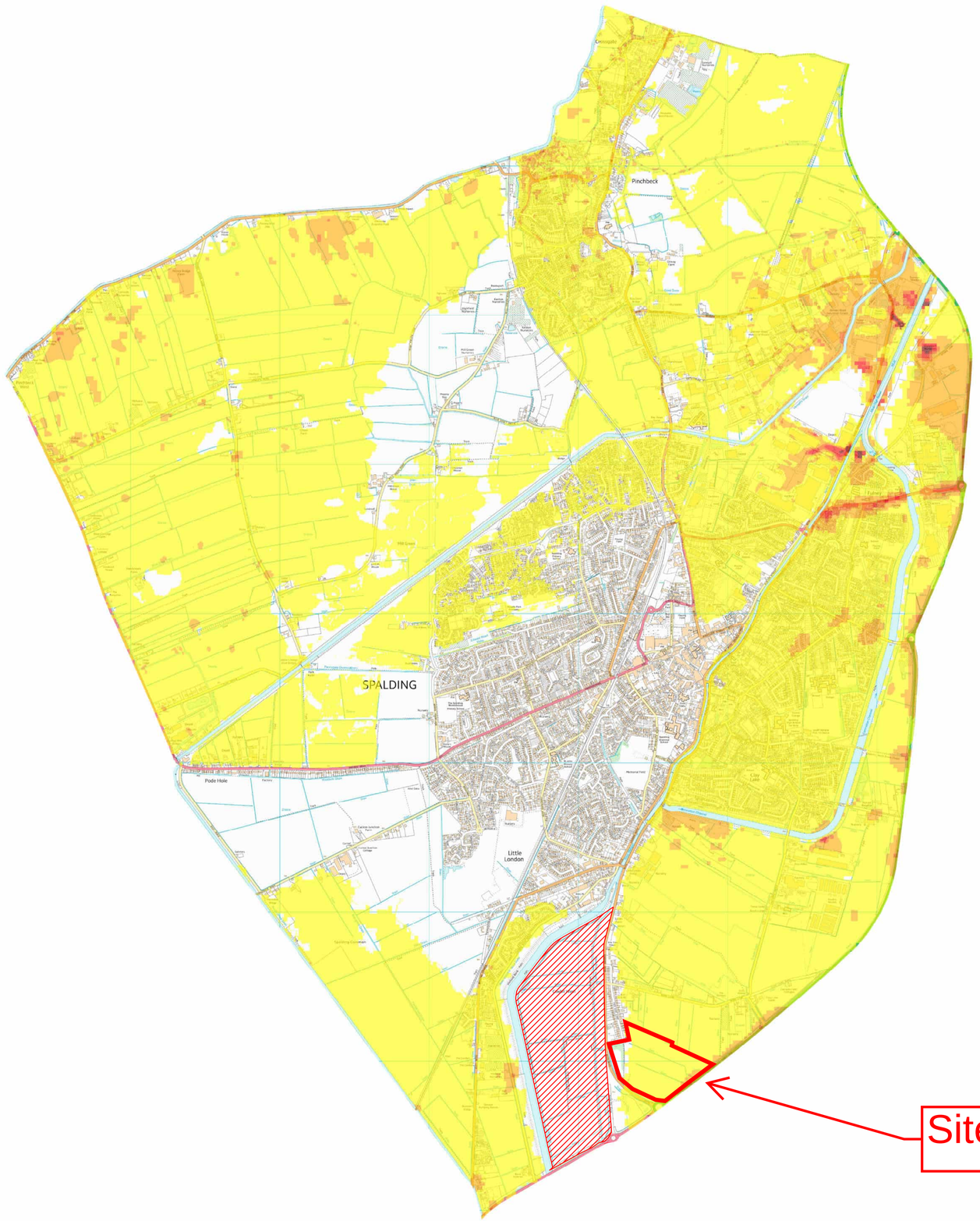
Residual Peak Velocity
Spalding - Present Day
0.1% Event Probability

DATE OF ISSUE: Feb 2017 **REV NO:** 2

SCALE: 1 : 16,000 @ A1

MAP NO:

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Map Legend

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- South Holland District Boundary

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UPDATE OF STRATEGIC FLOOD RISK ASSESSMENT

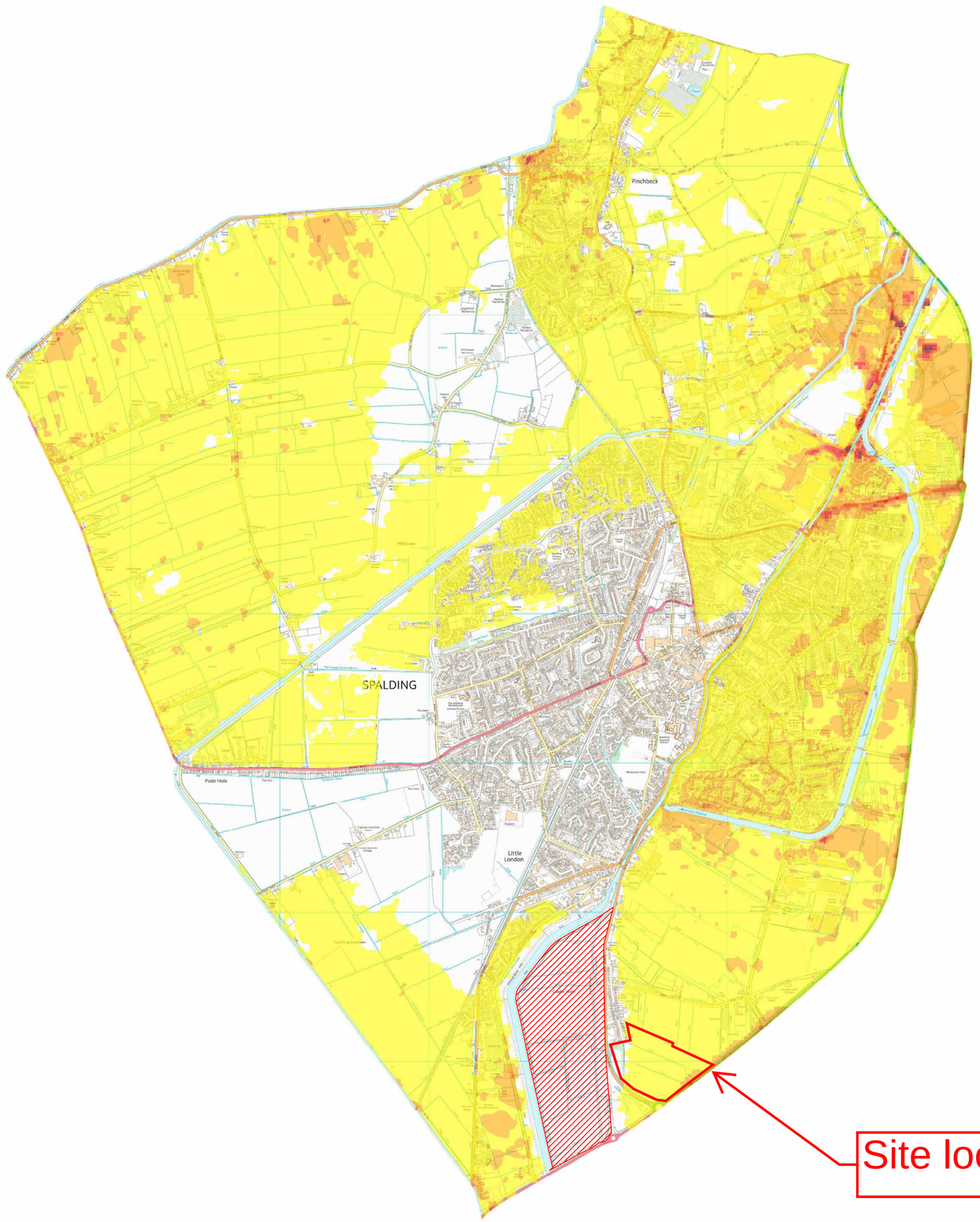
Residual Peak Velocity
Spalding - Year 2115
1% Fluvial / 0.5% Tidal Event Probability

DATE OF ISSUE: Feb 2017 **REV NO:** 2

SCALE: 1 : 16,000 @ A1

MAP NO:

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6. Land outside South Holland District is not considered.

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Map Legend

Peak Velocity (metres per second)

- 0 - 0.3
- 0.3 - 1
- 1 - 1.5
- 1.5 - 2.5
- 2.5 +
- Functional Floodplain
- South Holland District Boundary

REV	DATE	REMARKS
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UPDATE OF STRATEGIC FLOOD RISK ASSESSMENT

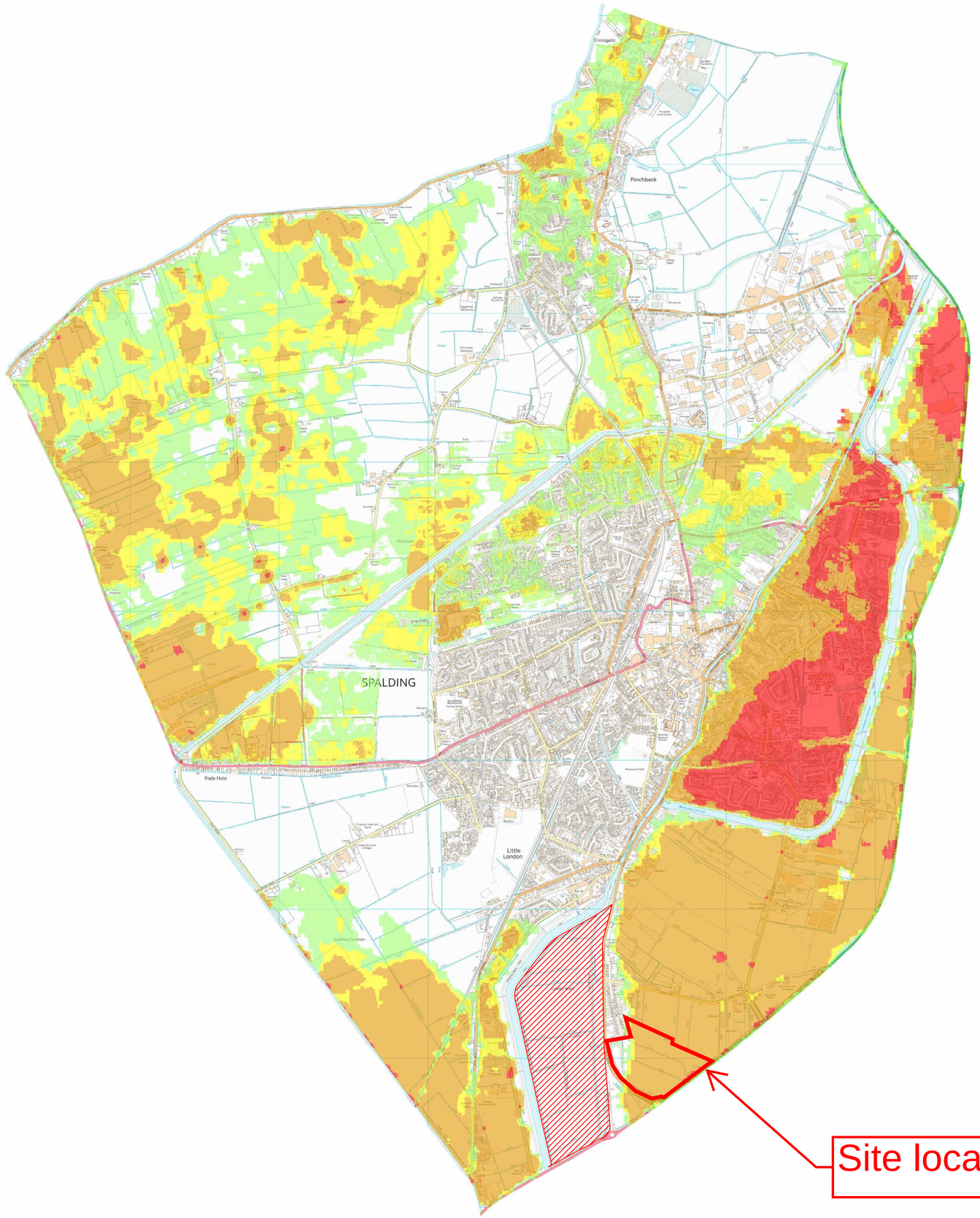
Residual Peak Velocity
Spalding - Year 2115
0.1% Event Probability

DATE OF ISSUE: Feb 2017 **REV NO:** 2

SCALE: 1 : 16,000 @ A1

MAP NO:

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7. This map shows the extents only of the flooding probability bands relevant to the map Title

Map Legend

Max Hazard
(Flood Risk to People : FD2320)

- Less than 0.75 (Low Hazard)
- Between 0.75 and 1.25 (Danger for Some)
- Between 1.25 and 2.0 (Danger for Most)
- Greater than 2.0 (Danger for All)
- Functional Floodplain
- South Holland District Boundary

REV	DATE	REMARKS
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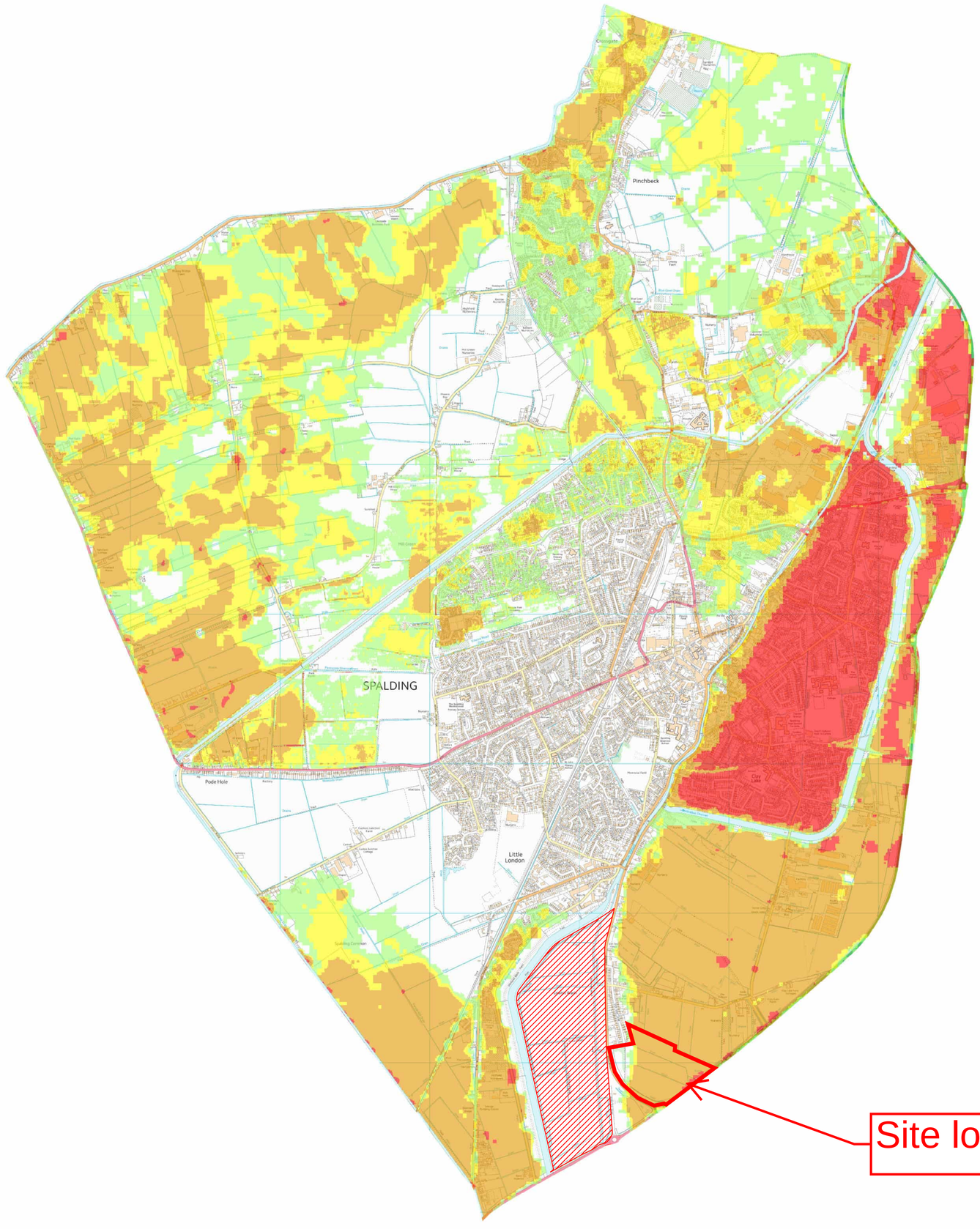
Residual Flood Hazard
Spalding - Present Day
1% Fluvial / 0.5% Tidal Event Probability

DATE OF ISSUE: Feb 2017 **REV NO:** 2

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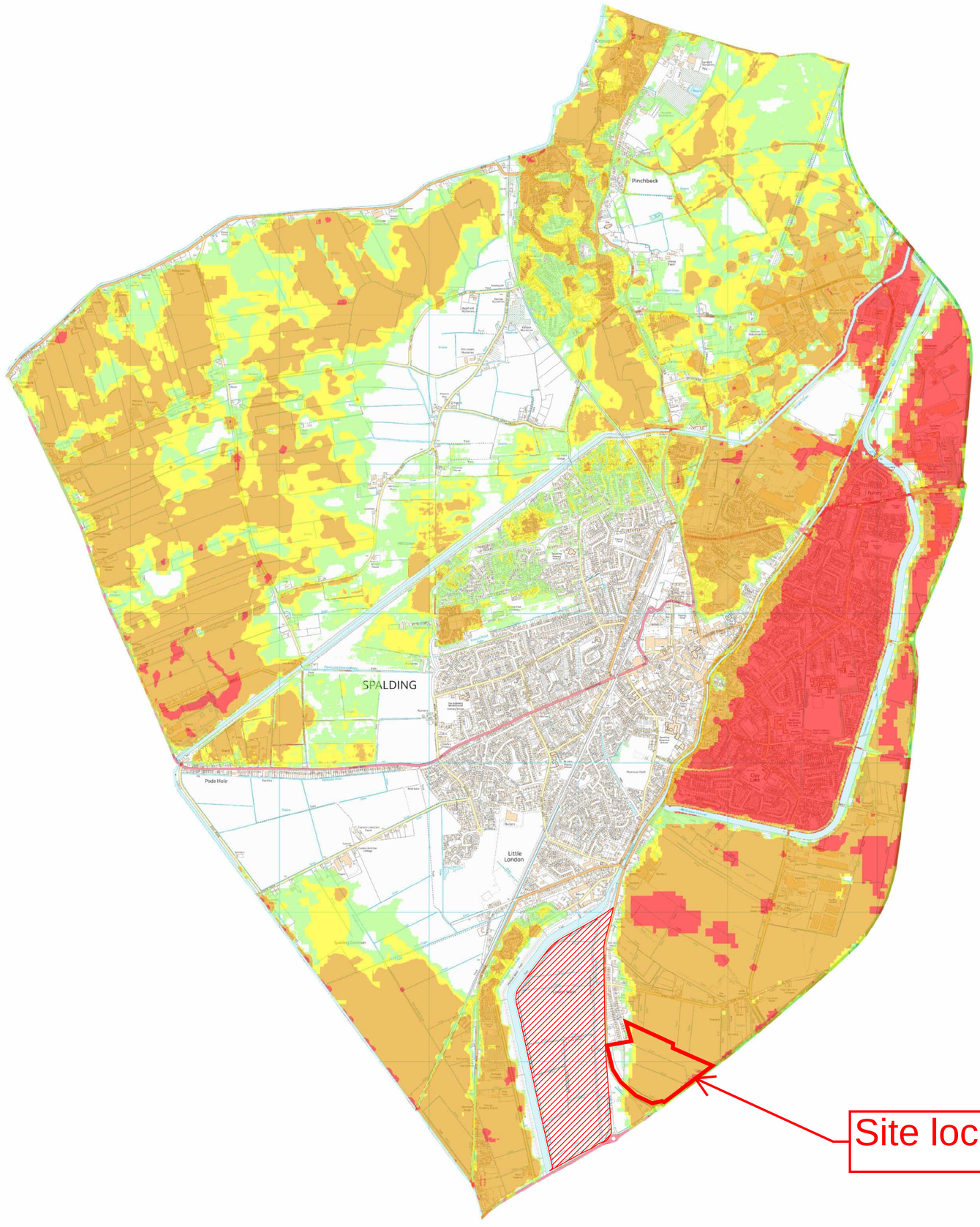
Residual Flood Hazard
Spalding - Present Day
0.1% Event Probability

DATE OF ISSUE: Feb 2017 **REV NO:** 2

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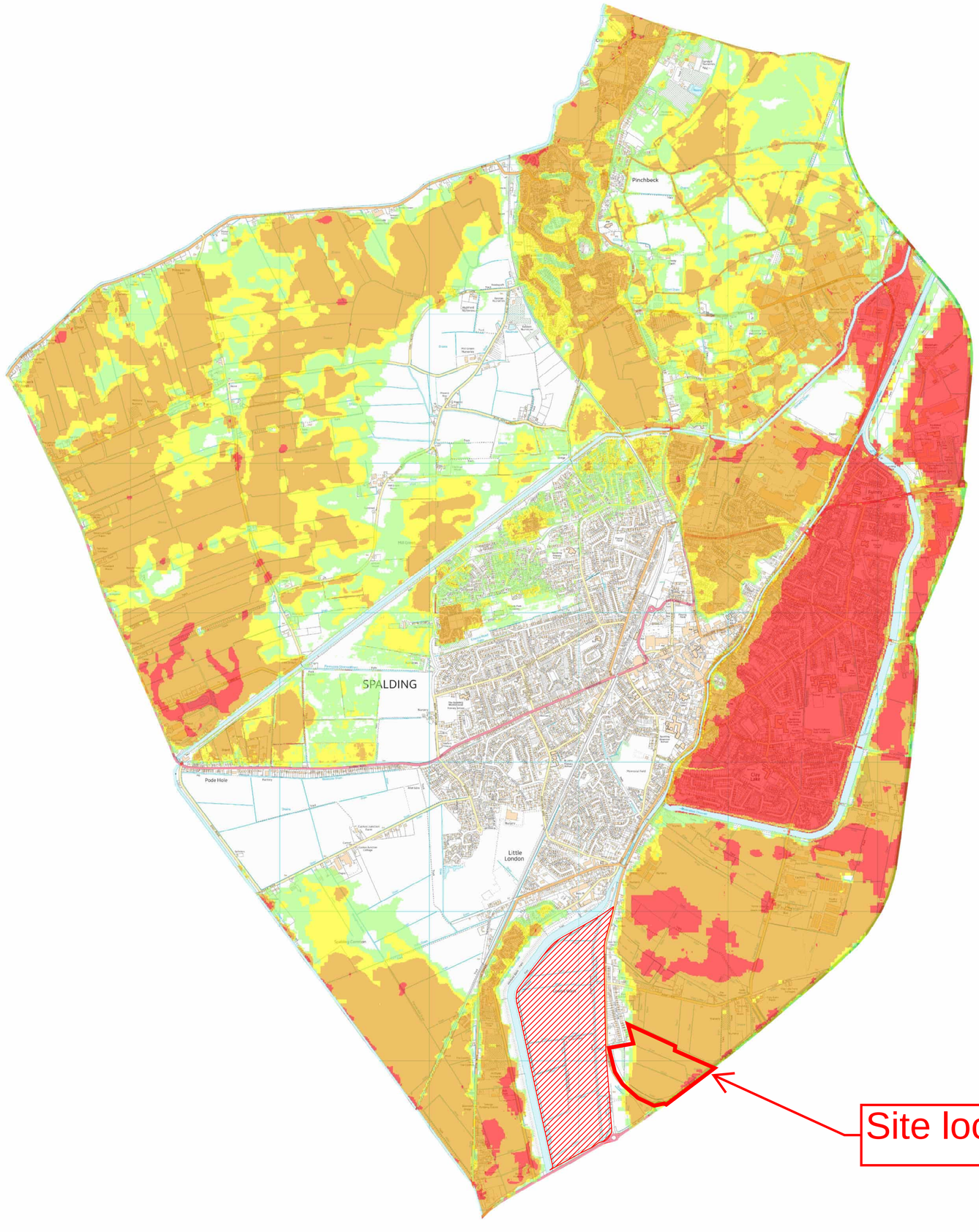
Residual Flood Hazard
Spalding - Year 2115
1% Fluvial / 0.5% Tidal Event Probability

DATE OF ISSUE: Feb 2017 **REV NO:** 2

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- South Holland District Boundary

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UPDATE OF STRATEGIC FLOOD RISK ASSESSMENT

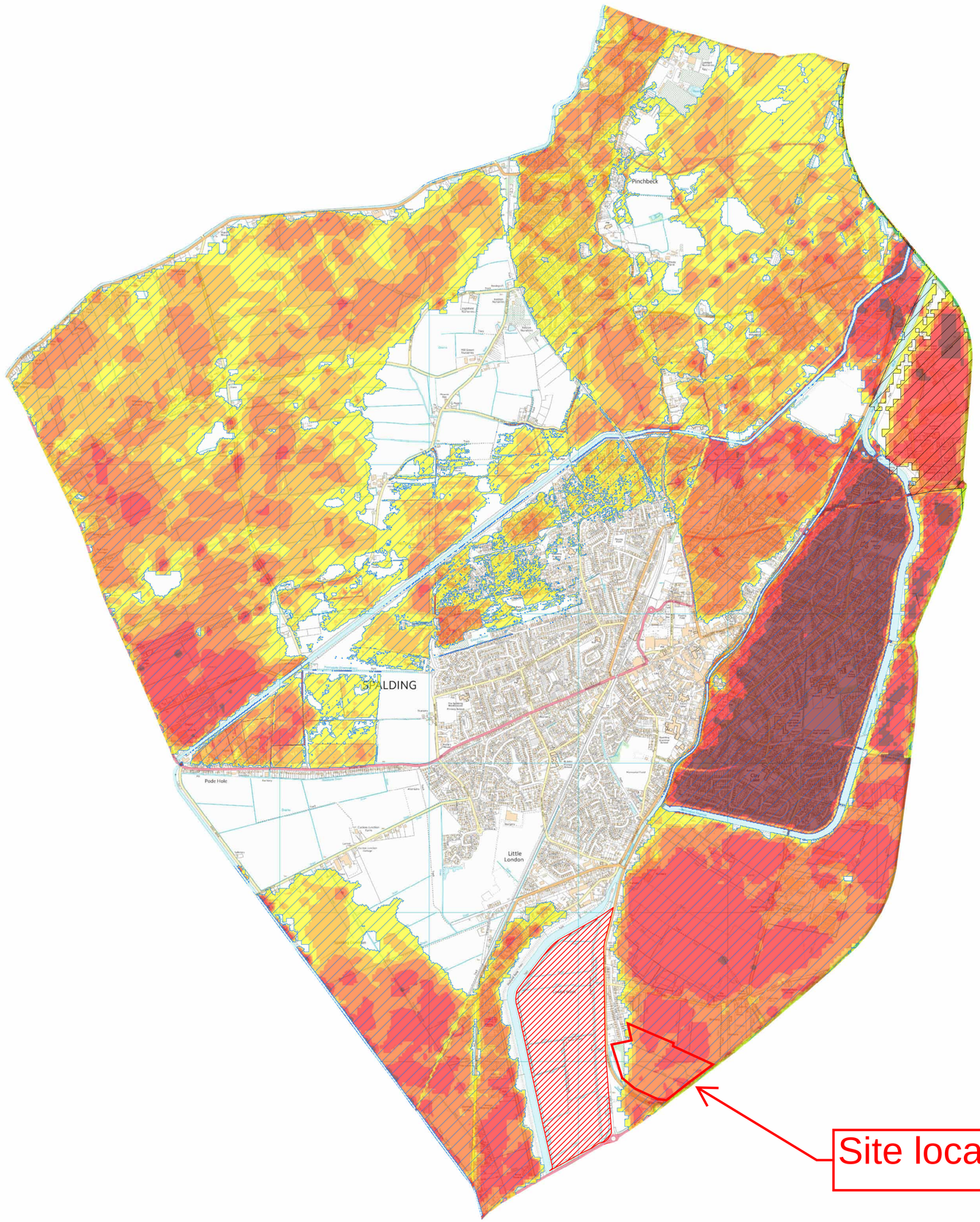
Residual Flood Hazard
Spalding - Year 2115
0.1% Event Probability

DATE OF ISSUE: Feb 2017 **REV NO:** 2

SCALE: 1 : 16,000 @ A1

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Map Legend

Peak Depth

- 0m - 0.25m
- 0.25m - 0.5m
- 0.5m - 1m
- 1m - 2m
- 2m +
- Fluvially dominated extent
- Tidally dominated extent
- Functional Floodplain
- South Holland District Boundary

REV	DATE	REMARKS
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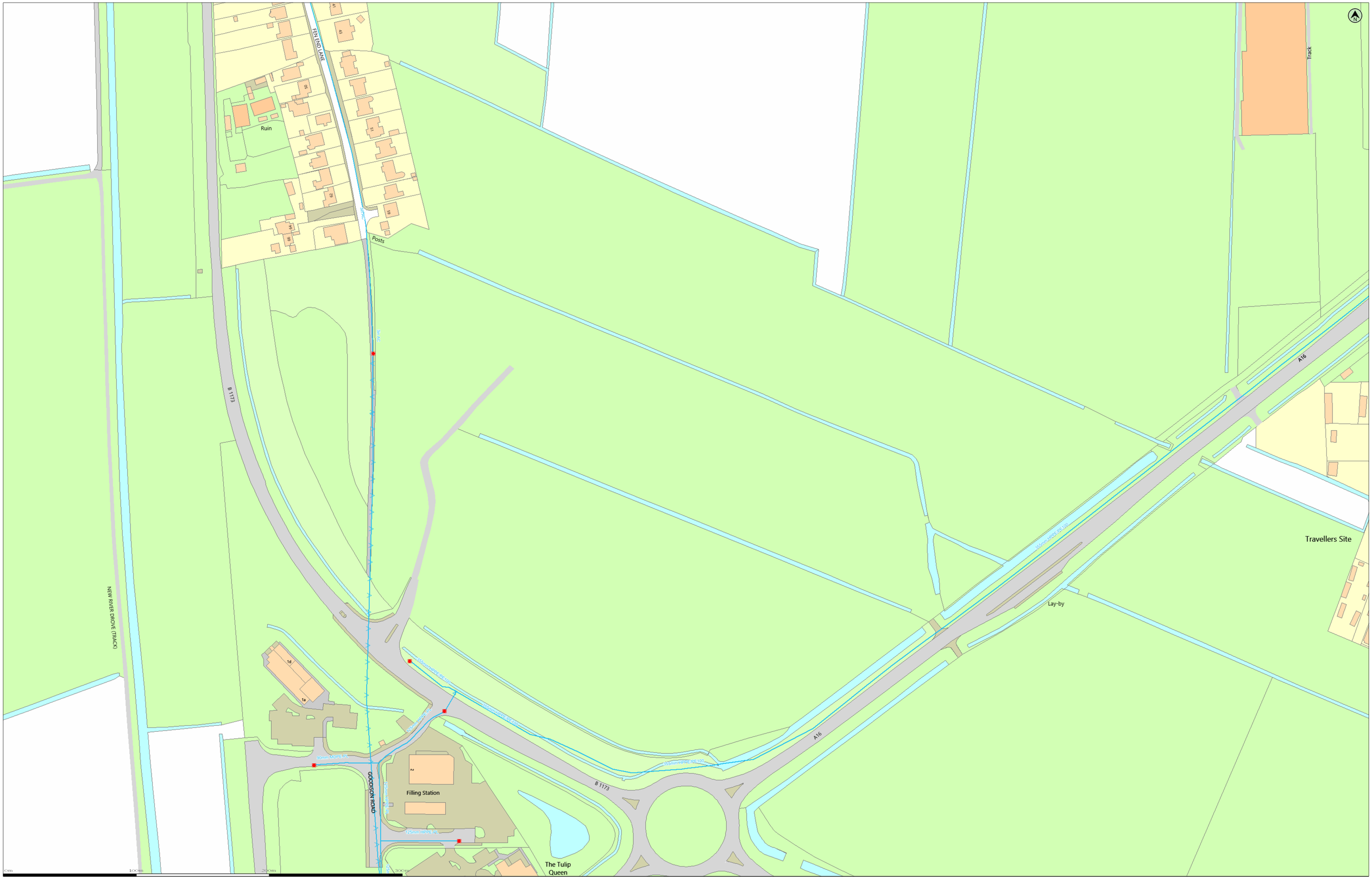
Residual Peak Depth
Extent of Fluvial and Tidal Domination
Spalding - Year 2115
1% Fluvial / 0.5% Tidal Event Probability

DATE OF ISSUE: Feb 2017 **REV NO:** 2

SCALE: 1 : 15,000 @ A1

MAP NO:

APPENDIX 6



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Date: 23/03/22

Scale: 1:1250

Map Centre: 524541,319980

Data updated: 31/01/22

Our Ref: 813832 - 1

Clean Water Plan A1

This plan is provided by Anglian Water pursuant its obligations under the Water Industry Act 1991 sections 198 or 199. It must be used in conjunction with any search results attached. The information on this plan is based on data currently recorded but position must be regarded as approximate. Service pipes, private sewers and drains are generally not shown. Users of this map are strongly advised to commission their own survey of the area shown on the plan before carrying out any works. The actual position of all apparatus MUST be established by trial holes. No liability whatsoever, including liability for negligence, is accepted by Anglian Water for any error or inaccuracy or omission, including the failure to accurately record, or record at all, the location of any water main, discharge pipe, sewer or disposal main or any item of apparatus. This information is valid for the date printed. This plan is produced by Anglian Water Services Limited (c) Crown copyright and database rights 2022 Ordnance Survey 100022432.This map is to be used for the purposes of viewing the location of Anglian Water plant only. Any other uses of the map data or further copies is not permitted. This notice is not intended to exclude or restrict liability for death or personal injury resulting from negligence.

Potable Water

Raw Water

Decommissioned Water

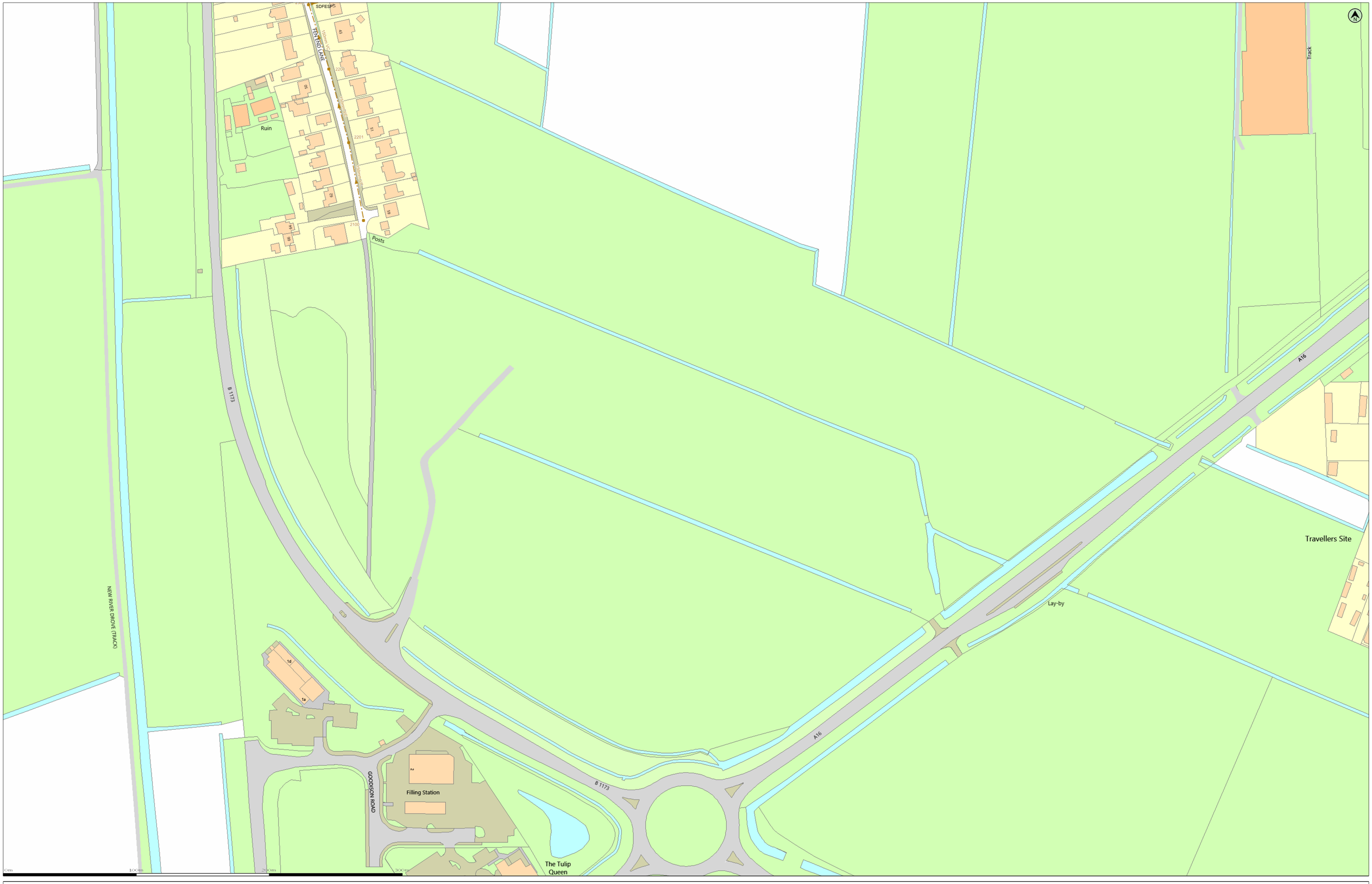
Fitting

Hydrant

mail@eastwoodandpartners.com

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love every drop anglianwater



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Foul Sewer
Surface Sewer
Combined Sewer
Final Effluent
Rising Main*
Private Sewer*
Decommissioned Sewer*

Outfall*
Inlet*
Manhole*

Sewage Treatment Works
Public Pumping Station
Decommissioned Pumping Station
*(Colour denotes effluent type)

mail@eastwoodandpartners.com
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love every drop anglianwater

Manhole Reference	Easting	Northing	Liquid Type	Cover Level	Invert Level	Depth to Invert
2100	524299	320144	F	3.608	1.883	1.725
2200	524273	320258	F	3.9	1.244	2.656
2201	524288	320203	F	3.81	1.55	2.26
2301	524258	320307	F	4.241	0.501	3.74

Manhole Reference	Easting	Northing	Liquid Type	Cover Level	Invert Level	Depth to Invert

Manhole Reference	Easting	Northing	Liquid Type	Cover Level	Invert Level	Depth to Invert

Manhole Reference	Easting	Northing	Liquid Type	Cover Level	Invert Level	Depth to Invert

Tier 1 Pre-Planning Assessment Report

Domestic Foul Water Drainage Feasibility Study

Anglian Water Reference Number:	**PPE-0240206**
Report Engineer:	**Maks Zdunek**
Publication Date:	**26/03/2026**
Expiration Date:	**26/03/2027**
Site Name:	**Lincs Gateway Spalding**
Development Details:	**40,630sqm Storage**
Site National Grid Reference:	**TF2455720005**
Development Type:	**Greenfield**
Planning Application Status:	**Unknown**

This report has been produced for Eastwood CE and is to be submitted as part of a developed drainage strategy should planning permission be sought.

Anglian Water will use this report as the basis for any forthcoming planning application response relevant to this application.

Anglian Water cannot reserve capacity and therefore you are recommended to formally apply for a connection at your earliest convenience. Please note that available capacity in both the receiving network and Water Recycling Centre (WRC) can be reduced at any time due to increased requirements from existing businesses and houses as well as from new housing and new commercial developments.

Summary

Please note that our assessment process was updated on the 1st April 2025. We recommend reviewing this report in its entirety. You can also read our FAQ's

Easements We have assessed above and below ground operational assets in relation to your proposed development site
Water Recycling Centre (WRC) We have assessed the receiving water recycling centre to determine whether it can process the increased flows and effluent quality arising from your development and continue to meet its permitted discharge consents. Our reference data tables are updated in April each year (following submission to regulators). Previously identified headroom may no longer be available.
Foul Drainage Network - Sustainable Point of Connection (SPOC) We have assessed the receiving foul water drainage system to identify a sustainable point of connection for your site to connect to the public sewerage network without causing a detriment to the operation of the system.
Indicative costs – The network infrastructure charge per dwelling is set for the 2025-26 charging period at £403.00. For a development of 0 dwellings the total infrastructure charge will total £0.00 excluding VAT. Please note that you should also budget for infrastructure charges on non-household premises where applicable and these will be calculated according to the number and type of water fittings in the premises. This is called the "relevant multiplier" method of calculating the charge. The relevant multiplier will be applied to the figures set out in our 2025-26 Developer Charging Arrangements to arrive at the amount payable. Details of the relevant multiplier for each fitting can be found on our website.

Section 1 - Anglian Water Assets and Easements

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.

Pipes - We have identified pipework infrastructure within the boundaries of your site

Operational Assets – We do not have operational assets within 20 m of your site

Source Protection Zone (SPZ) – Your site does not sit within an identified SPZ

Water Recycling Centre (WRC) – Your site is not within the encroachment zone of Spalding WRC

The proposed development site boundary is highlighted on Anglian Water's asset record in figure 1. 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.

Any potential instances of asset encroachment are to be identified and addressed at planning. Anglian Water are unable to permit development either over or within the easement strip without prior consent. The extent of asset easements are available in Table 1 for used water and Table 2 for potable water. Please be aware that the existing water mains/public sewers 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 and this should be taken into consideration when planning your site layout.

Used Water Easements – Measured either side of the centre line (m)						
	Depth to Invert (m)					
Sewer Diameter(mm)	< 3	3 - 4	4 - 5	5 - 6	6 - 7.5	> 7.5
< 150	3.0	3.0	4.0	5.0	6.0	4.0
150 - 299	3.0	3.0	4.0	5.0	6.0	4.0
300 - 449	3.0	3.0	4.0	5.0	6.0	4.0
450 - 600	3.5	4.0	5.0	6.0	6.0	4.0
601 - 749	3.5	4.0	5.0	6.0	6.0	4.0
750 - 924	4.0	5.0	5.0	6.5	6.5	5.0
925 - 1000	5.0	5.0	6.0	6.5	6.5	5.0

Table 1: Anglian Water used water asset easements

Potable Water Easements - Measured either side of the centre line (m)	
Potable Mains Pipe Diameter (mm)	Distance either side of the centre line (m)
< 150	2.25
150 - 449	3.0
450 - 749	4.5
750 >	6

Table 2: Anglian Water potable water asset easements

If it is not possible to avoid our assets then these may need to be diverted in accordance with Section 185 of the Water Industry Act (1991). You will need to make a formal application if you would like a diversion to be considered; please note that in some instances assets cannot be diverted;

it is therefore vital to engage with our Drainage team prior to finalising site layout. The Drainage team can be contacted by calling 03456 066 087.

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.

For your information, please be aware:

- We need to inform you that there is a 75mm diameter water main that runs on the boundary of the development site that may be affected by the proposed development.
- Anglian Water does not permit existing assets to be located within the curtilage of the proposed development buildings and we do not permit permeable paving or suds features over our assets. These assets should be located in areas of public open space and/or adoptable highways to ensure on-going maintenance and access is possible.
- Development is not permissible either over or within the established easement strip of any public asset without Anglian Water's granted prior consent.
- A new developments site layout must adhere to the required easements. You may also discuss potential diversions with us.
- Please be aware that existing water mains/public sewers should be located in highway or open space and not in private gardens or curtilages.
- Rising mains may not be located under play equipment or SUDS features. This is to ensure available access for any future maintenance and repair and this should be taken into consideration when planning your site layout.
- No significant planting can be located in the designated easement strip, to ensure that root intrusion does not pose a risk to our assets. Where necessary and to maintain the aesthetics of the proposed landscaping, ornamental/low lying hedges or similar are considered acceptable, but should be limited.
- In any case where site levels are to be altered within an easement strip, Anglian Water will request a CCTV survey is undertaken to understand the existing condition of the affected sewer and potential impact of this proposal. The footage and accompanying report should be provided to Anglian Water alongside any observations or recommendations (should these be identified) by your designer. In addition, the manholes in this area would also need to be raised to finished level. Anglian Water would expect photographs confirming the existing construction of these chambers and a design drawing which illustrates how this outcome will be achieved whilst maintaining compliance with Design and Construction Guidance (DCG) standards.
- Anglian Water will expect confirmation of the established measures that will allow 24 hour unencumbered access for assets within the vicinity of the development. It is beneficial to understand how awareness of Anglian Water's need for access to provide this in perpetuity will be established going forward. It can be assumed that plot transfers (if appropriate) will contain covenants/rights relating to these assets; we would appreciate clarification on this point.
- It is the developer's responsibility to ensure the correct sight surveys are completed i.e. trial holes, to ascertain the exact location of Anglian Water assets. You should then present your findings to Anglian Water – we may need to complete formal risk assessments (at the developers cost) for certain asset types.



figure 1: The site boundary for the proposed development as shown on Anglian Water asset records.

Section 2 – Used Water Assessment

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 the headroom available to manage the increased effluent flows and effluent quality from your development.

Water Recycling Centre

When assessing the receiving Water Recycling Centre's (WRC) dry weather flow (DWF) headroom, we use the latest Q90 DWF figures, as verified by the Environment Agency. We then add to this the flows from sites with existing planning consent. Our DWF data is reviewed and updated annually in consultation with the Environment Agency. This data is used to determine whether the WRC continues to comply with its environmental permit and whether it has sufficient capacity to accommodate flows from the new development without causing an unacceptable risk of breaching environmental legislation. It is also used to ensure there is no pollution or deterioration in the receiving watercourse.
Based on the above assessment, Spalding WRC is within the acceptance parameters and can accommodate the flows from the proposed growth.

Used Water Network

Our 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 site. The infrastructure to convey foul water flows to the receiving sewerage network is the responsibility of the developer. Conveyance to the connection point is considered as Onsite Work and includes all work carried out upstream from 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. We have assessed the sustainable point of connection, which is to the 150mm foul sewer in Fen End Lane, to manhole MH2100, located at national grid reference (NGR) TF2429620147.The cover level is 3.61 and the invert level is 1.88.

Anglian Water has assessed the local foul sewerage network up to the water recycling centre and determined that the additional foul flow from the proposed development would not create an unacceptable risk of flooding to our existing customers and the environment.

In line with the Sewage Sector Guidance - Appendix C - Design and Construction Guidance (DCG), found at https://www.water.org.uk/sewerage-sector-guidance-approved-documents, 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 with your detailed design. You should submit this detail with your Section 106 new connection application.

Anglian Water cannot reserve capacity and therefore you are recommended to formally apply for a connection at your earliest convenience. Please note that available capacity in our network can be reduced at any time due to increased requirements from existing businesses and houses as well as from new housing and new commercial developments.

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.

Trade Effluent

It is noted that there are no specified trade effluent requirements for the proposed development site. Should this be required in the future, please submit a Tier 2 PPE assessment.

Used Water Budget Costs

For a development site that benefits from full planning permission, infrastructure charges are raised on a standard basis of one charge per new connection, one each for water supply and drainage connections.

Infrastructure charges are applied to each new property connecting to the public water and sewerage network. The infrastructure charge type is set out in Section 146(2) of the Water Industry Act 1991.

The charge should be paid by any party that wishes to build or develop a property and is payable upon request of connection.

The sewerage infrastructure charge per dwelling is set for the 2025-26 charging period at £403.00. For a development of 0 dwellings the total infrastructure charge will total £0.00 excluding VAT.

Please note that you should also budget for infrastructure charges on non-household premises where applicable and these will be calculated according to the number and type of water fittings in the premises. This is called the “relevant multiplier” method of calculating the charge. The relevant multiplier will be applied to the figures set out in our 2025-26 Developer Charging Arrangements to arrive at the amount payable. Details of the relevant multiplier for each fitting can be found on our website.



Figure 2: Showing your water recycling foul water point of connection

Section 3 – Useful Information

Water Industry Act – Key used water sections

Section 98:
This provides you with the right to requisition a new public sewer. The new public sewer can be constructed by Anglian Water on your behalf. Alternatively, you can construct the sewer yourself under section 30 of the Anglian Water Authority Act 1977.

Section 102:
This provides you with the right to have an existing sewerage asset vested by us. It is your responsibility to bring the infrastructure to an adoptable condition ahead of the asset being vested.

Section 104:
This provides you with the right to have a design technically vetted and an agreement reached that will see us adopt your assets following their satisfactory construction and connection to the public sewer.

Section 106:
This provides you with the right to have your constructed sewer connected to the public sewer.

Section 185:
This provides you with the right to have a public sewerage asset diverted. Details on how to make a formal application for a new sewer, new connection or diversion are available on our website or via our Development Services team on 0345 60 66 087.

Surface Water Drainage

All surface water must be managed in line with Building Regs / Sewer Sector Guidance (SSG). Our guidance document and Surface Water policy (insert website link) detail our requirements and expectations. You must explore all on-site options per the SUDS hierarchy before speaking to us about a possible connection to our SW drainage network. We recommend that you contact the Local Authority and Lead Local Flood Authority (LLFA) for your site to discuss your application.

Sustainable drainage systems

Some existing urban drainage systems have additional risks of flooding, pollution or damage to the environment and are not resilient to climate change in the long term. Our preferred method of surface water disposal is through the use of Sustainable Drainage Systems or SuDS. SuDS are a range of techniques that aim to mimic the way surface water drains in natural systems within urban areas. For more information on SuDS, please visit our website.

Private sewer transfers

Sewers and lateral drains connected to the public sewer on the 1 July 2011 transferred into Water Company ownership on the 1 October 2011. This follows the implementation of the Floods and Water Management Act (FWMA). This included sewers and lateral drains that were subject to an existing Section 104 Adoption Agreement and those that were not. There were exemptions and the main non-transferable assets were as follows:

Surface water sewers and lateral drains that do not discharge to the public sewer, e.g. those that discharged to a watercourse.

Foul sewers and lateral drains that discharged to a privately owned sewage treatment/collection facility. Pumping stations and rising mains will transfer between 1 October 2011 and 1 October 2016.

The implementation of Section 42 of the FWMA will ensure that future private sewers will not be created. It is anticipated that all new sewer applications will need to have an approved section 104 application ahead of a section 106 connection.

It is anticipated that all new sewer applications will need to have an approved Section104 application ahead of a Section 106 connection.

Encroachment

Anglian Water operates a risk based approach to development encroachment on our above and below ground infrastructure and assets.

Locating our assets

Maps detailing the location of our water and used water infrastructure including both underground assets and above ground assets such as pumping stations and recycling centres are available from digdat.

All requests from members of the public or non-statutory bodies for maps showing the location of our assets will be subject to an appropriate administrative charge. We have more information on our website

Charging arrangements
Our charging arrangements and summary for this year's water and used water connection and infrastructure charges can be found on our website Charges

Environmental Incentives
Following regulatory guidance and changes to the charging rules the Infrastructure Charge for connections to our water network will no longer attract an income offset discount after 31st March 2025. This will be replaced with a new Environmental Incentive Scheme (EIS) aimed at promoting water efficiency and sustainability.

Anglian Water's EIS has been developed in accordance with the Environmental Incentive Common Framework (EICF), which was released by Ofwat in December 2024. For this charging year, 2025-26, and in accordance with Ofwat guidance, only household properties will be eligible for our EIS. We will continue to reassess this for future charging years.

There are two elements to our EIS;

Water Environmental Incentive
The applicant must demonstrate the newly connected property is designed to achieve consumption of 90 litres per person per day (pppd) or less.
Post property connection, we will conduct compliance audits on the first connected property and 10% of the remaining properties on a random basis.

Sewerage Environmental Incentive
Post property connection for redeveloped brownfield sites we will complete a site inspection to confirm the removal of surface water flows.

Environmental Component
This charge is used solely to fund the Environmental Incentive and is uniformly applied upon connection of each developed property; this includes connections which do not qualify for the Environmental Incentive.

Environmental Incentives	Charge per property
Water Environmental Incentive	-500
Environmental Incentive Component Charge Water	100
Additional Water EIS Audit (per premises)	84
Sewerage Environmental Incentive (50% of Sewerage Infra)	-202
Environmental Incentive Component Charge Sewerage	0

Our EIS will be available between 1st April 2025 and 31st March 2030 and during this period, we reserve the right to make any amendments to the EIS as we may see fit, including amendments to the value of both Environmental Incentives and the Component Charges. The EIS may close on 31st March 2030, therefore, to qualify for the Environmental Incentives, your plot must be connected to our network and validated by us. Please refer to our Developer Charging Arrangements for full details. To learn more or apply for our environmental incentive scheme please visit our website Water Environmental Incentive Scheme

Section 4 - Disclaimer

The information provided in this report is based on data currently held by Anglian Water Services Limited ('Anglian Water') or provided by a third party. Accordingly, the information in this report is provided with no guarantee of accuracy, timeliness, completeness and is without indemnity or warranty of any kind (express or implied).

This report should not be considered in isolation and does not nullify the need for the enquirer to make additional appropriate searches, inspections and enquiries. Anglian Water supports the plan led approach to sustainable development that is set out in the National Planning Policy Framework ('NPPF') and any infrastructure needs identified in this report must be considered in the context of current, adopted and/or emerging local plans. Where local plans are absent, silent or have expired these needs should be considered against the definition of sustainability holistically as set out in the NPPF.

Whilst the information in this report is based on the presumption that proposed development obtains planning permission, nothing in this report confirms that planning permission will be granted or that Anglian Water will be bound to carry out the works/proposals contained within this report.
No liability whatsoever, including liability for negligence is accepted by Anglian Water or its partners, employees or agents, for any error or omission, or for the results obtained from the use of this report and/or its content.

Furthermore, in no event will any of those parties be liable to the applicant or any third party for any decision made or action taken as a result of reliance on this report.

This report is valid from the date issued and the enquirer is advised to resubmit their request for an up to date report should there be a delay in submitting any subsequent application for water supply/sewer connection(s). Our pre-planning reports are valid for 12 months. Please note Anglian Water cannot reserve capacity and available capacity in our network can be reduced at any time due to increased requirements from existing businesses and houses as well as from new housing and new commercial developments.

Eastwood
CONSULTING ENGINEERS

APPENDIX 7

Pierpoint House
28 Horsley's Fields
KING'S LYNN
Norfolk PE30 5DD

01553 819600
Planning@wlma.org.uk

Alcan Properties Ltd
Leytonstone House
Hanbury Drive
London
E11 1GA

Our Refs: 25_33102_C, 25_33104_C, 25_33105_C

04 February 2026

Dear Alcan Properties Ltd,

Notice of Intention to Grant Consent to discharge surface water run-off into a watercourse, for the alteration of a watercourse and for the diversion of a watercourse at Lincs Gateway, Land on the south-east side of Fen End Lane, Spalding PE12 6FY

Further to your application for the above, and following a meeting of the Board on 04/11/2025, I am pleased to be able to provide notification of the Board's intention to grant consent under the terms of its Byelaws and the Land Drainage Act 1991 for the discharge of surface water run-off from the proposed development (as shown in your application) to a riparian watercourse, for the alteration of a watercourse and for the diversion of a watercourse. Formal consent will be issued once the conditions and specification of the consent have been accepted by yourself by completing the details at the bottom of this letter and returning it to us **within 28 days from today's date**. Failure to sign and return this element of the letter will result in this notification of intention to grant consent being null and void.

The purpose of this Notice:

Please be aware that this *'Notice of Intention to Grant Consent'* letter does not constitute a formal consent. Instead, this letter lists the conditions and specifications of the proposed consent, and asks you to confirm acceptance of these.

If you are ready to accept the conditions:

You should only sign the form on page 19 of this notice if you are ready to accept the conditions and specifications listed below. Once returned formal consent will be issued alongside an invoice for the Surface Water Development Contribution detailed within condition C4. To avoid 'reserving' volumetric capacity within the catchment, this notice is only valid for 28 days from the date of this letter.

If you are not ready to accept the conditions:

If you are not ready to accept the conditions and specifications of this consent (for example if the proposals shown within your application were indicative, or if you are awaiting planning permission) please let us know and we will mark your application as withdrawn by applicant. You should not sign and return the form on page 19 of this notice.

Duncan Worth (Chairman) Simon Bartlett (Vice-Chairman) Marcus Coleman (Chief Executive)
Constituted by The Anglian Water Authority (South Holland Internal Drainage District) Order 1974, Statutory Instrument 1974 No.1209. Reconstituted in 1993. Statutory Instrument 1993 No.453.
www.wlma.org.uk

Despite not being able to progress to receiving formal Land Drainage Consent, this notice will likely provide an assurance to you that, at the time of submission, the Board considered that the catchment had capacity for your proposals. This assurance may also prove useful for other interested parties, such as the Local Planning Authority.

When ready, you can re-apply for Land Drainage Consent with increased confidence regarding the ability of the system to accept surface water from the site (assuming no material changes to the catchment's volumetric capacity has occurred). However, please be aware that despite the assurances provided by an elapsed 'notification of intention to grant consent', consent is not guaranteed and there remains a risk that the capacity required by the development will not have been retained in the system by the time the applicant (or their successors) wish to re-apply for Land Drainage Consent.

Conditions:

C1 Officers must be allowed to inspect the works if they request to do so. **You must complete the Notice to Commence Works form included with this consent and return (via email or post) to the Board, or alternatively call this office to notify the Board of when you intend to start construction.**

C2 Consent is granted subject to the conditions (including specifications) within this document being completed and adhered to in their entirety. A breach of the conditions shall invalidate the consent and shall be deemed equivalent to undertaking works without prior written consent. This consent cannot be sold, inherited or otherwise passed on without prior written agreement being obtained from the Board, unless the works have previously been completed in accordance with the specifications contained herein, and all conditions have been complied with.

C3 Consent is granted subject to the proposed works being completed within 3 years of the date of this letter.

C4 A one-off Surface Water Development Contribution is due to the Board to cover the increased flow and volume in its maintained drainage network. Payment is due once consent is granted. The Surface Water Development Contribution for this consent is £223,604.50, representing 110,150 m² of additional impermeable surface. This is charged at £2.03 per m^2 within a pumped catchment (at ≤ 2l/s/ha) as per the Board's Development Control Charges and Fees document. This reflects the rate and volume of discharge proposed as part of this application.

C5 No impermeable surfaces which drain to a watercourse (whether directly or indirectly), other than the 110,150 m² (11.015 hectares) approved as part of your current application, are to be constructed on site unless prior written consent is obtained from the Board. The aforementioned 110,150 m^2 represents the 4no. units (units 100, 200, 300 & 400) and the access road only, as shown in the drawing 'Impermeable Areas Plan' 00000-ECE-XX-00-DR-C-0011, Rev P01 (Eastwood Consulting Engineers, 14/08/2025) and figure 2 below.

C6.1 Board Officers must be informed if any override/bypass feature is activated on any of the flow control devices limiting discharge to the hereby consented rate, as per S2 below.

C6.2 As the surface water from the development is using a pumped system, care must be taken at all times to ensure that the receiving watercourse has capacity to accommodate the additional flows, particularly when the outfalls are surcharged. Where the receiving watercourse is observed as being full to the brink of the

watercourse, pumping must cease. Failure to adhere to this condition may result in enforcement action.

C7.1 The applicant must ensure that the receiving watercourses downstream of the proposed discharge points, within the applicants land ownership, are regularly maintained to enable conveyance of flows from the outfall towards the Board's system and to enable future maintenance to be effected by riparian owners.

C7.2 **The applicant must ensure that, now and in the future, the existing watercourse along the northern site boundary is regularly maintained to enable the continued conveyance of flows. This watercourse is of significant importance as it provides surface water drainage from the properties along Fen End Lane.** The banks and beds of the watercourse should be cut annually, and the watercourse should be desilted periodically, as and when required. A copy of the maintenance schedule should be provided to the Board prior to commencement of the development.

C7.3 No fencing should be installed between the new and existing watercourse along the northern site boundary to allow for the efficient maintenance of the existing watercourse as per Condition C7.2 above.

C8.1 It is the applicant's responsibility to ensure no loss of protected species or habitat as a result of the consented works. If protected species are found on site, then the applicant is responsible for carrying out the hereby consented works in compliance with Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and under an appropriate licence from Natural England (where necessary). Where mitigation works are identified as being required to mitigate against impacts to a protected site or species these must be undertaken in full. Failure to do so will render the consent null and void.

C8.2 An environmental survey must be undertaken to screen the proposed works for the presence of protected species. The result of the survey must be provided to the Board to evidence that this condition has been fully complied with. Where the survey recommends further investigation and/or mitigation, these recommendations should be implemented and evidenced. Failure to do so may cause the Board to invalidate this consent and refer the matter to the appropriate enforcement authorities.

C8.3 The pre-commencement surveys identified as required within the Ecological Appraisal undertaken in support of this application must be carried out. Where the survey recommends further investigation and/or mitigation, these recommendations should be implemented and evidenced. Failure to do so may cause the Board to invalidate this consent and refer the matter to the appropriate enforcement authorities.

C9 Responsibility for maintenance of all elements of the works hereby consented, and all costs associated with this, will remain with you and future owners of the areas of land affected by this application.

C10 This consent cannot be taken to mean that the proposed works will comply with the requirements of any other interested parties, including the Highways Department, Local Planning Authority, Water Company, land owners or occupiers, and it is the applicants responsibility to ensure that they do. The Board cannot be held liable if the works outlined in this letter are carried out and are not acceptable to any other interested party, or for any possible implications arising from this. We strongly recommend that the aforementioned parties are consulted on the design prior to construction, **particularly the Highways Department in relation to the realigned watercourse adjacent to the highway watercourse along the eastern boundary.**

C11 The on-site drainage system is to be maintained by a management company as appointed by the applicant. If the management company ceases to operate, responsibility for maintenance of the on-site drainage system, and all costs associated with this, will revert to you as the relevant landowners, and your successors in title.

C12 It is the applicant's responsibility to ensure that they have landowner agreement/consent before proceeding with any consented works on third party land.

C13 You must ensure that the risk of flooding within or outside your site during the construction phase is adequately assessed and managed, particularly during periods of prolonged wet weather. **The Board recommends that you formulate a construction water management plan prior to commencement on site. Any temporary removal of surplus surface water from the site by pumping must have the Board's prior written consent.**

C14 The applicant is responsible and liable for the design and installation of the proposed works. Where there are any problems caused to others due to these planned or associated works, then the applicant will be held liable and be responsible to ensure that these are rectified.

C15 **Upon completion of the realignment of the watercourse (in accordance with Specification S8 below), the Board are to be notified, and the works are to be inspected by the Board for compliance with the conditions and specifications listed within this document, prior to the watercourse being infilled as per Specification S9 below.**

Recommendations:

R1 While not a condition of consent, the Board highly recommends that adequate space (3-5 m) be left empty and flat adjacent to all privately maintained watercourses and SuDS features, including swales, to facilitate future riparian maintenance. A copy of this maintenance schedule should be provided to the Board before construction on site begins.

R2 While not a condition of consent, the Board strongly recommends that:

(a) The buyer of each plot is provided with a copy of the Grant of Consent
(b) Each Transfer of any riparian plot or land within the existing Land Registry Title LL419651 contains wording informing future purchasers of the plots or land of their duty to maintain the drain to ensure that proper flow of water is not impeded.*

**It is the Board's preference that the proposed units extend to the watercourse where possible, even where a management company is due to operate.*

Specifications:

Discharge of surface water (Byelaw 3):

S1 The applicant is responsible for ensuring that the surface drainage system is designed so that no flooding occurs on any part of the site in a 1 in 30 year rainfall event (plus climate change), unless an area is designated to hold and/or convey water, such as the loading docks/bays for each unit, as shown within drawing 46934-ECE-XX-00-DR-C-0017, Rev P01 (Eastwood Consulting Engineers, 18/12/2025) and figure 3 below, and that flooding does not occur in any part of a building or offsite during a 1 in 100 year (plus climate change) rainfall event.

We anticipate that attenuation on site shall be provided through the construction of attenuation basins, swales, sub-surface storage crates and areas of lined permeable block paving built in accordance with drawing 46934-ECE-XX-00-DR-C-0012, Rev P03 (Eastwood Consulting Engineers, 22/01/2026), as shown in figures 4 and 5 below, and associated calculations.

S2 Discharge rate: The discharge of surface water run-off from this site is to be limited to a maximum rate of 15.4 litres per second under all circumstances through the use of 5no. separate pumped outfall points in accordance with drawing 46934-ECE-XX-00-DR-C-0012, Rev P03 (Eastwood Consulting Engineers, 22/01/2026), as shown in figures 4 and 5, and as detailed below:

- Unit 100 surface water discharge - 3.0 l/s
- Unit 200 surface water discharge - 3.4 l/s
- Unit 300 surface water discharge - 3.0 l/s
- Unit 400 surface water discharge - 3.0 l/s
- Access Road surface water discharge - 3.4 l/s

Any exceedance of the afore-mentioned maximum discharge rates, overall or from each individual outfall, may lead to further action being taken by the Board.

S3 Outfall and connection details: Consent is for the installation of 5no. outfalls in accordance with the submitted drawing 46934-ECE-XX-00-DR-C-0012, Rev P03 (Eastwood Consulting Engineers, 22/01/2026), as shown in figures 4 and 5, and as detailed below:

S3.1 Outfall 1 serving Unit 100: 150mm diameter outfall pipe at invert level 1.25mODN, with associated headwall, to be constructed in the new realigned riparian watercourse at the approximate location 524592, 320126.

S3.2 Outfall 2 serving unit 200: 150mm diameter outfall pipe at invert level 1.25mODN, with associated headwall, to be constructed in the new realigned riparian watercourse at the approximate location 524805, 319911.

S3.3 Outfall 3 serving unit 300: connection of a 150mm diameter surface water pipe into a new chamber (MHDD2) at the approximate location 524348, 320118. This manhole connects an existing surface water pipe, previously discharging into the open section of watercourse through the site to be infilled Both surface water pipes then connect to a new 300mm concrete culvert (see Specifications S8 – S10 below) which outfalls into the new realigned riparian watercourse at the approximate location 524370, 320140.

S3.4 Outfall 4 serving unit 400: 150mm diameter outfall pipe at invert level 1.25mODN, with associated headwall, to be constructed in the existing riparian watercourse adjacent to Cowbit Road, at the approximate location 524430, 319782.

S3.5 Outfall 5 serving the access road: 150mm diameter outfall pipe at invert level 1.25mODN, with associated headwall, to be constructed in the existing riparian watercourse adjacent to Cowbit Road, at the approximate location 524422, 319787.

S4 Headwalls: Where constructing the new outfalls these should enter the watercourse through a suitably-sized pre-cast concrete recessed headwall unit. The headwalls and

pipes should be installed so that they are flush with the batter of the watercourse with no part protruding beyond the existing bank profile at any point. The outfall headwalls should be constructed in accordance with the below drawings:

S4.1 Unit 100 - drawing 46934-ECE-XX-00-DR-C-0014, Rev P02 (Eastwood Consulting Engineers, 22/01/2026), shown in figure 6 below.

S4.2 Unit 200 - drawing 46934-ECE-XX-00-DR-C-0016, Rev P02 (Eastwood Consulting Engineers, 22/01/2026), shown in figure 7 below.

S4.3 Unit 300 – drawing 46934-ECE-XX-00-DR-C-0018, Rev P01 (Eastwood Consulting Engineers, 22/01/2026), shown in figure 8 below.

S4.4 Unit 400 - drawing 46934-ECE-XX-00-DR-C-0014, Rev P02 (Eastwood Consulting Engineers, 22/01/2026), shown in figure 6 below.

S4.5 Access road - drawing 46934-ECE-XX-00-DR-C-0014, Rev P02 (Eastwood Consulting Engineers, 22/01/2026), shown in figure 6 below.

S5 Revetment: You should ensure that the outfalls from the drainage system have suitable erosion protection (stone revetment) below the discharge pipes and across the drain, for at least one metre either side of the pipe edge to prevent any scouring of the bank of the watercourse. All erosion protection must be dug into the bank and bed so that no item protrudes beyond the existing batter and bed profile at any point. All material which is excavated as part of the headwall installation is to be removed from the watercourse, with the area around the new headwall and erosion protection restored to its previous condition as soon as possible.

Infilling and diversion of a watercourse (Section 23, Land Drainage Act 1991):

Infilling of a watercourse:

S6 A 354m length of existing riparian watercourse running through the development site, shown by orange line in drawing 46934-ECE-XX-00-DR-C-0013, Rev P02 (Eastwood Consulting Engineers, 22/01/2026) and figure 9 below, is to be infilled. This watercourse is not connected to the wider drainage system at either end.

S7 The watercourse should be infilled using appropriate material such as Type 1 stone as shown in drawing 46934-ECE-XX-00-DR-C-0013, Rev P02 (Eastwood Consulting Engineers, 22/01/2026), and figure 10 below. Under no circumstances is this infill to contain any garden rubbish, brick rubble or other deleterious material. All material should be suitably compacted as the drain is filled, in order to minimise the chance of potential settlement problems in the future. The infill material should be laid to the depth required to match the existing ground levels to either side of the earlier drain. Before completion of your works, any drain channel or drain banks that connected to the infilled watercourse that were affected by the infilling should be rehabilitated to match the condition of the channel and banks immediately adjacent to any confluence.

Infilling and diversion of a watercourse:

S8 A 517m length of riparian watercourse running through the development site, shown by purple line in drawing 46934-ECE-XX-00-DR-C-0013, Rev P02 (Eastwood Consulting Engineers, 22/01/2026), and figure 9 below is to be diverted around the northern site boundary, shown by a light blue line in the same drawing and as detailed

below (S8.1 – S8.5). Downstream of the development site the watercourse will be redirected to its original course at the approximate location 524784, 319893.

S8.1 The bank gradient of the re-aligned open watercourse is to be no steeper than 1:2, with an ideal slope being 1:3 as shown in drawing 46934-ECE-XX-00-DR-C-0016, Rev P02 (Eastwood Consulting Engineers, 22/01/2026), for both banks. Realigned banks must be grass seeded immediately following completion of the realignment works to promote increased stability.

S8.2 The new realigned watercourse should not be located any closer than 6 metres from the existing watercourse along the northern site boundary to allow for maintenance as per Condition C7.2 above.

S8.3 An existing 225mm diameter pipe enters the upstream end of the existing watercourse to be infilled and rediverted along the western site boundary. This pipe is to be extended using a 300mm diameter concrete pipe to connect to MHDD2 at the approximate location 524348, 320118. An access chamber/manhole is to be constructed at the connection between the existing pipe and the extended pipe (MHDD1). The new access chamber must be suitably designed to allow access/egress for future maintenance operations and should be built off a reinforced cast-concrete base, a minimum of 150-200 mm thick, with a 100-200 mm deep sump below the lowest pipe invert level. The new access chamber is to be built in line with current building regulations and therefore should be at least 1200mm x 750mm (for a rectangular chamber) or have a diameter of 1200mm (for a circular chamber). The chamber is to be built up to finished ground level, and should include a suitable reinforced concrete top slab complete with access chamber covers and frame.

S8.4 Between MHDD2 and the new realigned watercourse, a 300mm diameter concrete culvert is to be installed below the existing earth bund. The area surrounding the new pipe is to be excavated and the culvert is to be laid at a flat invert level. The new pipe should be bedded on and surrounded by 150-200 mm thick layer of pea gravel or 20-5 granular material, covered by a suitable permeable geotextile. The backfill material above the pea gravel/20-5 granular material should be “clean” topsoil or suitable stone followed by a suitable wearing surface, but under no circumstances is this backfill to contain any garden rubbish, brick rubble or other deleterious material. All backfill should be suitably compacted as the earth bund is restored, in order to minimise the chance of potential settlement problems in the future. The backfill material should be laid to the depth required to match the existing ground levels to either side of the drain. The headwall of the new pipe into the realigned watercourse should be installed as per S4.3 above.

S8.5 Any slip repairs within the re-aligned section of watercourse will be the financial responsibility of the applicant, or their successors in title, following completion and in perpetuity.

S9 Upon completion of the diversion, as outlined in Specification S8, and upon completion of Condition C15, the existing watercourse may be infilled using appropriate material such as Type 1 stone as shown in drawing 46934-ECE-XX-00-DR-C-0013, Rev P02 (Eastwood Consulting Engineers, 22/01/2026) and figure 10 below. Under no circumstances is this infill to contain any garden rubbish, brick rubble or other deleterious material. All material should be suitably compacted as the drain is filled, in order to minimise the chance of potential settlement problems in the future. The infill material should be laid to the depth required to match the existing ground levels to

either side of the earlier drain. Before completion of your works, any drain channel or drain banks that connected to the infilled watercourse that were affected by the infilling should be rehabilitated to match the condition of the channel and banks immediately adjacent to any confluence.

S10 Should there be any existing pipes entering either stretch of watercourse to be infilled from either bank, these are to be suitably extended and diverted to outfall into the nearest open channel at one end or the other of the section being infilled.

S11 To facilitate maintenance access to the watercourse along the northern site boundary, an additional culvert within the new realigned section of watercourse is to be installed. The realigned watercourse is to be culverted for 10 metres using a 600 mm internal diameter concrete pipe (of a suitable specification) as shown in drawing 46934-ECE-XX-00-DR-C-0015, Rev P02 (Eastwood Consulting Engineers, 22/01/2026), and figure 11 below.

S11.1 The pipe is to be laid at a flat invert level, approximately 50-150 mm below the firm bed level. The new pipes should be bedded on and surrounded by 150-200 mm thick layer of pea gravel or 20-5 granular material, covered by a suitable permeable geotextile. The backfill material above the pea gravel/20-5 granular material should be “clean” topsoil or suitable stone/MOT type 1 material or equivalent followed by a suitable wearing surface, but under no circumstances is this backfill to contain any garden rubbish, brick rubble or other deleterious material. All backfill should be suitably compacted as the drain is filled, in order to minimise the chance of potential settlement problems in the future. The backfill material should be laid to the depth required to match the existing ground levels to either side of the drain.

S11.2 Culvert headwalls: A headwall must be constructed at each end of the new culvert. This should be constructed in line with your proposals and as shown in drawing 46934-ECE-XX-00-DR-C-0015, Rev P02 (Eastwood Consulting Engineers, 22/01/2026) and figure 11 below.

S11.3 Where vehicle access over the culverts are required, it is the responsibility of the applicant to ensure the final arrangement is sufficient for vehicle loading. The pipe manufacturer should have standard guidelines regarding the type and depth of fill material needed to allow traffic loading, which should be followed diligently in order not to unduly risk damaging the pipes by taking vehicles across them.

S12 Before completion of your works, the drain and banks around the culverted lengths of watercourse must all be restored to their previous condition.

In addition to the above, please be aware of the following informative conditions. If you disagree with any of the below, the consent will be invalid until revised terms are agreed with the Board.

I1 All references in this letter to the Board are to be construed as including successor organisations to the current Board.

I2 No part of this consent shall adversely affect the Board’s rights or responsibilities as defined in the Land Drainage Act 1991 or in its Byelaws, unless those rights or responsibilities are expressly varied herein.

I3 Other than the works consented in this letter, you must not make alterations to any watercourse, or otherwise infringe the Board's Byelaws or the current or any future Land Drainage Act, unless prior written consent is obtained from the Board.

I5 The Board cannot be held liable for damage to any services crossing, or adjacent to, the areas of land where you will be undertaking these works, howsoever caused. It is therefore entirely your responsibility to locate and avoid any such services.

I6 It is the applicant's responsibility to ensure no loss of protected species or habitat as a result of the consented works. This may require the undertaking of an environmental survey. You should seek specialist advice as to the need for this and implement mitigation if specified.

I7.2 The discharge is to consist solely of surface water run-off and must not include any treated foul water (unless otherwise consented separately). All surface water discharged to the watercourse must be free from contamination.

I8.1 The applicant is responsible and liable for the design and installation of the proposed works. Where there are any problems caused to others due to these planned or associated works, then the applicant will be held liable and be responsible to ensure that these are rectified.

I9 It's possible that the outfall from this drainage system may be submerged during times of high rainfall and flows. The Board cannot be held liable should this cause any problems in your drainage systems. The effect of a submerged outfall may be to restrict the rate of discharge from the system. This constraint may require additional storage capacity to be provided in your system. It may also be advisable to install a non-return valve or flap on the end of the discharge pipe or outfall structure to limit the impact of high water levels in the receiving watercourse on your system. The Boards officers have previously provided details of predicted maximum water levels in the nearest Board arterial watercourse so that the design of your on-site drainage system can take this matter into account.

I10.1 The Board is not responsible for the operation and ongoing maintenance (including repair) of the outfall or any elements of the drainage system served by the outfall. You must ensure that responsibility for ownership, maintenance and operation of each and every element of the drainage system that is part of the proposed works and that is served by the outfall is clearly-defined and transferred to the relevant Risk Management Authority, Management Company or individual property owners as appropriate. For the purposes of clarity, where the land or property owner is also the riparian owner, they are responsible for the maintenance of their sections of the watercourse.

I10.2 Responsibility for maintenance of all elements of the works hereby consented, and all costs associated with this, will remain with you and future owners of the areas of land affected by this application.

I12 The works are all to be undertaken entirely at your expense.

I13 If the proposed works will require the watercourse to be temporarily dammed off and over-pumped, this work is to be undertaken entirely at your risk, and must not affect the drainage of any other person. The dams must be able to be removed at short notice should water levels rise to an unacceptably high level or if the over-pumping system is unable to cope with the flow of water. The dams must also be completely removed

from the drain, and the areas where they were situated restored to their previous condition, as soon as possible.

I14 Should there be any existing pipes entering the stretch of watercourse to be infilled from either bank, these are to be suitably extended and diverted to outfall into the nearest open channel at one end or the other of the section being infilled.

I15 If a third party contractor is appointed to undertake these works, they must be provided with a copy of this consent prior to commencing work on site.

I16 This consent is valid for the lifetime of the current works only. Any future replacement of the hereby consented works will require a new consent from the Board, the decision for which is in no way influenced by the current granting of consent. In the event of this consent being forthcoming, the responsibility and any associated costs for any future replacement, will remain with you and future owners of the areas of land affected by this application.

Map and Site Plans

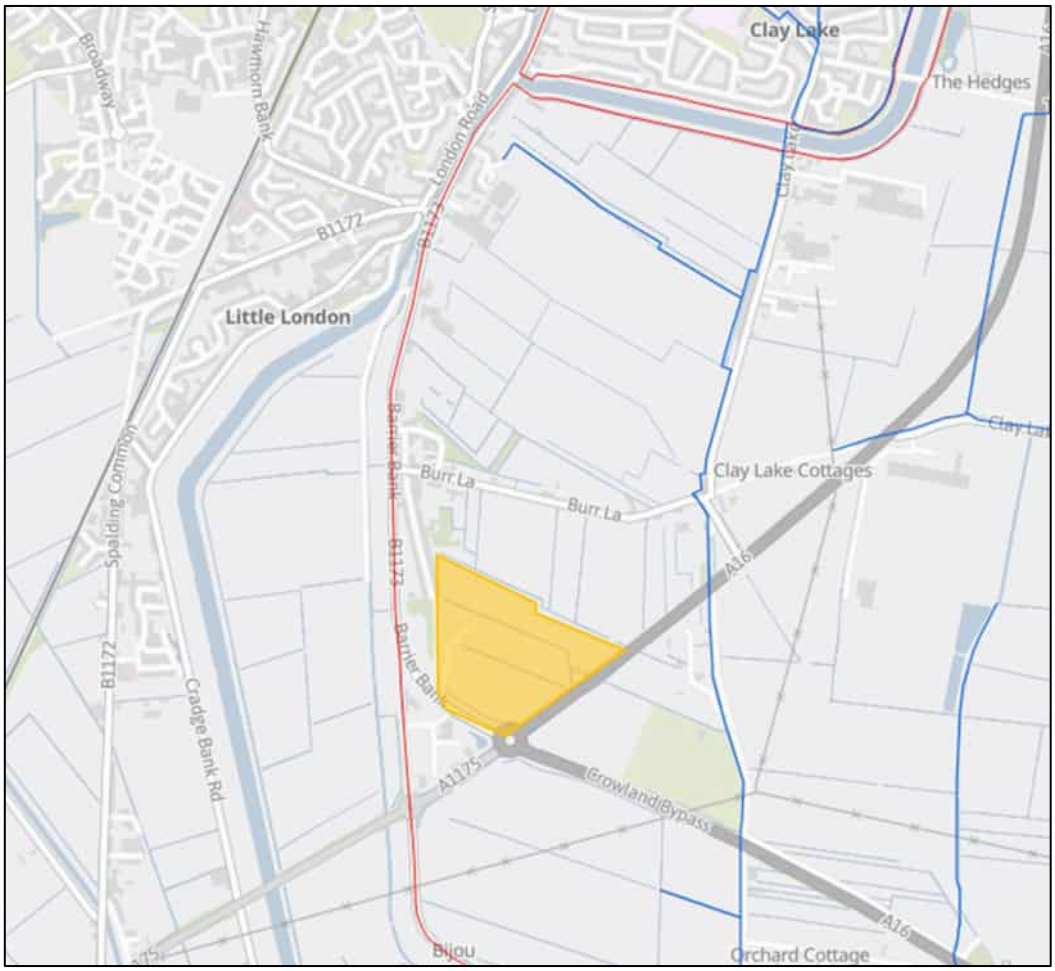


Figure 1 – Site location shaded orange. Internal Drainage District of South Holland IDB indicated by red line. Board arterial watercourses shown dark blue. (Ordnance Survey Licence Number AC0000808046, © Crown Copyright 2026, all rights reserved).



Figure 2 – 'Impermeable Areas Plan' 00000-ECE-XX-00-DR-C-0011, Rev P01 (Eastwood Consulting Engineers, 14/08/2025)

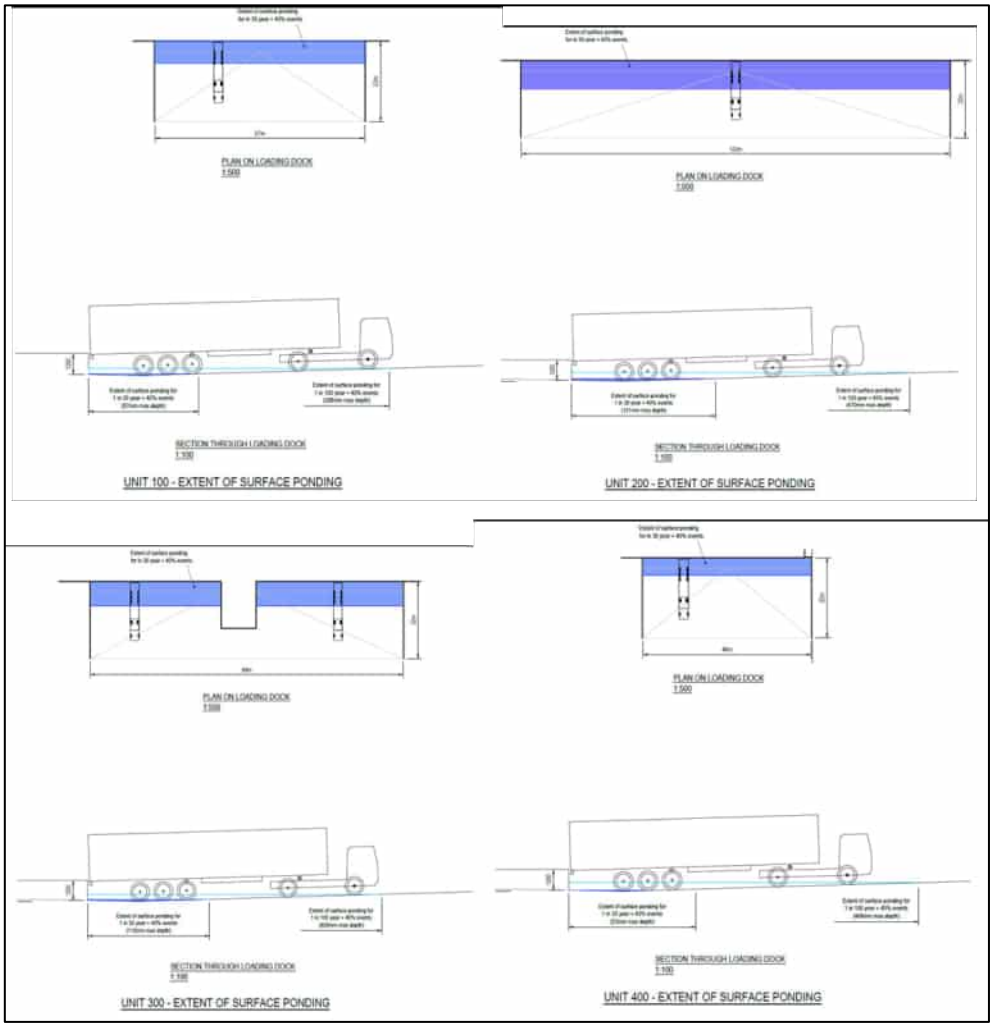


Figure 3 – Extent of pooling in loading docks for each unit. Extract from 'Loading Dock Ponding' 46934-ECE-XX-00-DR-C-0017, Rev P01 (Eastwood Consulting Engineers, 18/12/2025)

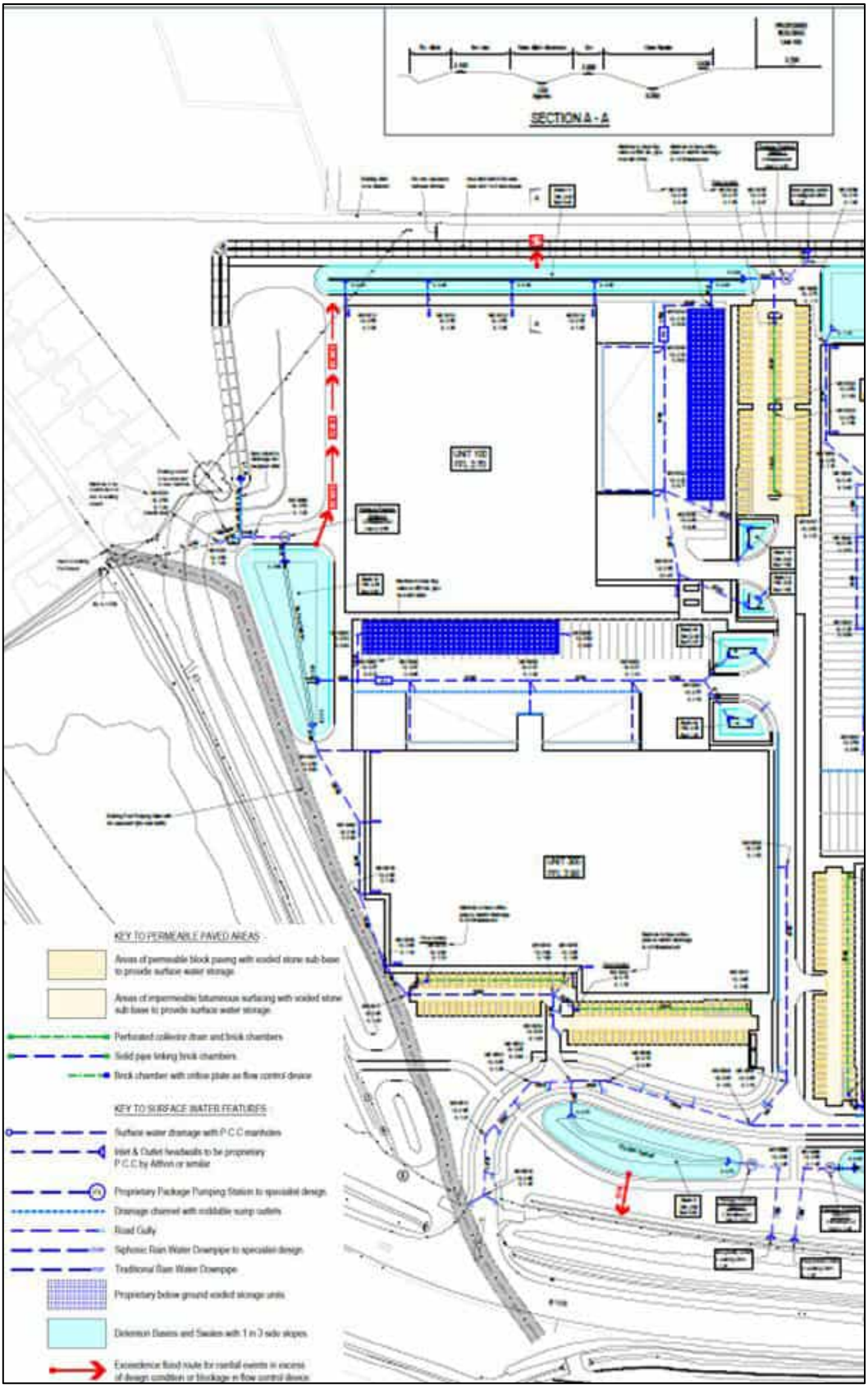


Figure 4 – Surface water drainage strategy (western side of site). Extract from 'Surface water drainage strategy' 46934-ECE-XX-00-DR-C-0012, Rev P03 (Eastwood Consulting Engineers, 22/01/2025)

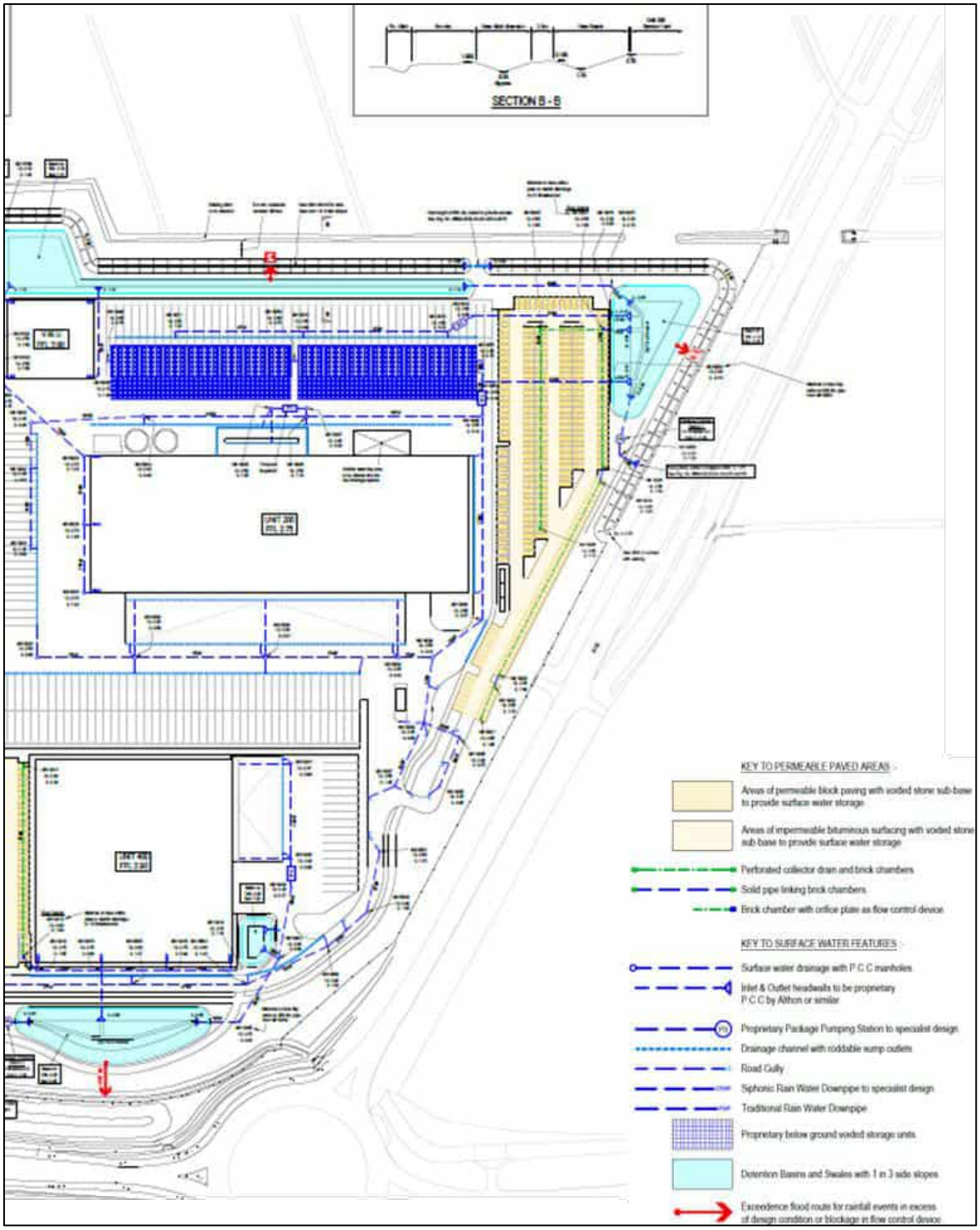


Figure 5 – Surface water drainage strategy (eastern side of site). Extract from 'Surface water drainage strategy' 46934-ECE-XX-00-DR-C-0012, Rev P03 (Eastwood Consulting Engineers, 22/01/2025)

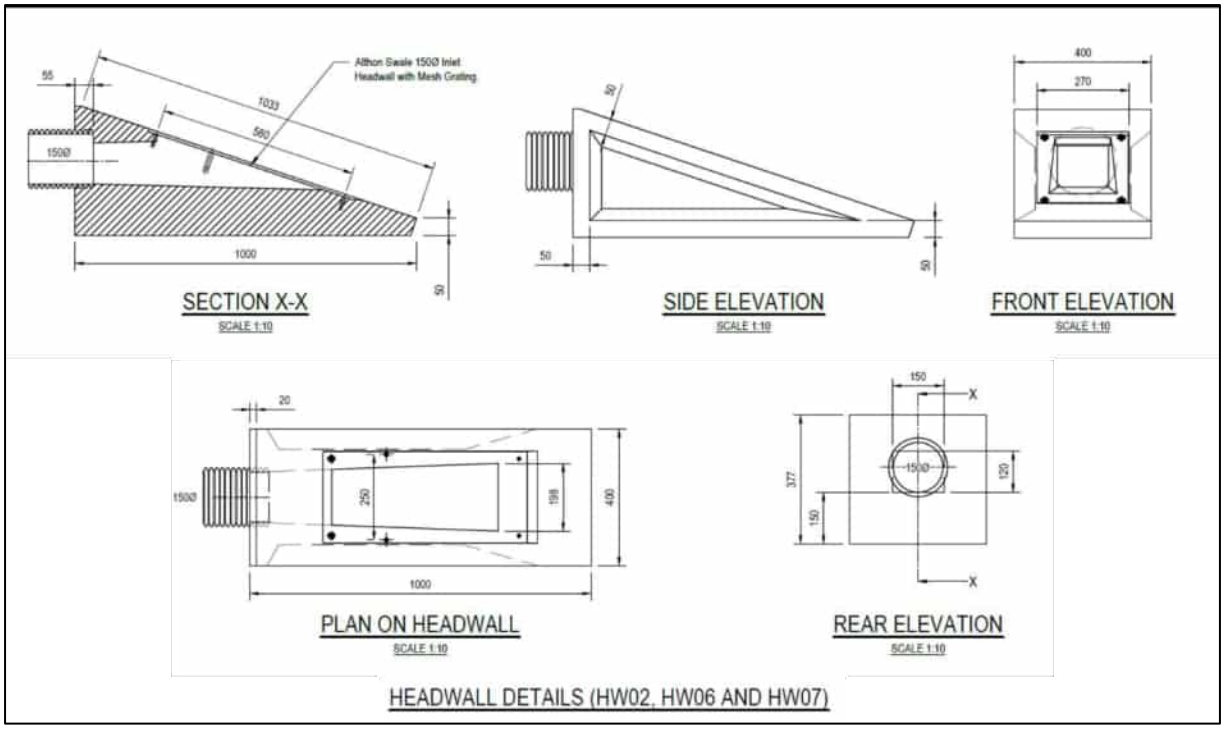


*Figure 6 – Headwall details for the surface water outfall pipe from **Units 100, 400 and access road**. Extract from 'Outfall headwalls to ditch' 46934-ECE-XX-00-DR-C-0014, Rev P02 (Eastwood Consulting Engineers, 22/01/2026)*

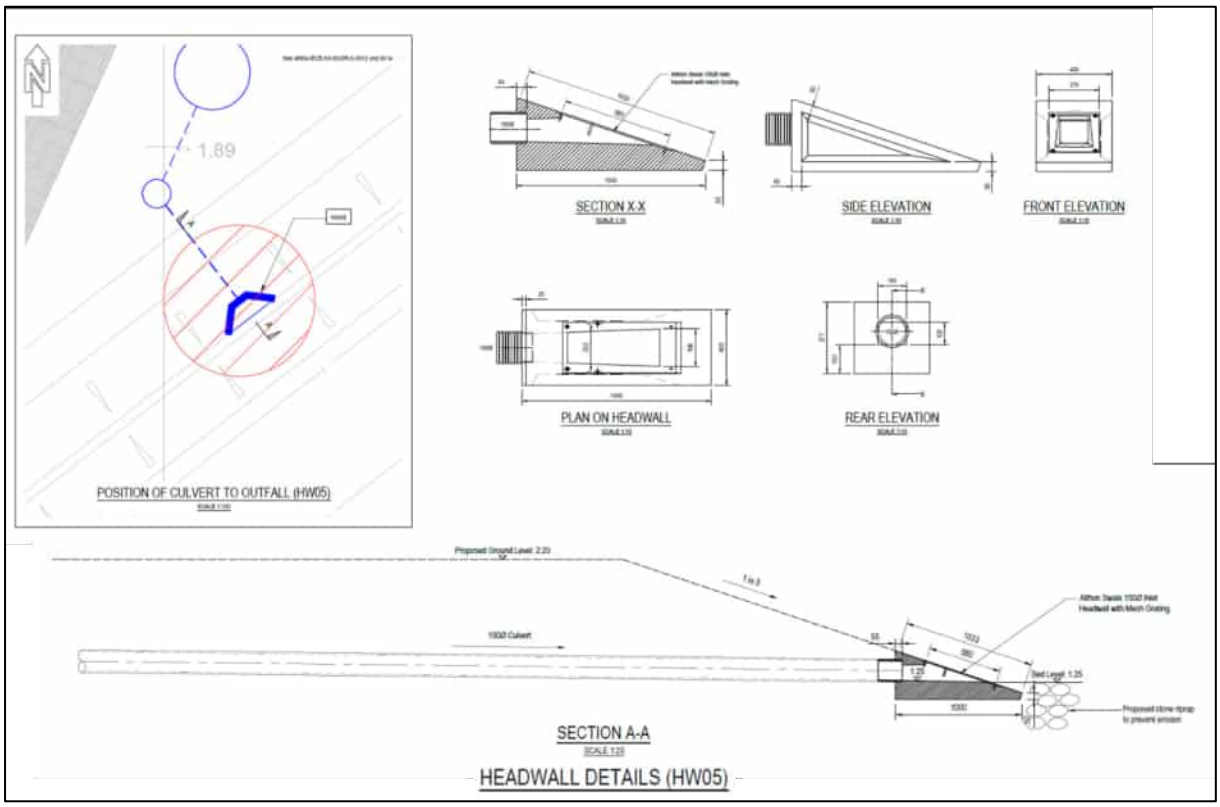


*Figure 7 – Headwall and connection details for the surface water outfall pipe from **Unit 200**. Extract from 'Culvert details (150mm) into eastern realigned ditch (HW05)' 46934-ECE-XX-00-DR-C-0016, Rev P02 (Eastwood Consulting Engineers, 22/01/2026)*

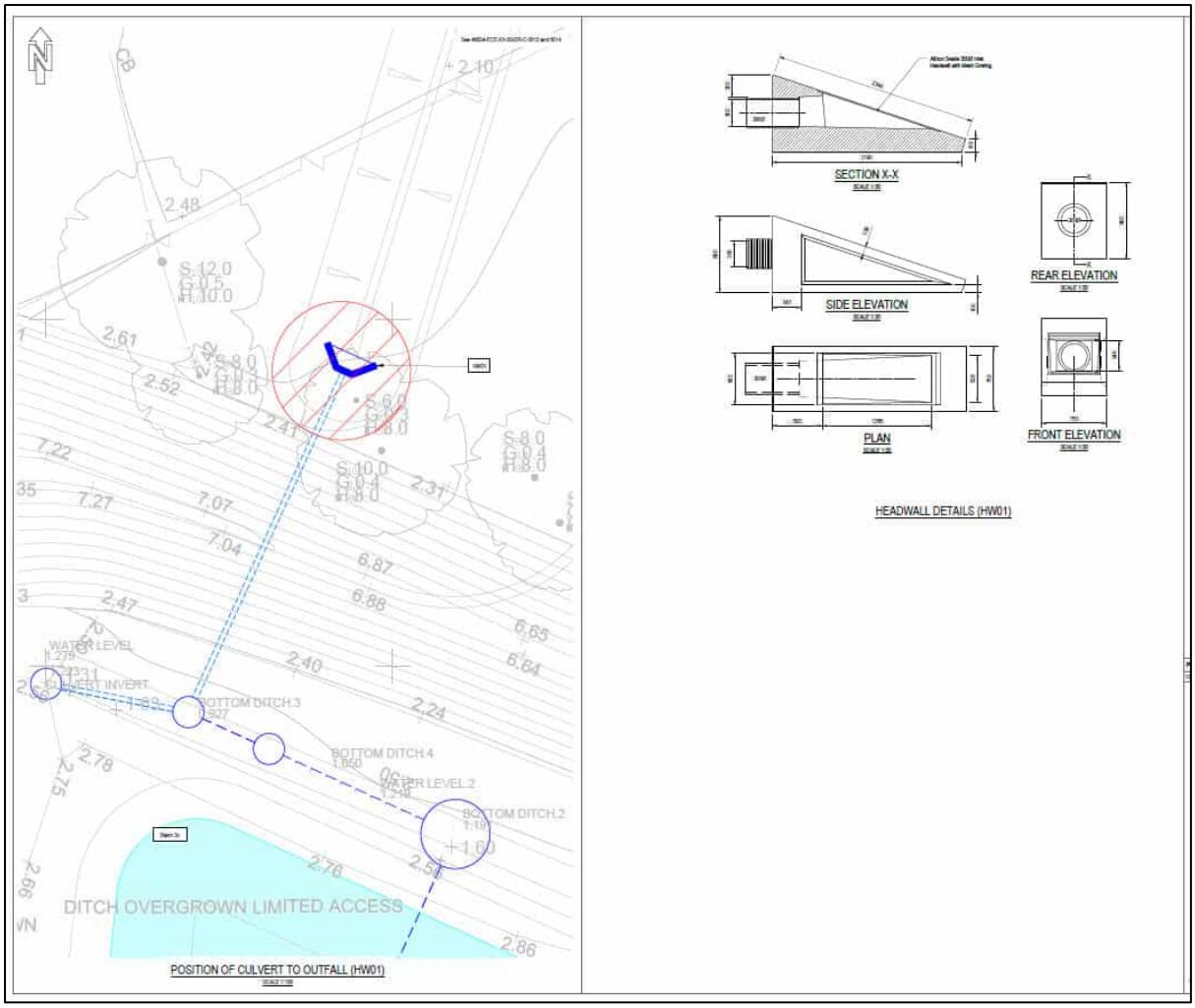


*Figure 8 – Headwall and connection details for the surface water outfall pipe from **Unit 300**. Extract from 'Outfall Headwall (300mm) to realigned ditch in north-west (HW01)' 46934-ECE-XX-00-DR-C-0018, Rev P01 (Eastwood Consulting Engineers, 22/01/2026)*

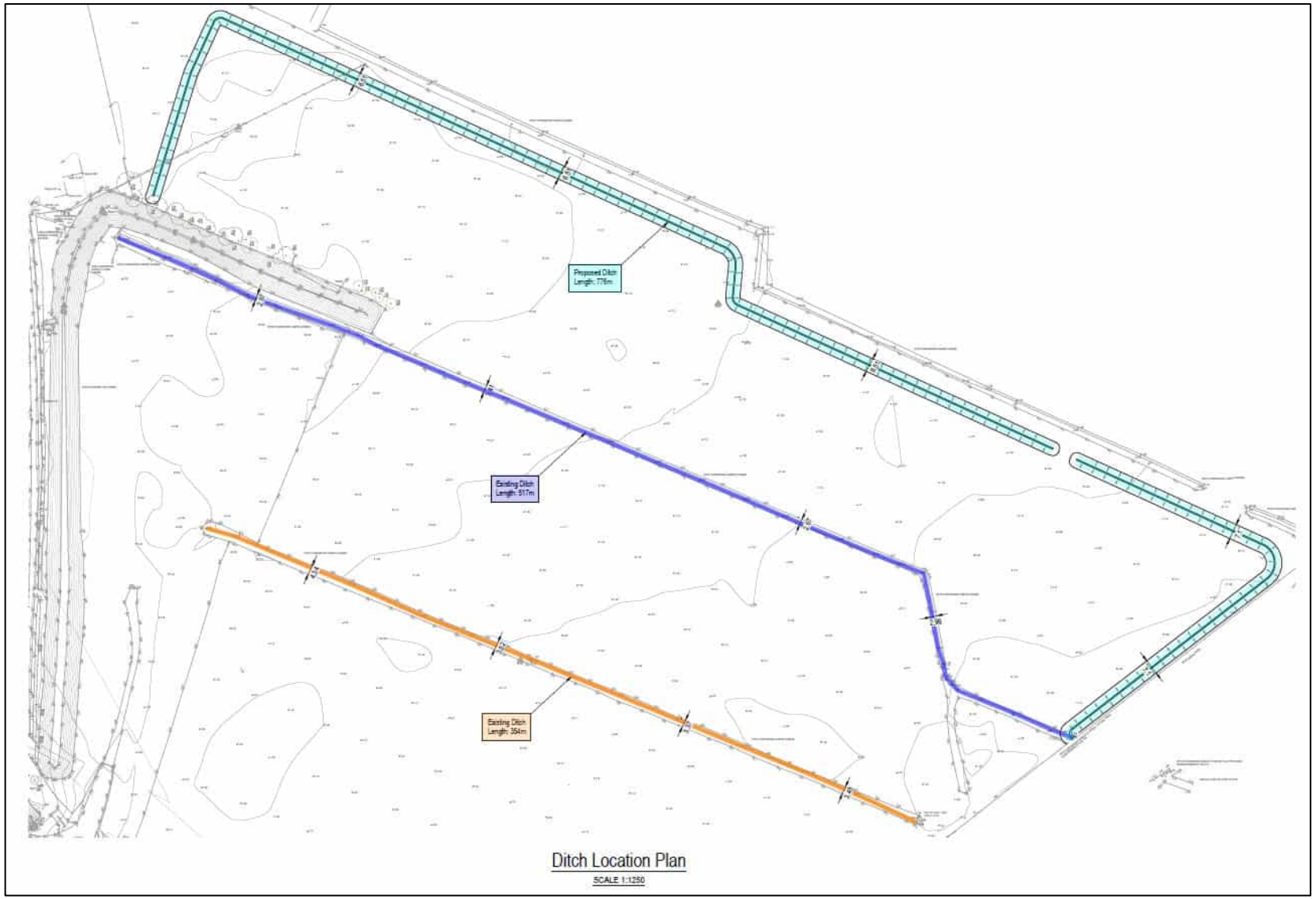


Figure 9 – Ditches to be infilled indicated by orange and purple lines. New realigned watercourse indicated by light blue lines. Extract from 'Ditch volume assessment' 46934-ECE-XX-00-DR-C-0013, Rev P02 (Eastwood Consulting Engineers, 22/01/2026)

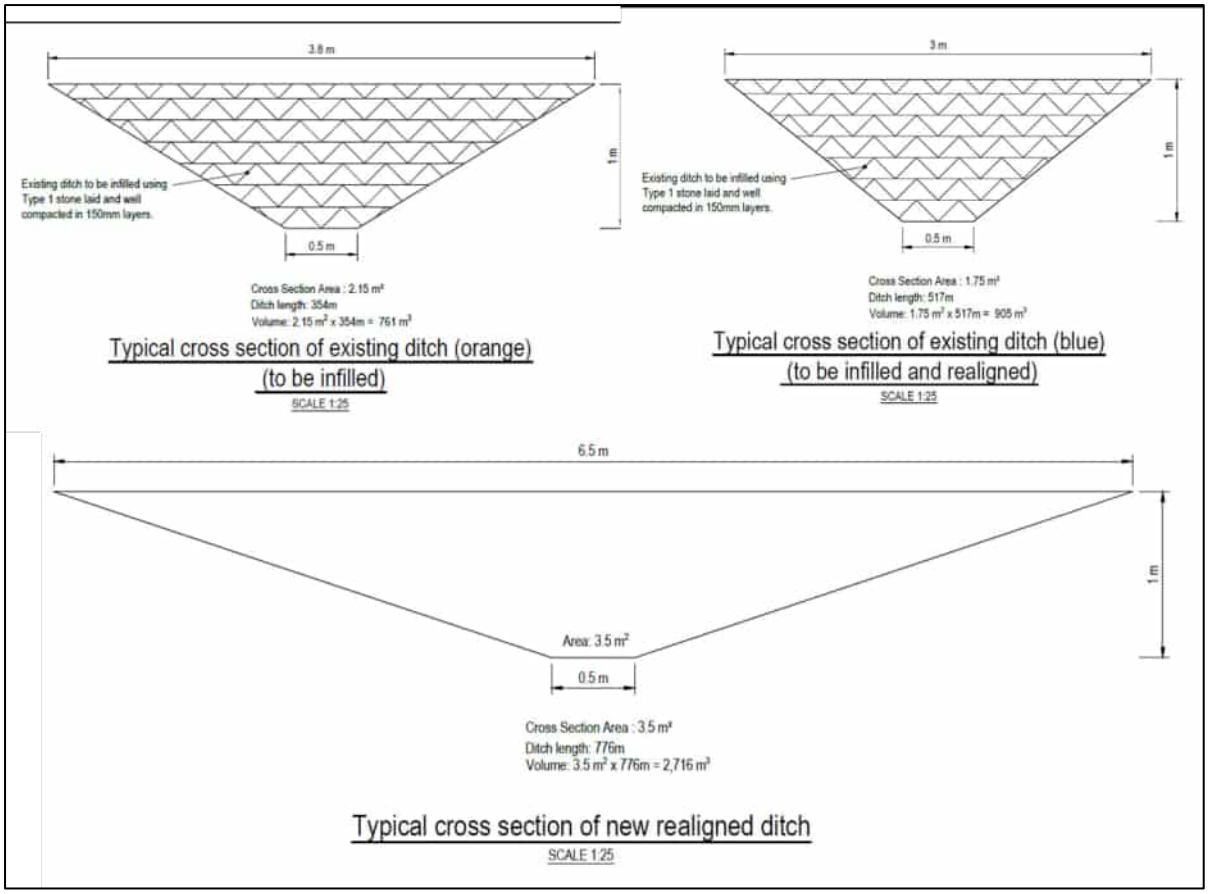


Figure 10 – Dimensions/cross-section drawings of the two watercourses to be infilled and of the proposed new realigned watercourse. Extract from 'Ditch volume assessment' 46934-ECE-XX-00-DR-C-0013, Rev P02 (Eastwood Consulting Engineers, 22/01/2026)

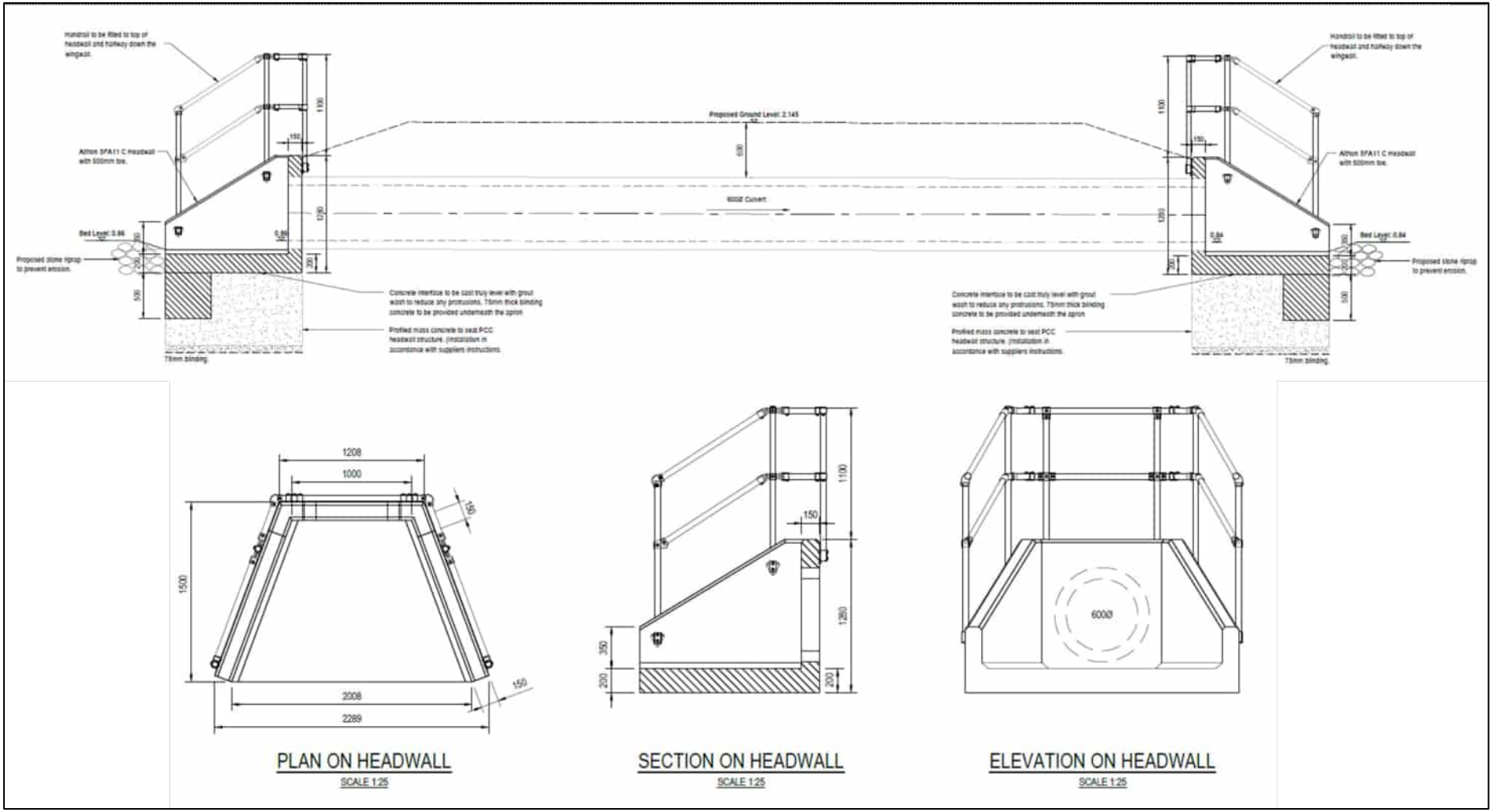


Figure 11 – Culvert to be installed in the proposed new realigned watercourse. Extract from 'Culvert details (600mm) along northern realigned ditch (HW03 and HW04)' 46934-ECE-XX-00-DR-C-0015, Rev P02 (Eastwood Consulting Engineers, 22/01/2026)

Acknowledgement of conditions for proposed consent

The granting of consent by the South Holland Internal Drainage Board for the activities and works described within your application form submitted to us (Water Management Alliance ("WMA") references 25_33102_C, 25_33104_C and 25_33105_C) will be subject to compliance with conditions and specifications as stated above.

Before consent can be granted we require you to acknowledge and accept the conditions set out above. As such, please can you print, sign and return this form to the address above or via email to planning@wlma.org.uk **within 28 days from today's date**.

WMA Refs: 25_33102_C, 25_33104_C and 25_33105_C

I, the applicant of the above referenced application for consent, acknowledge and accept the conditions and specifications set out above.

Specifically, any reference to conditions includes all conditions relating to the payment of Surface Water Development Contributions, Commuted Maintenance Fees and the entering into Deeds of Indemnity, Deeds of Covenant and/or Licence Agreements.

Name: _____ Position: _____

Address: _____

Signed: _____

Date: _____

The SWDC as conditioned in C4 above should be invoiced using the following details:

Payee name _____

Payee address _____

Payee phone number _____

Payee e-mail address _____

If you require any further information, please do not hesitate to contact me.

Kind Regards,

Ella

Ella Thorpe
Senior Sustainable Development Officer
Water Management Alliance

APPENDIX 8

SUDS Type	SUDS Technique	Description	Suitable	Comments
Source Control	Green roof	Vegetated roof that reduces runoff volume and rate	No	Design unsuitable for industrial building roof and risk of sedimentation of the drainage system. Difficulty in roof access for maintenance.
	Rain garden/ bio retention area	Small depressions in the ground that can act as infiltration points.	No	Alternative solutions are proposed.
	Rainwater harvesting/rainwater butts	Rainwater is stored and re-used	No	Low volumes of water are likely to be required by the development.
	Permeable paving	Paving which allows inflow of rainwater into underlying construction/soil	Yes	Private permeable paving areas would have limited infiltration to the sub-soils. Issues associated with traffic loading.
Infiltration	Soakaway	Pit or trench which stores and disposes of water to the ground	No	Presence of impermeable ground (clay). Soakaway tests were conducted by Eastwood and Partners in foul trail pits. Infiltration rates in the 2 deeper tests were negligible and infiltration rates were low (4.5×10^{-6} m/s and 2.2×10^{-6} m/s) in the 2 shallower tests.
	Filter Drain	Trench which conveys and/or disposes of water to the ground.	No	
	Infiltration Basin	Shallow basin which stores and disposes of water to the ground	No	Lack of suitable open space and poor infiltration rate
Conveyance	Swale	Shallow vegetated depression which conducts and retains water	Yes	Possible ditch/swale within centre of the site.
Detention	Subsurface storage	Traditional underground pipes, tank storage, or modular systems	Yes	Area available on the site for an attenuation tank.
	Detention Basin	Normally dry but may have small permanent water pools at the inlet and outlet. They can function as POS	Yes	Poor infiltration rate due to clay resulting may result in residual water stagnation and siltation of the basin.

	Pond	Permanent body of water	No	Lack of suitable public open space.
	Wetland	Permanent body of shallow water or marsh	No	

UK Design Flood Estimation

Generated on 19 July 2022 08:51:24 by ihopkinson
Printed from the ReFH2 Flood Modelling software package, version 3.2.7591.25584

Summary of estimate using the Flood Estimation Handbook revitalised flood hydrograph method (ReFH2)

Site details Checksum: 4CFB-7D3E

Site name: FEH_Point_Descriptors_524517_319919

Easting: 524517

Northing: 319919

Country: England, Wales or Northern Ireland

Catchment Area (km²): 0.19 [0.5]*

Using plot scale calculations: Yes

Model: 2.3

Site description: None

Model run: 1 year

Summary of results

Rainfall - FEH 2013 model (mm):	21.12	Total runoff (ML):	0.31
Total Rainfall (mm):	13.49	Total flow (ML):	1.00
Peak Rainfall (mm):	3.07	Peak flow (m³/s):	0.01

Parameters

Where the user has overriden a system-generated value, this original value is shown in square brackets after the value used.
** Indicates that the user locked the duration/timestep*

Rainfall parameters (Rainfall - FEH 2013 model)

Name	Value	User-defined?
Duration (hh:mm:ss)	05:30:00	No
Timestep (hh:mm:ss)	00:30:00	No
SCF (Seasonal correction factor)	0.64	No
ARF (Areal reduction factor)	1 [0.99]	Yes
Seasonality	Winter	No

Loss model parameters

Name	Value	User-defined?
Cini (mm)	80.31	No
Cmax (mm)	722.54	No
Use alpha correction factor	No	No
Alpha correction factor	n/a	No

Routing model parameters

Name	Value	User-defined?
Tp (hr)	3.56 [2.71]	Yes
Up	0.65	No
Uk	0.8	No

Baseflow model parameters

Name	Value	User-defined?
BF0 (m^3/s)	0	No
BL (hr)	57.88 [53.78]	Yes
BR	2.22	No

Urbanisation parameters

Name	Value	User-defined?
Urban area (km^2)	0	No
Urbext 2000	0	No
Impervious runoff factor	0.7	No
Imperviousness factor	0.4	No
Tp scaling factor	0.75	No
Depression storage depth (mm)	0.5	No
Exporting drained area (km^2)	0.00	Yes
Sewer capacity (m^3/s)	0.00	Yes

Appendix

Catchment descriptors *

Name	Value	User-defined value used?
BFIHOST	0.71	No
BFIHOST19	0.68	No
PROPWET (mm)	0.21	No
SAAR (mm)	556	No

Values in square brackets are the original values loaded from the FEH Web Service or FEH CD-ROM

UK Design Flood Estimation

Generated on 19 July 2022 09:07:25 by ihopkinson
Printed from the ReFH2 Flood Modelling software package, version 3.2.7591.25584

Summary of estimate using the Flood Estimation Handbook revitalised flood hydrograph method (ReFH2)

Site details Checksum: 4CFB-7D3E

Site name: FEH_Point_Descriptors_524517_319919

Easting: 524517

Northing: 319919

Country: England, Wales or Northern Ireland

Catchment Area (km²): 0.19 [0.5]*

Using plot scale calculations: Yes

Model: 2.3

Site description: None

Model run: 2 year

Summary of results

Rainfall - FEH 2013 model (mm):	24.24	Total runoff (ML):	0.36
Total Rainfall (mm):	15.48	Total flow (ML):	1.16
Peak Rainfall (mm):	3.52	Peak flow (m³/s):	0.02

Parameters

Where the user has overriden a system-generated value, this original value is shown in square brackets after the value used.
** Indicates that the user locked the duration/timestep*

Rainfall parameters (Rainfall - FEH 2013 model)

Name	Value	User-defined?
Duration (hh:mm:ss)	05:30:00	No
Timestep (hh:mm:ss)	00:30:00	No
SCF (Seasonal correction factor)	0.64	No
ARF (Areal reduction factor)	1 [0.99]	Yes
Seasonality	Winter	No

Loss model parameters

Name	Value	User-defined?
Cini (mm)	80.31	No
Cmax (mm)	722.54	No
Use alpha correction factor	No	No
Alpha correction factor	n/a	No

Routing model parameters

Name	Value	User-defined?
Tp (hr)	3.56 [2.71]	Yes
Up	0.65	No
Uk	0.8	No

Baseflow model parameters

Name	Value	User-defined?
BF0 (m^3/s)	0	No
BL (hr)	57.88 [53.78]	Yes
BR	2.22	No

Urbanisation parameters

Name	Value	User-defined?
Urban area (km^2)	0	No
Urbext 2000	0	No
Impervious runoff factor	0.7	No
Imperviousness factor	0.4	No
Tp scaling factor	0.75	No
Depression storage depth (mm)	0.5	No
Exporting drained area (km^2)	0.00	Yes
Sewer capacity (m^3/s)	0.00	Yes

Appendix

Catchment descriptors *

Name	Value	User-defined value used?
BFIHOST	0.71	No
BFIHOST19	0.68	No
PROPWET (mm)	0.21	No
SAAR (mm)	556	No

Values in square brackets are the original values loaded from the FEH Web Service or FEH CD-ROM

UK Design Flood Estimation

Generated on 19 July 2022 09:07:42 by ihopkinson
Printed from the ReFH2 Flood Modelling software package, version 3.2.7591.25584

Summary of estimate using the Flood Estimation Handbook revitalised flood hydrograph method (ReFH2)

Site details Checksum: 4CFB-7D3E

Site name: FEH_Point_Descriptors_524517_319919

Easting: 524517

Northing: 319919

Country: England, Wales or Northern Ireland

Catchment Area (km²): 0.19 [0.5]*

Using plot scale calculations: Yes

Model: 2.3

Site description: None

Model run: 10 year

Summary of results

Rainfall - FEH 2013 model (mm):	42.96	Total runoff (ML):	0.68
Total Rainfall (mm):	27.44	Total flow (ML):	2.19
Peak Rainfall (mm):	6.24	Peak flow (m³/s):	0.03

Parameters

Where the user has overriden a system-generated value, this original value is shown in square brackets after the value used.
** Indicates that the user locked the duration/timestep*

Rainfall parameters (Rainfall - FEH 2013 model)

Name	Value	User-defined?
Duration (hh:mm:ss)	05:30:00	No
Timestep (hh:mm:ss)	00:30:00	No
SCF (Seasonal correction factor)	0.64	No
ARF (Areal reduction factor)	1 [0.99]	Yes
Seasonality	Winter	No

Loss model parameters

Name	Value	User-defined?
Cini (mm)	80.31	No
Cmax (mm)	722.54	No
Use alpha correction factor	No	No
Alpha correction factor	n/a	No

Routing model parameters

Name	Value	User-defined?
Tp (hr)	3.56 [2.71]	Yes
Up	0.65	No
Uk	0.8	No

Baseflow model parameters

Name	Value	User-defined?
BF0 (m^3/s)	0	No
BL (hr)	57.88 [53.78]	Yes
BR	2.22	No

Urbanisation parameters

Name	Value	User-defined?
Urban area (km^2)	0	No
Urbext 2000	0	No
Impervious runoff factor	0.7	No
Imperviousness factor	0.4	No
Tp scaling factor	0.75	No
Depression storage depth (mm)	0.5	No
Exporting drained area (km^2)	0.00	Yes
Sewer capacity (m^3/s)	0.00	Yes

Appendix

Catchment descriptors *

Name	Value	User-defined value used?
BFIHOST	0.71	No
BFIHOST19	0.68	No
PROPWET (mm)	0.21	No
SAAR (mm)	556	No

Values in square brackets are the original values loaded from the FEH Web Service or FEH CD-ROM

UK Design Flood Estimation

Generated on 19 July 2022 09:07:54 by ihopkinson
Printed from the ReFH2 Flood Modelling software package, version 3.2.7591.25584

Summary of estimate using the Flood Estimation Handbook revitalised flood hydrograph method (ReFH2)

Site details Checksum: 4CFB-7D3E

Site name: FEH_Point_Descriptors_524517_319919

Easting: 524517

Northing: 319919

Country: England, Wales or Northern Ireland

Catchment Area (km²): 0.19 [0.5]*

Using plot scale calculations: Yes

Model: 2.3

Site description: None

Model run: 30 year

Summary of results

Rainfall - FEH 2013 model (mm):	60.38	Total runoff (ML):	1.01
Total Rainfall (mm):	38.56	Total flow (ML):	3.22
Peak Rainfall (mm):	8.76	Peak flow (m³/s):	0.05

Parameters

Where the user has overriden a system-generated value, this original value is shown in square brackets after the value used.
** Indicates that the user locked the duration/timestep*

Rainfall parameters (Rainfall - FEH 2013 model)

Name	Value	User-defined?
Duration (hh:mm:ss)	05:30:00	No
Timestep (hh:mm:ss)	00:30:00	No
SCF (Seasonal correction factor)	0.64	No
ARF (Areal reduction factor)	1 [0.99]	Yes
Seasonality	Winter	No

Loss model parameters

Name	Value	User-defined?
Cini (mm)	80.31	No
Cmax (mm)	722.54	No
Use alpha correction factor	No	No
Alpha correction factor	n/a	No

Routing model parameters

Name	Value	User-defined?
Tp (hr)	3.56 [2.71]	Yes
Up	0.65	No
Uk	0.8	No

Baseflow model parameters

Name	Value	User-defined?
BF0 (m^3/s)	0	No
BL (hr)	57.88 [53.78]	Yes
BR	2.22	No

Urbanisation parameters

Name	Value	User-defined?
Urban area (km^2)	0	No
Urbext 2000	0	No
Impervious runoff factor	0.7	No
Imperviousness factor	0.4	No
Tp scaling factor	0.75	No
Depression storage depth (mm)	0.5	No
Exporting drained area (km^2)	0.00	Yes
Sewer capacity (m^3/s)	0.00	Yes

Appendix

Catchment descriptors *

Name	Value	User-defined value used?
BFIHOST	0.71	No
BFIHOST19	0.68	No
PROPWET (mm)	0.21	No
SAAR (mm)	556	No

Values in square brackets are the original values loaded from the FEH Web Service or FEH CD-ROM

UK Design Flood Estimation

Generated on 19 July 2022 09:08:04 by ihopkinson
Printed from the ReFH2 Flood Modelling software package, version 3.2.7591.25584

Summary of estimate using the Flood Estimation Handbook revitalised flood hydrograph method (ReFH2)

Site details Checksum: 4CFB-7D3E

Site name: FEH_Point_Descriptors_524517_319919

Easting: 524517

Northing: 319919

Country: England, Wales or Northern Ireland

Catchment Area (km²): 0.19 [0.5]*

Using plot scale calculations: Yes

Model: 2.3

Site description: None

Model run: 100 year

Summary of results

Rainfall - FEH 2013 model (mm):	87.00	Total runoff (ML):	1.58
Total Rainfall (mm):	55.57	Total flow (ML):	4.94
Peak Rainfall (mm):	12.63	Peak flow (m³/s):	0.07

Parameters

Where the user has overriden a system-generated value, this original value is shown in square brackets after the value used.
** Indicates that the user locked the duration/timestep*

Rainfall parameters (Rainfall - FEH 2013 model)

Name	Value	User-defined?
Duration (hh:mm:ss)	05:30:00	No
Timestep (hh:mm:ss)	00:30:00	No
SCF (Seasonal correction factor)	0.64	No
ARF (Areal reduction factor)	1 [0.99]	Yes
Seasonality	Winter	No

Loss model parameters

Name	Value	User-defined?
Cini (mm)	80.31	No
Cmax (mm)	722.54	No
Use alpha correction factor	No	No
Alpha correction factor	n/a	No

Routing model parameters

Name	Value	User-defined?
Tp (hr)	3.56 [2.71]	Yes
Up	0.65	No
Uk	0.8	No

Baseflow model parameters

Name	Value	User-defined?
BF0 (m^3/s)	0	No
BL (hr)	57.88 [53.78]	Yes
BR	2.22	No

Urbanisation parameters

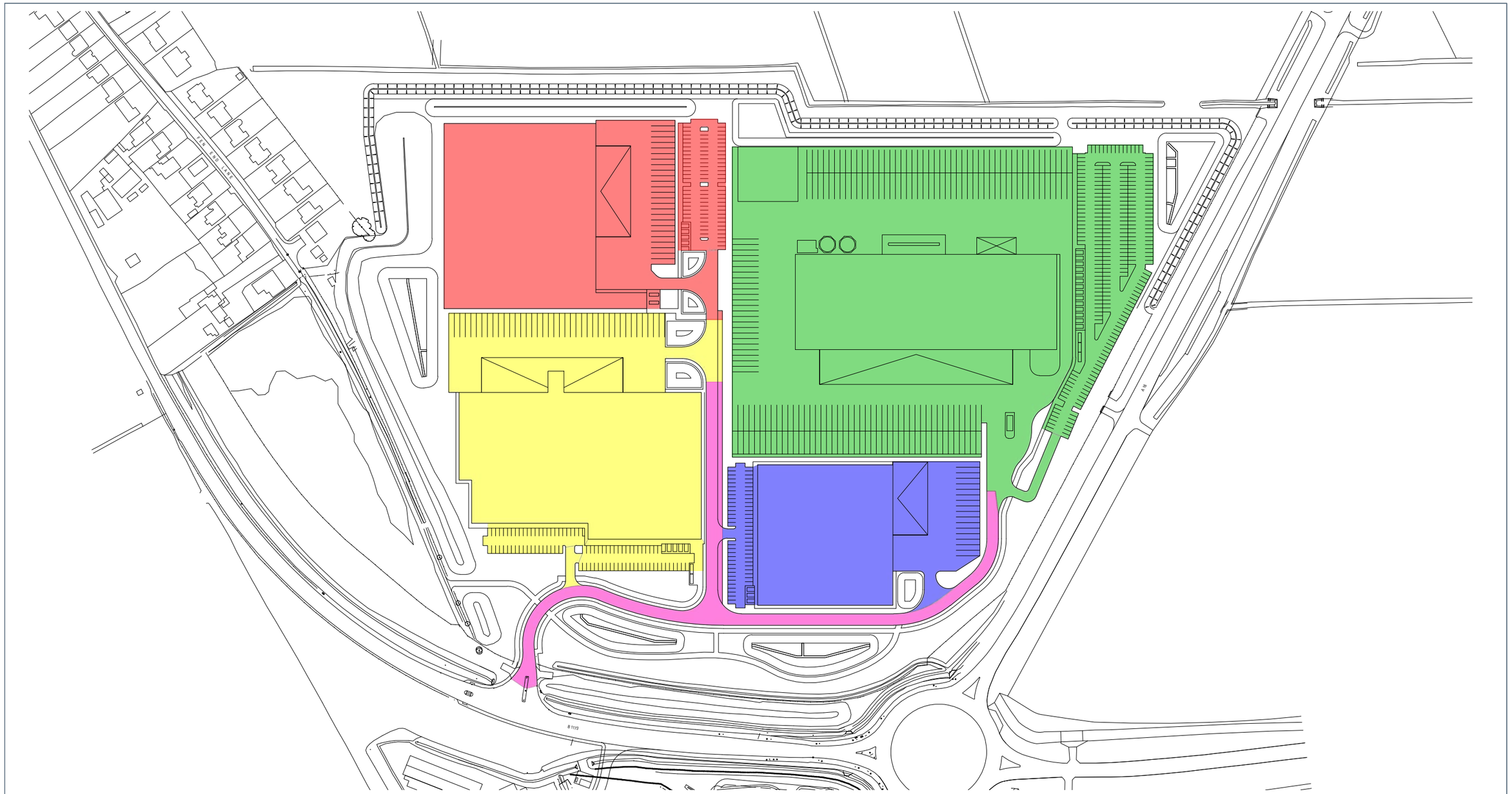
Name	Value	User-defined?
Urban area (km^2)	0	No
Urbext 2000	0	No
Impervious runoff factor	0.7	No
Imperviousness factor	0.4	No
Tp scaling factor	0.75	No
Depression storage depth (mm)	0.5	No
Exporting drained area (km^2)	0.00	Yes
Sewer capacity (m^3/s)	0.00	Yes

Appendix

Catchment descriptors *

Name	Value	User-defined value used?
BFIHOST	0.71	No
BFIHOST19	0.68	No
PROPWET (mm)	0.21	No
SAAR (mm)	556	No

Values in square brackets are the original values loaded from the FEH Web Service or FEH CD-ROM



UNIT 100

19,960 m²

UNIT 400

13,260 m²

UNIT 200

48,790 m²

ROAD

4,550m²

UNIT 300

23,590 m²

TOTAL AREA = 110,150 m² (11.015 Ha)

REV	DESCRIPTION	SIG	CHK	DATE
P01	First Issue.	MW	AP	14.08.2025

ALCAN PROPERTIES LTD.

LINCS GATEWAY
SPALDING

IMPERMEABLE AREAS PLAN

Eastwood
CONSULTING ENGINEERS

St Andrew's House
23 Kingfield Road
Sheffield, S11 9AS

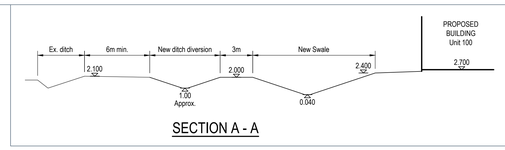
T: 0114 255 4554
E: mail@eastwoodce.com
eastwoodce.com

ECE PROJECT No	SCALE AT A3	STATUS	SUITABLE FOR
00000	1:2500	S0	Initial

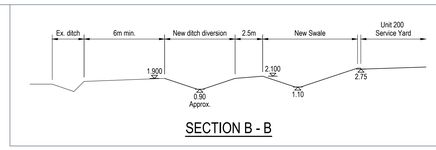
DRAWING NUMBER

00000 - ECE - XX - 00 - DR - C - **0011** P01

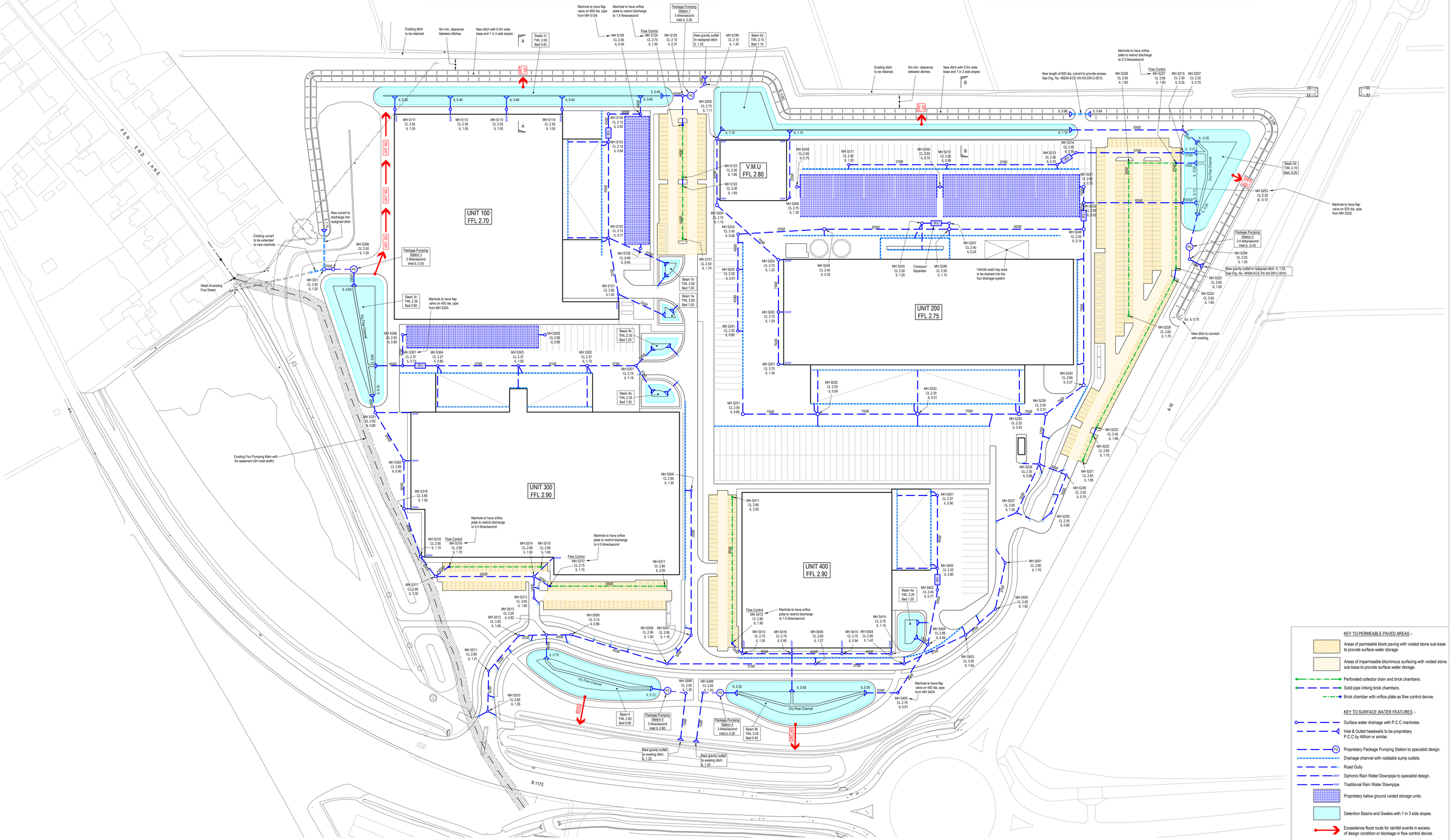
Project · Originator · Zone · Level · Type · Role · Number · REV



SECTION A - A



SECTION B - B



KEY TO PERMEABLE PAVED AREAS :-

- Areas of permeable block paving with voided stone sub-base to provide surface water storage.
- Areas of impermeable bituminous surfacing with voided stone sub-base to provide surface water storage.
- Perforated collector drain and brick chambers.
- Solid pipe linking brick chambers.
- Brick chamber with orifice plate as flow control device.

KEY TO SURFACE WATER FEATURES :-

- Surface water drainage with P.C.C manholes.
- Inlet & Outlet headwalls to be proprietary P.C.C by Althon or similar.
- Proprietary Package Pumping Station to specialist design.
- Drainage channel with roddable sump outlets.
- Road Gully
- Siphonic Rain Water Downpipe to specialist design.
- Traditional Rain Water Downpipe.
- Proprietary below ground voided storage units.
- Detention Basins and Swales with 1 in 3 side slopes.
- Exceedence flood route for rainfall events in excess of design condition or blockage in flow control device.

1. This drawing to be read in conjunction with Eastwood Consulting Engineers Drg. Nos. 46934-ECE-XX-XX-DR-C-0015 & 0016.

REV	DESCRIPTION	SIG	CHK	DATE
P01	First Issue.	MW	AP	14.08.2025
P02	Unit 200 & 300 storage area increased. Exceedance routes added.	MW	AP	19.12.2025

ALCAN PROPERTIES LTD.

LINCS GATEWAY
SPALDING

SURFACE WATER DRAINAGE STRATEGY

Eastwood CONSULTING ENGINEERS
St Andrew's House
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ECE PROJECT No	SCALE AT A0	STATUS	SUITABLE FOR
46934	1:750	S0	Initial

DRAWING NUMBER: 46934 - ECE - XX - 00 - DR - C - 0012 P02
(Project - Originator - Zone - Level - Type - Role - Number)

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	2	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	0.900
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	x
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
Basin 1a	0.025	5.00	2.700	1200	524527.000	320012.000	1.150	1.550
S101	0.054	5.00	2.650	1200	524494.916	320034.724	1.200	1.450
Basin 1b	0.034	5.00	2.550	1200	524525.147	320031.913	1.050	1.500
S102	0.150	5.00	1.500	1350	524503.155	320066.339	0.730	0.770
S103	0.357	5.00	1.500	1350	524525.888	320116.130	0.860	0.640
Crates		5.00	2.450	1500	524530.170	320078.961	2.000	0.450
S106			2.450	1500	524549.117	320122.985	2.000	0.450
S104			2.450	1500	524532.485	320130.578	1.950	0.500
S114		5.00	2.550	1200	524509.535	320143.996	1.500	1.050
Swale 1c	1.133	5.00	2.050	1500	524511.235	320151.477	1.650	0.400
PP	0.243	5.00	2.400	1200	524539.005	320038.962	0.350	2.050
S124			2.750	1350	524568.564	320106.819	1.200	1.550
S125 (pump)			2.100	1500	524575.343	320122.481	1.730	0.370
Outfall			2.100	1200	524589.676	320123.266	0.800	1.300
Ditch			2.100	1200	524592.916	320126.605	0.850	1.250

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	Basin 1a	S101	27.180	0.600	1.550	1.450	0.100	271.8	225	5.57	50.0
1.001	S101	S102	32.671	0.600	1.450	0.770	0.680	48.0	225	5.86	50.0
2.000	Basin 1b	S102	35.510	0.600	1.500	0.770	0.730	48.6	225	5.31	50.0
1.002	S102	S103	54.735	0.600	0.770	0.640	0.130	421.0	450	6.79	47.3
1.003	S103	S104	15.883	0.600	0.640	0.500	0.140	113.4	450	6.93	46.8
3.000	Crates	S106	5.000	0.600	0.450	0.450	0.000	0.0	600	5.08	50.0
1.004	S104	S106	18.283	0.600	0.500	0.450	0.050	365.7	600	7.17	46.0
4.000	S114	Swale 1c	7.672	0.600	1.050	0.400	0.650	11.8	300	5.03	50.0
1.005	S106	Swale 1c	9.400	0.600	0.450	0.400	0.050	188.0	600	7.26	45.8

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	0.788	31.3	4.5	0.925	0.975	0.025	0.0	58	0.563
1.001	1.891	75.2	14.3	0.975	0.505	0.079	0.0	66	1.466
2.000	1.880	74.7	6.1	0.825	0.505	0.034	0.0	44	1.146
1.002	0.984	156.5	45.0	0.280	0.410	0.263	0.0	165	0.855
1.003	1.908	303.4	104.9	0.410	1.500	0.620	0.0	182	1.741
3.000	1.000	282.7	0.0	1.400	1.400	0.000	0.0	0	0.000
1.004	1.267	358.3	103.2	1.350	1.400	0.620	0.0	219	1.102
4.000	4.600	325.2	0.0	1.200	1.350	0.000	0.0	0	0.000
1.005	1.772	501.1	102.6	1.400	1.050	0.620	0.0	183	1.408

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Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
5.000	PP	S124	74.016	0.600	2.050	2.050	0.000	0.0	300	6.23	49.3
5.002	S124	S125 (pump)	16.160	0.600	1.550	0.370	1.180	13.7	450	6.28	49.1
1.007	Swale 1c	S125 (pump)	11.303	0.600	0.400	0.370	0.030	376.8	600	7.41	45.3
1.008	S125 (pump)	Outfall	7.742	0.600	0.370	1.300	-0.930	-8.3	90	30.00	19.4
1.009	Outfall	Ditch	2.500	0.600	1.300	1.250	0.050	50.0	90	30.00	19.4

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
5.000	1.000	70.7	43.3	0.050	0.400	0.243	0.0	300	0.000
5.002	5.515	877.1	43.1	0.750	1.280	0.243	0.0	67	2.929
1.007	1.248	352.9	287.1	1.050	1.130	1.753	0.0	413	1.383
1.008	0.004	0.0	139.9	1.640	0.710	1.996	0.0	90	0.000
1.009	1.018	6.5	139.9	0.710	0.760	1.996	0.0	90	1.046

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	27.180	271.8	225	Circular	2.700	1.550	0.925	2.650	1.450	0.975
1.001	32.671	48.0	225	Circular	2.650	1.450	0.975	1.500	0.770	0.505
2.000	35.510	48.6	225	Circular	2.550	1.500	0.825	1.500	0.770	0.505
1.002	54.735	421.0	450	Circular	1.500	0.770	0.280	1.500	0.640	0.410
1.003	15.883	113.4	450	Circular	1.500	0.640	0.410	2.450	0.500	1.500
3.000	5.000	0.0	600	Circular	2.450	0.450	1.400	2.450	0.450	1.400
1.004	18.283	365.7	600	Circular	2.450	0.500	1.350	2.450	0.450	1.400
4.000	7.672	11.8	300	Circular	2.550	1.050	1.200	2.050	0.400	1.350
1.005	9.400	188.0	600	Circular	2.450	0.450	1.400	2.050	0.400	1.050
5.000	74.016	0.0	300	Circular	2.400	2.050	0.050	2.750	2.050	0.400
5.002	16.160	13.7	450	Circular	2.750	1.550	0.750	2.100	0.370	1.280
1.007	11.303	376.8	600	Circular	2.050	0.400	1.050	2.100	0.370	1.130
1.008	7.742	-8.3	90	Circular	2.100	0.370	1.640	2.100	1.300	0.710
1.009	2.500	50.0	90	Circular	2.100	1.300	0.710	2.100	1.250	0.760

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	Basin 1a	1200	Manhole	Adoptable	S101	1200	Manhole	Adoptable
1.001	S101	1200	Manhole	Adoptable	S102	1350	Manhole	Adoptable
2.000	Basin 1b	1200	Manhole	Adoptable	S102	1350	Manhole	Adoptable
1.002	S102	1350	Manhole	Adoptable	S103	1350	Manhole	Adoptable
1.003	S103	1350	Manhole	Adoptable	S104	1500	Manhole	Adoptable
3.000	Crates	1500	Manhole	Adoptable	S106	1500	Manhole	Adoptable
1.004	S104	1500	Manhole	Adoptable	S106	1500	Manhole	Adoptable
4.000	S114	1200	Manhole	Adoptable	Swale 1c	1500	Manhole	Adoptable
1.005	S106	1500	Manhole	Adoptable	Swale 1c	1500	Manhole	Adoptable
5.000	PP	1200	Manhole	Adoptable	S124	1350	Manhole	Adoptable
5.002	S124	1350	Manhole	Adoptable	S125 (pump)	1500	Manhole	Adoptable
1.007	Swale 1c	1500	Manhole	Adoptable	S125 (pump)	1500	Manhole	Adoptable
1.008	S125 (pump)	1500	Manhole	Adoptable	Outfall	1200	Manhole	Adoptable
1.009	Outfall	1200	Manhole	Adoptable	Ditch	1200	Manhole	Adoptable

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Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	1.000	Drain Down Time (mins)	1440	Check Discharge Volume	x
Winter CV	1.000	Additional Storage (m³/ha)	20.0		

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
30	0	0	0
30	40	0	0
100	40	0	0

Node S124 Online Orifice Control

Flap Valve	x	Design Depth (m)	0.350	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	1.0		
Invert Level (m)	1.550	Diameter (m)	0.028		

Node S125 (pump) Online Pump Control

Flap Valve	x	Design Depth (m)	1.200	Switch off depth (m)	0.000
Replaces Downstream Link	✓	Design Flow (l/s)	3.0		
Invert Level (m)	0.370	Switch on depth (m)	0.050		

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.050	3.000	1.200	3.000

Node S106 Online Orifice Control

Flap Valve	✓	Design Depth (m)	0.800	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	500.0		
Invert Level (m)	0.450	Diameter (m)	0.579		

Node Basin 1a Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	1.550
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	0

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	22.7	0.0	1.200	63.0	0.0	1.201	0.0	0.0

Node Basin 1b Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	1.500
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	0

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Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	31.1	0.0	1.050	81.5	0.0	1.051	0.0	0.0

Node Crates Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	0.450
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	1022.0	0.0	0.800	1022.0	0.0	0.801	0.0	0.0

Node Swale 1c Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	0.400
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	79.7	0.0	1.600	1628.9	0.0	1.601	1628.9	0.0

Node PP Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	2.050
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	2173.0	0.0	0.350	2173.0	0.0	0.351	2173.0	0.0

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Results for 1 year Critical Storm Duration. Lowest mass balance: 99.98%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	Basin 1a	21	1.580	0.030	2.3	0.7501	0.0000	OK
15 minute summer	S101	11	1.493	0.043	6.2	0.0878	0.0000	OK
30 minute summer	Basin 1b	20	1.525	0.025	3.1	0.8500	0.0000	OK
15 minute summer	S102	11	0.880	0.110	22.6	0.6070	0.0000	OK
15 minute summer	S103	11	0.786	0.146	56.5	1.4234	0.0000	OK
2160 minute winter	Crates	2220	0.588	0.138	3.3	133.8357	0.0000	OK
120 minute summer	S106	66	0.705	0.255	35.2	0.4513	0.0000	OK
120 minute summer	S104	66	0.710	0.210	33.5	0.3715	0.0000	OK
15 minute summer	S114	1	1.050	0.000	0.0	0.0000	0.0000	OK
480 minute winter	Swale 1c	464	0.869	0.469	19.0	151.2101	0.0000	OK
1440 minute summer	PP	930	2.108	0.058	2.6	38.7043	0.0000	OK
1440 minute summer	S124	930	1.850	0.300	0.9	0.4292	0.0000	OK
480 minute winter	S125 (pump)	464	0.869	0.499	3.4	0.8820	0.0000	SURCHARGED
15 minute summer	Outfall	10	1.349	0.049	3.0	0.0552	0.0000	OK
15 minute summer	Ditch	10	1.293	0.043	3.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	Basin 1a	1.000	S101	1.2	0.371	0.039	0.1066	
15 minute summer	S101	1.001	S102	6.1	0.536	0.081	0.4001	
30 minute summer	Basin 1b	2.000	S102	2.0	0.242	0.027	0.3671	
15 minute summer	S102	1.002	S103	21.1	0.584	0.135	2.0357	
15 minute summer	S103	1.003	S104	55.4	1.078	0.183	0.8256	
2160 minute winter	Crates	3.000	S106	-3.3	-0.424	-0.012	0.2432	
120 minute summer	S106	1.005	Swale 1c	10.3	0.428	0.020	1.7575	
120 minute summer	S104	1.004	S106	35.2	0.556	0.098	1.8488	
15 minute summer	S114	4.000	Swale 1c	0.0	0.000	0.000	0.2572	
480 minute winter	Swale 1c	1.007	S125 (pump)	3.4	0.351	0.010	2.7521	
1440 minute summer	PP	5.000	S124	0.9	0.160	0.012	0.4330	
1440 minute summer	S124	5.002	S125 (pump)	0.9	0.171	0.001	1.2870	
480 minute winter	S125 (pump)	Pump	Outfall	3.0				
15 minute summer	Outfall	1.009	Ditch	3.0	0.922	0.463	0.0081	71.3

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Results for 30 year Critical Storm Duration. Lowest mass balance: 99.82%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	Basin 1a	12	1.637	0.087	13.5	2.2471	0.0000	OK
15 minute summer	S101	12	1.588	0.138	37.2	0.2812	0.0000	OK
15 minute summer	Basin 1b	12	1.569	0.069	18.3	2.3981	0.0000	OK
15 minute summer	S102	12	1.440	0.670	129.5	3.7121	0.0000	FLOOD RISK
15 minute summer	S103	12	1.348	0.708	297.9	6.8950	0.0000	FLOOD RISK
7200 minute winter	Crates	7260	0.942	0.492	9.4	478.2201	0.0000	OK
15 minute summer	S106	12	1.102	0.652	286.5	1.1528	0.0000	SURCHARGED
15 minute summer	S104	12	1.154	0.654	288.1	1.1560	0.0000	SURCHARGED
960 minute winter	S114	960	1.468	0.418	0.1	0.4727	0.0000	SURCHARGED
960 minute winter	Swale 1c	960	1.468	1.068	33.9	653.8555	0.0000	SURCHARGED
600 minute winter	PP	585	2.234	0.184	10.8	122.6327	0.0000	OK
600 minute winter	S124	585	2.234	0.684	1.7	0.9783	0.0000	SURCHARGED
960 minute winter	S125 (pump)	960	1.468	1.098	3.3	1.9401	0.0000	SURCHARGED
15 minute summer	Outfall	7	1.349	0.049	3.0	0.0552	0.0000	OK
15 minute summer	Ditch	7	1.293	0.043	3.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	Basin 1a	1.000	S101	10.2	0.661	0.325	0.5415	
15 minute summer	S101	1.001	S102	35.6	1.056	0.474	1.0682	
15 minute summer	Basin 1b	2.000	S102	15.6	0.521	0.209	0.8906	
15 minute summer	S102	1.002	S103	121.2	0.765	0.774	8.6724	
15 minute summer	S103	1.003	S104	288.1	1.818	0.950	2.5166	
7200 minute winter	Crates	3.000	S106	-9.4	-0.274	-0.033	1.2358	
15 minute summer	S106	1.005	Swale 1c	218.1	0.909	0.435	2.6478	
15 minute summer	S104	1.004	S106	286.5	1.017	0.800	5.1499	
960 minute winter	S114	4.000	Swale 1c	-0.1	-0.002	0.000	0.5403	
960 minute winter	Swale 1c	1.007	S125 (pump)	3.2	0.354	0.009	3.1838	
600 minute winter	PP	5.000	S124	1.7	0.204	0.024	3.3477	
600 minute winter	S124	5.002	S125 (pump)	1.3	0.015	0.002	1.2908	
960 minute winter	S125 (pump)	Pump	Outfall	3.0				
15 minute summer	Outfall	1.009	Ditch	3.0	0.922	0.463	0.0081	261.2

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Results for 30 year +40% CC Critical Storm Duration. Lowest mass balance: 99.75%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	Basin 1a	13	1.723	0.173	21.9	4.7027	0.0000	OK
15 minute summer	S101	10	1.712	0.262	47.0	0.5321	0.0000	SURCHARGED
15 minute summer	Basin 1b	11	1.584	0.084	25.6	2.9418	0.0000	OK
15 minute summer	S102	10	1.500	0.730	170.6	4.0449	17.9578	FLOOD
15 minute summer	S103	10	1.500	0.860	349.8	8.3712	0.1680	FLOOD
10080 minute winter	Crates	10140	1.217	0.767	3.7	745.8179	0.0000	SURCHARGED
10080 minute winter	S106	10080	1.217	0.767	12.3	1.3549	0.0000	SURCHARGED
15 minute summer	S104	12	1.245	0.745	331.4	1.3169	0.0000	SURCHARGED
1440 minute winter	S114	1440	1.722	0.672	0.1	0.7597	0.0000	SURCHARGED
1440 minute winter	Swale 1c	1440	1.722	1.322	33.4	971.5971	0.0000	SURCHARGED
720 minute winter	PP	705	2.320	0.270	13.0	179.8382	0.0000	OK
720 minute winter	S124	705	2.320	0.770	1.9	1.1012	0.0000	SURCHARGED
1440 minute winter	S125 (pump)	1440	1.722	1.352	3.2	2.3885	0.0000	SURCHARGED
15 minute summer	Outfall	7	1.349	0.049	3.0	0.0552	0.0000	OK
15 minute summer	Ditch	7	1.293	0.043	3.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	Basin 1a	1.000	S101	21.2	0.941	0.675	0.9860	
15 minute summer	S101	1.001	S102	45.2	1.161	0.601	1.2994	
15 minute summer	Basin 1b	2.000	S102	22.6	0.718	0.302	0.9469	
15 minute summer	S102	1.002	S103	117.6	0.803	0.751	8.6724	
15 minute summer	S103	1.003	S104	331.4	2.092	1.092	2.5166	
10080 minute winter	Crates	3.000	S106	12.1	-0.208	0.043	1.4084	
10080 minute winter	S106	1.005	Swale 1c	12.6	0.187	0.025	2.6478	
15 minute summer	S104	1.004	S106	330.5	1.174	0.922	5.1499	
1440 minute winter	S114	4.000	Swale 1c	-0.1	-0.002	0.000	0.5403	
1440 minute winter	Swale 1c	1.007	S125 (pump)	3.2	0.353	0.009	3.1838	
720 minute winter	PP	5.000	S124	1.9	0.194	0.027	4.9382	
720 minute winter	S124	5.002	S125 (pump)	1.4	0.015	0.002	1.6706	
1440 minute winter	S125 (pump)	Pump	Outfall	3.0				
15 minute summer	Outfall	1.009	Ditch	3.0	0.922	0.463	0.0081	261.3

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.69%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	Basin 1a	13	1.830	0.280	33.9	8.1100	0.0000	SURCHARGED
15 minute summer	S101	12	1.808	0.358	53.0	0.7281	0.0000	SURCHARGED
15 minute summer	Basin 1b	12	1.608	0.108	33.4	3.8171	0.0000	OK
10080 minute winter	S102	7080	1.500	0.730	2.3	4.0449	76.9659	FLOOD
8640 minute winter	S103	6180	1.500	0.860	5.9	8.3712	91.8217	FLOOD
1440 minute summer	Crates	1380	1.502	1.052	34.7	779.0641	0.0000	SURCHARGED
1440 minute summer	S106	1380	1.502	1.052	35.1	1.8585	0.0000	SURCHARGED
1440 minute summer	S104	1380	1.501	1.001	35.7	1.7692	0.0000	SURCHARGED
1440 minute winter	S114	1440	1.984	0.934	0.1	1.0561	0.0000	SURCHARGED
1440 minute winter	Swale 1c	1440	1.984	1.584	45.0	1365.2200	0.0000	FLOOD RISK
960 minute summer	PP	675	2.400	0.350	20.5	233.4209	22.4550	FLOOD
480 minute summer	S124	424	2.400	0.850	2.3	1.2163	0.0000	SURCHARGED
1440 minute winter	S125 (pump)	1440	1.984	1.614	3.5	2.8516	0.0000	FLOOD RISK
15 minute summer	Outfall	7	1.349	0.049	3.0	0.0552	0.0000	OK
15 minute summer	Ditch	7	1.293	0.043	3.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	Basin 1a	1.000	S101	33.9	1.148	1.080	1.0810	
15 minute summer	S101	1.001	S102	57.0	1.484	0.758	1.2994	
15 minute summer	Basin 1b	2.000	S102	27.4	0.814	0.367	1.0389	
10080 minute winter	S102	1.002	S103	-2.3	0.294	-0.014	8.6724	
8640 minute winter	S103	1.003	S104	11.4	0.481	0.038	2.5166	
1440 minute summer	Crates	3.000	S106	-34.7	-0.529	-0.123	1.4084	
1440 minute summer	S106	1.005	Swale 1c	2.8	0.228	0.006	2.6478	
1440 minute summer	S104	1.004	S106	35.1	0.422	0.098	5.1499	
1440 minute winter	S114	4.000	Swale 1c	-0.1	-0.002	0.000	0.5403	
1440 minute winter	Swale 1c	1.007	S125 (pump)	3.5	0.341	0.010	3.1838	
960 minute summer	PP	5.000	S124	1.7	0.189	0.024	5.2122	
480 minute summer	S124	5.002	S125 (pump)	1.4	0.015	0.002	2.2947	
1440 minute winter	S125 (pump)	Pump	Outfall	3.0				
15 minute summer	Outfall	1.009	Ditch	3.0	0.922	0.463	0.0081	261.3

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Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	2	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	0.900
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	x
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
S201	0.338	5.00	2.700	1800	524561.389	319960.395	1.360	1.340
S202	0.329	5.00	2.700	1800	524573.777	319987.527	1.410	1.290
S203	0.329	5.00	2.700	1800	524588.378	320018.424	1.470	1.230
S204	0.054	5.00	2.750	1800	524567.166	320057.528	1.600	1.150
S205	0.046	5.00	2.750	1800	524582.924	320092.043	1.640	1.110
Basin 2a	0.000		2.100	1800	524604.495	320101.858	1.000	1.100
S206	0.065	5.00	2.750	1200	524606.796	320044.318	1.450	1.300
S207	0.000		2.300	1200	524826.740	319986.276	1.600	0.700
Basin 2b	0.000		2.100	1800	524841.232	319962.811	2.250	-0.150
S211	0.109	5.00	2.450	1350	524645.141	320047.385	1.220	1.230
S212	0.111	5.00	2.450	1350	524696.068	320024.133	1.460	0.990
S213	0.066	5.00	2.450	1350	524753.363	319997.974	1.720	0.730
S214	0.000		2.500	1350	524766.011	319999.700	1.910	0.590
S215	0.000		2.300	1350	524821.648	319974.297	2.200	0.100
PP	0.700	5.00	2.550	1350	524773.442	319900.430	0.500	2.050
S227	0.000	5.00	2.650	1350	524814.839	319970.541	1.050	1.600
S231	0.209	5.00	2.300	1800	524531.106	319942.965	1.650	0.650
S232	0.472	5.00	1.550	1800	524569.956	319925.227	0.960	0.590
S233	0.293	5.00	1.550	1800	524621.808	319901.553	1.040	0.510
S234	0.251	5.00	1.550	1800	524674.569	319877.464	1.120	0.430
S235	0.018	5.00	2.300	1200	524667.628	319818.682	1.450	0.850
S236	0.010	5.00	2.400	1200	524684.547	319834.705	1.650	0.750
S237	0.093	5.00	2.450	1200	524649.855	319826.904	1.100	1.350
S238	0.052	5.00	2.250	1350	524673.066	319846.829	1.570	0.680
S239	0.087	5.00	2.550	1800	524688.214	319871.234	2.240	0.310
S240	0.067	5.00	2.600	1800	524714.823	319877.215	2.330	0.270
S241	0.139	5.00	2.300	1350	524548.186	319987.318	1.700	0.600
S242	0.077	5.00	2.300	1350	524562.750	320019.217	1.790	0.510
S243	0.067	5.00	2.450	1500	524571.692	320040.023	1.990	0.460
S244	0.318	5.00	2.300	1800	524617.184	320019.651	1.950	0.350
S247	0.270	5.00	2.300	1800	524682.029	319990.045	2.060	0.240
S248	0.000		2.550	1800	524751.795	319958.192	2.410	0.140
Crates	0.309	5.00	2.650	1500	524643.762	320039.378	1.900	0.750
S251	0.000	5.00	2.650	1800	524761.832	319980.174	1.900	0.750
S252	0.000		2.650	1800	524758.080	319971.958	2.630	0.020
S253			2.300	1800	524832.770	319963.236	2.400	-0.100
S299 (Pump)	0.000		2.200	1350	524805.783	319925.318	2.370	-0.170
Outfall	0.000	5.00	2.200	1200	524799.605	319917.534	0.900	1.300
Ditch			2.200	1200	524805.855	319911.990	0.950	1.250

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Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	S201	S202	29.826	0.600	1.340	1.290	0.050	600.0	750	5.44	50.0
1.001	S202	S203	34.173	0.600	1.290	1.230	0.060	569.6	750	5.93	50.0
1.002	S203	S204	44.487	0.600	1.230	1.150	0.080	556.1	750	6.56	48.1
1.003	S204	S205	37.942	0.600	1.150	1.110	0.040	948.6	825	7.22	45.9
1.004	S205	Basin 2a	5.700	0.600	1.110	1.100	0.010	570.0	825	7.29	45.7
2.000	S206	Basin 2a	37.240	0.600	1.300	1.100	0.200	186.2	225	5.65	50.0
3.000	S211	S212	55.984	0.600	1.230	0.990	0.240	233.3	375	5.79	50.0
3.001	S212	S213	62.984	0.600	0.990	0.730	0.260	242.2	375	6.69	47.6
3.002	S213	S214	12.765	0.600	0.730	0.590	0.140	91.2	375	6.81	47.2
3.003	S214	S215	61.162	0.600	0.590	0.100	0.490	124.8	375	7.44	45.2
3.004	S215	Basin 2b	5.655	0.600	0.250	-0.070	0.320	17.7	375	7.46	45.2
4.000	S231	S232	42.708	0.600	0.650	0.590	0.060	711.8	750	5.68	50.0
4.001	S232	S233	57.001	0.600	0.590	0.510	0.080	712.5	750	6.60	48.0
4.002	S233	S234	58.000	0.600	0.510	0.430	0.080	725.0	750	7.53	44.9
4.003	S234	S239	15.000	0.600	0.430	0.310	0.120	125.0	750	7.63	44.6
5.000	S235	S236	23.302	0.600	0.850	0.750	0.100	233.0	300	5.38	50.0
6.000	S237	S238	30.590	0.600	1.350	0.680	0.670	45.7	300	5.22	50.0
5.001	S236	S238	16.697	0.600	0.750	0.680	0.070	240.0	300	5.65	50.0
5.002	S238	S239	28.724	0.600	0.680	0.310	0.370	77.6	375	5.89	50.0
4.004	S239	S240	27.273	0.600	0.310	0.270	0.040	681.8	750	8.06	43.4
4.005	S240	S248	89.018	0.600	0.270	0.140	0.130	684.8	750	9.46	39.8
7.000	S241	S242	35.066	0.600	0.600	0.510	0.090	389.6	450	5.57	50.0
7.001	S242	S243	22.646	0.600	0.510	0.460	0.050	452.9	450	5.97	50.0
7.002	S243	S244	49.845	0.600	0.460	0.350	0.110	453.1	525	6.76	47.4

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.135	501.4	61.1	0.610	0.660	0.338	0.0	175	0.780
1.001	1.165	514.7	120.5	0.660	0.720	0.667	0.0	246	0.960
1.002	1.179	521.0	173.2	0.720	0.850	0.996	0.0	297	1.066
1.003	0.955	510.7	174.2	0.775	0.815	1.050	0.0	331	0.868
1.004	1.236	660.8	180.9	0.815	0.175	1.096	0.0	294	1.062
2.000	0.955	38.0	11.7	1.225	0.775	0.065	0.0	86	0.843
3.000	1.182	130.5	19.7	0.845	1.085	0.109	0.0	98	0.859
3.001	1.159	128.1	37.9	1.085	1.345	0.220	0.0	140	1.015
3.002	1.898	209.6	48.8	1.345	1.535	0.286	0.0	123	1.558
3.003	1.620	178.9	46.8	1.535	1.825	0.286	0.0	130	1.370
3.004	4.327	477.9	46.7	1.675	1.795	0.286	0.0	79	2.794
4.000	1.041	459.9	37.8	0.900	0.210	0.209	0.0	143	0.639
4.001	1.040	459.6	118.1	0.210	0.290	0.681	0.0	258	0.878
4.002	1.031	455.6	158.2	0.290	0.370	0.974	0.0	304	0.942
4.003	2.501	1105.1	197.6	0.370	1.490	1.225	0.0	213	1.916
5.000	1.025	72.5	3.3	1.150	1.350	0.018	0.0	43	0.523
6.000	2.333	164.9	16.8	0.800	1.270	0.093	0.0	64	1.516
5.001	1.010	71.4	5.1	1.350	1.270	0.028	0.0	54	0.588
5.002	2.058	227.3	31.3	1.195	1.865	0.173	0.0	93	1.461
4.004	1.064	470.0	232.7	1.490	1.580	1.485	0.0	372	1.061
4.005	1.062	469.0	223.4	1.580	1.660	1.552	0.0	364	1.049
7.000	1.024	162.8	25.1	1.250	1.340	0.139	0.0	119	0.751
7.001	0.949	150.9	39.0	1.340	1.540	0.216	0.0	155	0.800
7.002	1.045	226.3	48.5	1.465	1.425	0.283	0.0	164	0.838

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Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
7.003	S244	S247	71.284	0.600	0.350	0.240	0.110	648.0	825	7.79	44.2
7.004	S247	S248	76.694	0.600	0.240	0.140	0.100	766.9	825	8.99	40.9
4.006	S248	S252	15.133	0.600	0.140	0.020	0.120	126.1	825	9.55	39.6
8.000	Crates	S251	132.082	0.600	0.750	0.750	0.000	0.0	300	7.20	11.5
8.001	S251	S252	9.032	0.600	0.750	0.020	0.730	12.4	750	7.22	45.9
4.007	S252	S253	56.800	0.600	0.020	-0.100	0.120	473.3	825	10.25	38.1
4.008	S253	Basin 2b	8.473	0.600	-0.100	-0.130	0.030	282.4	825	10.33	37.9
9.000	PP	S227	81.420	0.600	2.050	2.050	0.000	0.0	375	6.36	25.8
9.001	S227	Basin 2b	9.390	0.600	1.600	-0.080	1.680	5.6	150	6.39	48.7
1.005	Basin 2a	S207	63.600	0.600	1.100	0.700	0.400	159.0	300	8.15	43.1
1.006	S207	Basin 2b	8.300	0.600	0.700	-0.050	0.750	11.1	300	8.18	43.1
1.007	Basin 2b	S299 (Pump)	6.534	0.600	-0.150	-0.170	0.020	326.7	150	10.53	37.5
1.008	S299 (Pump)	Outfall	7.188	0.600	-0.170	1.300	-1.470	-4.9	90	30.00	11.5
1.009	Outfall	Ditch	6.397	0.600	1.300	1.250	0.050	127.9	150	30.00	19.4

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
7.003	1.159	619.3	95.9	1.125	1.235	0.601	0.0	217	0.852
7.004	1.064	568.7	128.8	1.235	1.585	0.871	0.0	265	0.869
4.006	2.642	1412.4	346.8	1.585	1.805	2.423	0.0	277	2.206
8.000	1.000	70.7	12.8	1.600	1.600	0.309	0.0	300	0.000
8.001	7.979	3525.1	51.2	1.150	1.880	0.309	0.0	62	2.986
4.007	1.358	725.7	375.9	1.805	1.575	2.732	0.0	421	1.369
4.008	1.761	941.5	374.3	1.575	1.405	2.732	0.0	361	1.665
9.000	1.000	110.4	65.3	0.125	0.225	0.700	0.0	375	0.000
9.001	4.291	75.8	123.2	0.900	2.030	0.700	0.0	150	4.370
1.005	1.244	87.9	181.0	0.700	1.300	1.161	0.0	300	1.260
1.006	4.751	335.8	180.7	1.300	1.850	1.161	0.0	157	4.835
1.007	0.550	9.7	661.4	2.100	2.220	4.879	0.0	150	0.561
1.008	0.004	0.0	202.8	2.280	0.810	4.879	0.0	90	0.000
1.009	0.887	15.7	342.1	0.750	0.800	4.879	0.0	150	0.903

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	29.826	600.0	750	Circular	2.700	1.340	0.610	2.700	1.290	0.660
1.001	34.173	569.6	750	Circular	2.700	1.290	0.660	2.700	1.230	0.720
1.002	44.487	556.1	750	Circular	2.700	1.230	0.720	2.750	1.150	0.850
1.003	37.942	948.6	825	Circular	2.750	1.150	0.775	2.750	1.110	0.815
1.004	5.700	570.0	825	Circular	2.750	1.110	0.815	2.100	1.100	0.175
2.000	37.240	186.2	225	Circular	2.750	1.300	1.225	2.100	1.100	0.775

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	S201	1800	Manhole	Adoptable	S202	1800	Manhole	Adoptable
1.001	S202	1800	Manhole	Adoptable	S203	1800	Manhole	Adoptable
1.002	S203	1800	Manhole	Adoptable	S204	1800	Manhole	Adoptable
1.003	S204	1800	Manhole	Adoptable	S205	1800	Manhole	Adoptable
1.004	S205	1800	Manhole	Adoptable	Basin 2a	1800	Manhole	Adoptable
2.000	S206	1200	Manhole	Adoptable	Basin 2a	1800	Manhole	Adoptable

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Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
3.000	55.984	233.3	375	Circular	2.450	1.230	0.845	2.450	0.990	1.085
3.001	62.984	242.2	375	Circular	2.450	0.990	1.085	2.450	0.730	1.345
3.002	12.765	91.2	375	Circular	2.450	0.730	1.345	2.500	0.590	1.535
3.003	61.162	124.8	375	Circular	2.500	0.590	1.535	2.300	0.100	1.825
3.004	5.655	17.7	375	Circular	2.300	0.250	1.675	2.100	-0.070	1.795
4.000	42.708	711.8	750	Circular	2.300	0.650	0.900	1.550	0.590	0.210
4.001	57.001	712.5	750	Circular	1.550	0.590	0.210	1.550	0.510	0.290
4.002	58.000	725.0	750	Circular	1.550	0.510	0.290	1.550	0.430	0.370
4.003	15.000	125.0	750	Circular	1.550	0.430	0.370	2.550	0.310	1.490
5.000	23.302	233.0	300	Circular	2.300	0.850	1.150	2.400	0.750	1.350
6.000	30.590	45.7	300	Circular	2.450	1.350	0.800	2.250	0.680	1.270
5.001	16.697	240.0	300	Circular	2.400	0.750	1.350	2.250	0.680	1.270
5.002	28.724	77.6	375	Circular	2.250	0.680	1.195	2.550	0.310	1.865
4.004	27.273	681.8	750	Circular	2.550	0.310	1.490	2.600	0.270	1.580
4.005	89.018	684.8	750	Circular	2.600	0.270	1.580	2.550	0.140	1.660
7.000	35.066	389.6	450	Circular	2.300	0.600	1.250	2.300	0.510	1.340
7.001	22.646	452.9	450	Circular	2.300	0.510	1.340	2.450	0.460	1.540
7.002	49.845	453.1	525	Circular	2.450	0.460	1.465	2.300	0.350	1.425
7.003	71.284	648.0	825	Circular	2.300	0.350	1.125	2.300	0.240	1.235
7.004	76.694	766.9	825	Circular	2.300	0.240	1.235	2.550	0.140	1.585
4.006	15.133	126.1	825	Circular	2.550	0.140	1.585	2.650	0.020	1.805
8.000	132.082	0.0	300	Circular	2.650	0.750	1.600	2.650	0.750	1.600
8.001	9.032	12.4	750	Circular	2.650	0.750	1.150	2.650	0.020	1.880
4.007	56.800	473.3	825	Circular	2.650	0.020	1.805	2.300	-0.100	1.575
4.008	8.473	282.4	825	Circular	2.300	-0.100	1.575	2.100	-0.130	1.405

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
3.000	S211	1350	Manhole	Adoptable	S212	1350	Manhole	Adoptable
3.001	S212	1350	Manhole	Adoptable	S213	1350	Manhole	Adoptable
3.002	S213	1350	Manhole	Adoptable	S214	1350	Manhole	Adoptable
3.003	S214	1350	Manhole	Adoptable	S215	1350	Manhole	Adoptable
3.004	S215	1350	Manhole	Adoptable	Basin 2b	1800	Manhole	Adoptable
4.000	S231	1800	Manhole	Adoptable	S232	1800	Manhole	Adoptable
4.001	S232	1800	Manhole	Adoptable	S233	1800	Manhole	Adoptable
4.002	S233	1800	Manhole	Adoptable	S234	1800	Manhole	Adoptable
4.003	S234	1800	Manhole	Adoptable	S239	1800	Manhole	Adoptable
5.000	S235	1200	Manhole	Adoptable	S236	1200	Manhole	Adoptable
6.000	S237	1200	Manhole	Adoptable	S238	1350	Manhole	Adoptable
5.001	S236	1200	Manhole	Adoptable	S238	1350	Manhole	Adoptable
5.002	S238	1350	Manhole	Adoptable	S239	1800	Manhole	Adoptable
4.004	S239	1800	Manhole	Adoptable	S240	1800	Manhole	Adoptable
4.005	S240	1800	Manhole	Adoptable	S248	1800	Manhole	Adoptable
7.000	S241	1350	Manhole	Adoptable	S242	1350	Manhole	Adoptable
7.001	S242	1350	Manhole	Adoptable	S243	1500	Manhole	Adoptable
7.002	S243	1500	Manhole	Adoptable	S244	1800	Manhole	Adoptable
7.003	S244	1800	Manhole	Adoptable	S247	1800	Manhole	Adoptable
7.004	S247	1800	Manhole	Adoptable	S248	1800	Manhole	Adoptable
4.006	S248	1800	Manhole	Adoptable	S252	1800	Manhole	Adoptable
8.000	Crates	1500	Manhole	Adoptable	S251	1800	Manhole	Adoptable
8.001	S251	1800	Manhole	Adoptable	S252	1800	Manhole	Adoptable
4.007	S252	1800	Manhole	Adoptable	S253	1800	Manhole	Adoptable
4.008	S253	1800	Manhole	Adoptable	Basin 2b	1800	Manhole	Adoptable

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Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
9.000	81.420	0.0	375	Circular	2.550	2.050	0.125	2.650	2.050	0.225
9.001	9.390	5.6	150	Circular	2.650	1.600	0.900	2.100	-0.080	2.030
1.005	63.600	159.0	300	Circular	2.100	1.100	0.700	2.300	0.700	1.300
1.006	8.300	11.1	300	Circular	2.300	0.700	1.300	2.100	-0.050	1.850
1.007	6.534	326.7	150	Circular	2.100	-0.150	2.100	2.200	-0.170	2.220
1.008	7.188	-4.9	90	Circular	2.200	-0.170	2.280	2.200	1.300	0.810
1.009	6.397	127.9	150	Circular	2.200	1.300	0.750	2.200	1.250	0.800

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
9.000	PP	1350	Manhole	Adoptable	S227	1350	Manhole	Adoptable
9.001	S227	1350	Manhole	Adoptable	Basin 2b	1800	Manhole	Adoptable
1.005	Basin 2a	1800	Manhole	Adoptable	S207	1200	Manhole	Adoptable
1.006	S207	1200	Manhole	Adoptable	Basin 2b	1800	Manhole	Adoptable
1.007	Basin 2b	1800	Manhole	Adoptable	S299 (Pump)	1350	Manhole	Adoptable
1.008	S299 (Pump)	1350	Manhole	Adoptable	Outfall	1200	Manhole	Adoptable
1.009	Outfall	1200	Manhole	Adoptable	Ditch	1200	Manhole	Adoptable

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	1.000	Drain Down Time (mins)	240	Check Discharge Volume	x
Winter CV	1.000	Additional Storage (m³/ha)	20.0		

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
30	0	0	0
30	40	0	0
100	40	0	0

Node S299 (Pump) Online Pump Control

Flap Valve	x	Design Depth (m)	1.750	Switch off depth (m)	0.000
Replaces Downstream Link	✓	Design Flow (l/s)	3.4		
Invert Level (m)	-0.170	Switch on depth (m)	0.050		

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.050	3.400	1.750	3.400

Node S227 Online Orifice Control

Flap Valve	x	Design Depth (m)	1.000	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	2.2		
Invert Level (m)	1.600	Diameter (m)	0.032		

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Node S253 Online Orifice Control

Flap Valve	✓	Design Depth (m)	1.000	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	1050.0		
Invert Level (m)	-0.100	Diameter (m)	0.807		

Node Basin 2a Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	1.100
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	660.0	0.0	1.000	1994.0	0.0	1.001	1994.0	0.0

Node Basin 2b Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	-0.150
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	83.7	0.0	0.201	886.0	0.0	2.051	1629.0	0.0
0.200	83.7	0.0	2.050	1629.0	0.0			

Node PP Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	2.050
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	6297.0	0.0	0.500	6297.0	0.0	0.501	0.0	0.0

Node Crates Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	0.750
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	3500.0	0.0	0.800	3500.0	0.0	0.801	0.0	0.0

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Results for 1 year Critical Storm Duration. Lowest mass balance: 99.56%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S201	13	1.505	0.165	35.0	1.2407	0.0000	OK
15 minute summer	S202	13	1.509	0.219	65.4	1.5819	0.0000	OK
15 minute summer	S203	12	1.506	0.276	95.1	1.9407	0.0000	OK
15 minute summer	S204	12	1.502	0.352	85.5	1.1320	0.0000	OK
15 minute summer	S205	12	1.497	0.387	105.7	1.2024	0.0000	OK
240 minute summer	Basin 2a	148	1.215	0.115	45.3	85.1704	0.0000	OK
15 minute summer	S206	10	1.446	0.146	6.8	0.2971	0.0000	OK
240 minute summer	S207	148	0.753	0.053	23.1	0.0600	0.0000	OK
10080 minute summer	Basin 2b	6720	0.632	0.782	28.6	602.0208	0.0000	SURCHARGED
15 minute summer	S211	11	1.302	0.072	11.3	0.2330	0.0000	OK
15 minute summer	S212	11	1.095	0.105	22.2	0.3104	0.0000	OK
15 minute summer	S213	11	0.827	0.097	27.9	0.2141	0.0000	OK
15 minute summer	S214	12	0.688	0.098	27.3	0.1398	0.0000	OK
10080 minute summer	S215	6720	0.632	0.532	1.1	0.7615	0.0000	SURCHARGED
5760 minute summer	PP	3360	2.119	0.069	2.9	132.4949	0.0000	OK
5760 minute summer	S227	3360	2.106	0.506	1.6	0.7247	0.0000	SURCHARGED
15 minute summer	S231	11	0.786	0.136	21.7	0.6904	0.0000	OK
15 minute summer	S232	12	0.779	0.189	65.9	2.3429	0.0000	OK
15 minute summer	S233	12	0.732	0.222	89.2	1.8140	0.0000	OK
10080 minute summer	S234	6660	0.625	0.195	4.3	1.3717	0.0000	OK
15 minute summer	S235	11	0.883	0.033	1.9	0.0451	0.0000	OK
15 minute summer	S236	11	0.790	0.040	2.8	0.0503	0.0000	OK
15 minute summer	S237	10	1.399	0.049	9.7	0.1375	0.0000	OK
15 minute summer	S238	11	0.750	0.070	17.6	0.1456	0.0000	OK
10080 minute summer	S239	6660	0.624	0.314	7.2	1.0444	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S201	1.000	S202	32.7	0.449	0.065	2.6658	
15 minute summer	S202	1.001	S203	62.5	0.638	0.121	4.3029	
15 minute summer	S203	1.002	S204	80.5	0.749	0.154	7.7801	
15 minute summer	S204	1.003	S205	103.3	0.817	0.202	8.7639	
15 minute summer	S205	1.004	Basin 2a	128.9	2.127	0.195	0.7038	
240 minute summer	Basin 2a	1.005	S207	23.1	1.433	0.263	1.0580	
15 minute summer	S206	2.000	Basin 2a	10.3	1.282	0.272	0.5115	
240 minute summer	S207	1.006	Basin 2b	23.1	0.630	0.069	0.3270	
10080 minute summer	Basin 2b	1.007	S299 (Pump)	3.4	0.590	0.354	0.1150	
15 minute summer	S211	3.000	S212	10.9	0.562	0.084	1.1232	
15 minute summer	S212	3.001	S213	21.4	0.893	0.167	1.5094	
15 minute summer	S213	3.002	S214	27.3	1.218	0.130	0.2898	
15 minute summer	S214	3.003	S215	27.3	0.662	0.153	2.7219	
10080 minute summer	S215	3.004	Basin 2b	1.8	0.613	0.004	0.6237	
5760 minute summer	PP	9.000	S227	1.6	0.182	0.014	0.9880	
5760 minute summer	S227	9.001	Basin 2b	1.5	0.604	0.020	0.0868	
15 minute summer	S231	4.000	S232	19.1	0.304	0.041	3.0092	
15 minute summer	S232	4.001	S233	61.1	0.628	0.133	5.5806	
15 minute summer	S233	4.002	S234	86.1	0.901	0.189	5.5527	
10080 minute summer	S234	4.003	S239	6.9	0.385	0.006	1.9947	
15 minute summer	S235	5.000	S236	1.8	0.386	0.025	0.1134	
15 minute summer	S236	5.001	S238	2.8	0.319	0.039	0.1498	
15 minute summer	S237	6.000	S238	9.5	0.987	0.058	0.3003	
15 minute summer	S238	5.002	S239	17.5	0.447	0.077	1.4537	
10080 minute summer	S239	4.004	S240	6.5	0.341	0.014	5.1942	

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Results for 1 year Critical Storm Duration. Lowest mass balance: 99.56%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
10080 minute summer	S240	6900	0.626	0.356	7.0	1.1111	0.0000	OK
15 minute summer	S241	11	0.688	0.088	14.4	0.2689	0.0000	OK
15 minute summer	S242	11	0.630	0.120	21.9	0.2744	0.0000	OK
10080 minute summer	S243	6780	0.626	0.166	6.6	0.4048	0.0000	OK
10080 minute summer	S244	6900	0.625	0.275	13.1	1.5994	0.0000	OK
10080 minute summer	S247	6660	0.625	0.385	7.0	1.9906	0.0000	OK
10080 minute summer	S248	6900	0.626	0.486	22.6	1.2364	0.0000	OK
10080 minute winter	Crates	7620	0.784	0.034	0.6	112.3087	0.0000	OK
10080 minute winter	S251	7620	0.753	0.003	0.1	0.0088	0.0000	OK
10080 minute summer	S252	6720	0.625	0.605	24.3	1.5397	0.0000	OK
10080 minute summer	S253	6840	0.626	0.726	12.9	1.8480	0.0000	OK
10080 minute summer	S299 (Pump)	6720	0.629	0.799	3.4	1.1429	0.0000	SURCHARGED
30 minute summer	Outfall	17	1.350	0.050	3.4	0.0568	0.0000	OK
30 minute summer	Ditch	17	1.297	0.047	3.4	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
10080 minute summer	S240	4.005	S248	6.4	0.341	0.014	22.5971	
15 minute summer	S241	7.000	S242	14.0	0.518	0.086	0.9720	
15 minute summer	S242	7.001	S243	21.6	0.641	0.143	0.7660	
10080 minute summer	S243	7.002	S244	-6.5	0.194	-0.029	4.2946	
10080 minute summer	S244	7.003	S247	-6.9	0.226	-0.011	14.2129	
10080 minute summer	S247	7.004	S248	7.4	0.251	0.013	21.8689	
10080 minute summer	S248	4.006	S252	24.2	0.442	0.017	5.6338	
10080 minute winter	Crates	8.000	S251	0.1	0.068	0.002	0.2949	
10080 minute winter	S251	8.001	S252	0.1	0.002	0.000	1.5840	
10080 minute summer	S252	4.007	S253	12.9	0.332	0.018	25.9717	
10080 minute summer	S253	4.008	Basin 2b	25.4	0.399	0.027	4.2994	
10080 minute summer	S299 (Pump)	Pump	Outfall	3.4				
30 minute summer	Outfall	1.009	Ditch	3.4	0.685	0.217	0.0318	51.8

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Results for 30 year Critical Storm Duration. Lowest mass balance: 99.74%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S201	10	2.067	0.727	181.9	5.4628	0.0000	OK
15 minute summer	S202	10	2.028	0.738	361.5	5.3237	0.0000	OK
15 minute summer	S203	10	1.958	0.728	543.2	5.1082	0.0000	OK
15 minute summer	S204	10	1.835	0.685	588.5	2.2061	0.0000	OK
15 minute summer	S205	9	1.777	0.667	649.2	2.0704	0.0000	OK
60 minute summer	Basin 2a	46	1.414	0.314	418.3	274.2655	0.0000	SURCHARGED
15 minute winter	S206	8	1.632	0.332	32.8	0.6731	0.0000	SURCHARGED
720 minute summer	S207	735	1.301	0.601	61.0	0.6799	0.0000	SURCHARGED
720 minute summer	Basin 2b	735	1.301	1.451	156.4	1442.5590	0.0000	SURCHARGED
15 minute summer	S211	10	1.401	0.171	58.7	0.5502	0.0000	OK
720 minute summer	S212	735	1.301	0.311	12.5	0.9184	0.0000	OK
720 minute summer	S213	735	1.301	0.571	19.9	1.2559	0.0000	SURCHARGED
720 minute summer	S214	735	1.301	0.711	16.5	1.0176	0.0000	SURCHARGED
720 minute summer	S215	735	1.301	1.201	17.9	1.7188	0.0000	SURCHARGED
960 minute winter	PP	945	2.266	0.216	21.0	414.2881	0.0000	OK
960 minute winter	S227	945	2.266	0.666	2.1	0.9527	0.0000	SURCHARGED
15 minute summer	S231	13	1.370	0.720	112.4	3.6582	0.0000	OK
15 minute summer	S232	12	1.328	0.738	338.8	9.1323	0.0000	OK
15 minute summer	S233	13	1.331	0.821	434.6	6.7164	0.0000	FLOOD RISK
15 minute summer	S234	13	1.275	0.845	502.8	5.9410	0.0000	FLOOD RISK
15 minute summer	S235	12	1.298	0.448	12.8	0.6174	0.0000	SURCHARGED
15 minute summer	S236	12	1.284	0.534	16.3	0.6687	0.0000	SURCHARGED
15 minute summer	S237	10	1.462	0.112	50.1	0.3160	0.0000	OK
15 minute summer	S238	12	1.277	0.597	93.7	1.2498	0.0000	SURCHARGED
15 minute summer	S239	12	1.238	0.928	553.1	3.0819	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S201	1.000	S202	192.4	0.488	0.384	13.0483	
15 minute summer	S202	1.001	S203	374.0	0.874	0.727	14.9523	
15 minute summer	S203	1.002	S204	560.8	1.353	1.076	19.0895	
15 minute summer	S204	1.003	S205	625.6	1.531	1.225	17.6406	
15 minute summer	S205	1.004	Basin 2a	681.6	3.483	1.031	1.3293	
60 minute summer	Basin 2a	1.005	S207	92.8	1.862	1.055	4.4023	
15 minute winter	S206	2.000	Basin 2a	37.6	1.585	0.990	1.0682	
720 minute summer	S207	1.006	Basin 2b	60.4	0.874	0.180	0.5845	
720 minute summer	Basin 2b	1.007	S299 (Pump)	3.6	0.269	0.373	0.1150	
15 minute summer	S211	3.000	S212	57.4	0.836	0.440	3.9166	
720 minute summer	S212	3.001	S213	12.5	0.795	0.098	6.5523	
720 minute summer	S213	3.002	S214	16.5	0.969	0.079	1.4079	
720 minute summer	S214	3.003	S215	17.9	0.165	0.100	6.7460	
720 minute summer	S215	3.004	Basin 2b	18.3	0.832	0.038	0.6237	
960 minute winter	PP	9.000	S227	2.1	0.193	0.019	5.3450	
960 minute winter	S227	9.001	Basin 2b	1.7	0.156	0.023	0.0872	
15 minute summer	S231	4.000	S232	86.8	0.336	0.189	18.6089	
15 minute summer	S232	4.001	S233	282.3	0.836	0.614	25.0328	
15 minute summer	S233	4.002	S234	373.8	1.008	0.820	25.5270	
15 minute summer	S234	4.003	S239	448.6	1.142	0.406	6.6018	
15 minute summer	S235	5.000	S236	11.1	0.581	0.153	1.6409	
15 minute summer	S236	5.001	S238	18.8	0.429	0.264	1.1758	
15 minute summer	S237	6.000	S238	49.7	1.506	0.302	1.4436	
15 minute summer	S238	5.002	S239	76.9	0.697	0.338	3.1682	
15 minute summer	S239	4.004	S240	540.5	1.252	1.150	12.0034	

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Results for 30 year Critical Storm Duration. Lowest mass balance: 99.74%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
360 minute winter	S240	272	1.216	0.946	90.8	2.9511	0.0000	SURCHARGED
480 minute winter	S241	328	1.224	0.624	7.4	1.9141	0.0000	SURCHARGED
480 minute winter	S242	328	1.222	0.712	11.8	1.6314	0.0000	SURCHARGED
480 minute winter	S243	344	1.219	0.759	15.2	1.8520	0.0000	SURCHARGED
480 minute winter	S244	344	1.222	0.872	30.2	5.0616	0.0000	SURCHARGED
600 minute winter	S247	420	1.219	0.979	44.8	5.0553	0.0000	SURCHARGED
600 minute winter	S248	420	1.217	1.077	89.5	2.7398	0.0000	SURCHARGED
7200 minute winter	Crates	7080	1.147	0.397	14.7	1320.9670	0.0000	SURCHARGED
360 minute winter	S251	272	1.216	0.466	43.2	1.1848	0.0000	OK
600 minute winter	S252	420	1.216	1.196	132.0	3.0447	0.0000	SURCHARGED
360 minute winter	S253	272	1.217	1.317	105.8	3.3514	0.0000	SURCHARGED
720 minute summer	S299 (Pump)	735	1.298	1.468	3.6	2.1002	0.0000	SURCHARGED
60 minute summer	Outfall	12	1.350	0.050	3.4	0.0569	0.0000	OK
60 minute winter	Ditch	13	1.297	0.047	3.4	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
360 minute winter	S240	4.005	S248	84.2	0.727	0.180	39.1787	
480 minute winter	S241	7.000	S242	8.4	0.407	0.051	5.5560	
480 minute winter	S242	7.001	S243	12.5	0.491	0.083	3.5881	
480 minute winter	S243	7.002	S244	15.6	0.415	0.069	10.7682	
480 minute winter	S244	7.003	S247	27.0	0.434	0.044	38.0039	
600 minute winter	S247	7.004	S248	50.4	0.411	0.089	40.8881	
600 minute winter	S248	4.006	S252	132.0	0.760	0.093	8.0679	
7200 minute winter	Crates	8.000	S251	-13.1	-0.406	-0.186	9.3011	
360 minute winter	S251	8.001	S252	-43.2	-0.107	-0.012	3.2843	
600 minute winter	S252	4.007	S253	73.8	0.531	0.102	30.2820	
360 minute winter	S253	4.008	Basin 2b	114.7	0.732	0.122	4.5172	
720 minute summer	S299 (Pump)	Pump	Outfall	3.4				
60 minute summer	Outfall	1.009	Ditch	3.4	0.685	0.217	0.0318	58.9

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Results for 30 year +40% CC Critical Storm Duration. Lowest mass balance: 99.74%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S201	9	2.399	1.059	254.6	7.9588	0.0000	SURCHARGED
15 minute summer	S202	10	2.350	1.060	521.5	7.6430	0.0000	SURCHARGED
15 minute summer	S203	10	2.252	1.022	773.2	7.1755	0.0000	SURCHARGED
15 minute summer	S204	10	1.989	0.839	822.6	2.7022	0.0000	SURCHARGED
15 minute summer	S205	9	1.838	0.728	863.4	2.2605	0.0000	OK
720 minute summer	Basin 2a	735	1.556	0.456	91.3	440.2918	0.0000	SURCHARGED
15 minute winter	S206	7	1.703	0.403	46.0	0.8175	0.0000	SURCHARGED
720 minute summer	S207	735	1.556	0.856	68.4	0.9678	0.0000	SURCHARGED
720 minute summer	Basin 2b	735	1.556	1.706	209.2	1809.6880	0.0000	SURCHARGED
15 minute summer	S211	12	1.581	0.351	82.1	1.1311	0.0000	OK
720 minute summer	S212	735	1.556	0.566	17.5	1.6696	0.0000	SURCHARGED
720 minute summer	S213	735	1.556	0.826	22.4	1.8156	0.0000	SURCHARGED
720 minute summer	S214	735	1.556	0.966	33.2	1.3819	0.0000	SURCHARGED
720 minute summer	S215	735	1.556	1.456	19.2	2.0831	0.0000	SURCHARGED
1440 minute winter	PP	1410	2.362	0.312	20.6	599.0516	0.0000	OK
1440 minute winter	S227	1410	2.362	0.762	2.1	1.0907	0.0000	FLOOD RISK
15 minute winter	S231	11	1.717	1.067	147.8	5.4198	0.0000	SURCHARGED
15 minute summer	S232	10	1.550	0.960	574.8	11.8829	62.4676	FLOOD
15 minute summer	S233	11	1.550	1.040	530.5	8.5062	20.2835	FLOOD
30 minute summer	S234	18	1.550	1.120	515.7	7.8702	10.7609	FLOOD
30 minute summer	S235	19	1.684	0.834	19.8	1.1497	0.0000	SURCHARGED
30 minute summer	S236	19	1.690	0.940	20.3	1.1772	0.0000	SURCHARGED
15 minute summer	S237	11	1.831	0.481	70.1	1.3574	0.0000	SURCHARGED
15 minute summer	S238	11	1.670	0.990	115.2	2.0728	0.0000	SURCHARGED
30 minute summer	S239	19	1.552	1.242	572.5	4.1242	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S201	1.000	S202	273.7	0.622	0.546	13.1270	
15 minute summer	S202	1.001	S203	525.4	1.194	1.021	15.0402	
15 minute summer	S203	1.002	S204	781.9	1.777	1.501	19.5797	
15 minute summer	S204	1.003	S205	828.7	1.783	1.623	19.4764	
15 minute summer	S205	1.004	Basin 2a	902.6	3.600	1.366	1.4757	
720 minute summer	Basin 2a	1.005	S207	68.4	1.673	0.778	4.4787	
15 minute winter	S206	2.000	Basin 2a	46.9	1.545	1.235	1.4751	
720 minute summer	S207	1.006	Basin 2b	67.7	0.961	0.201	0.5845	
720 minute summer	Basin 2b	1.007	S299 (Pump)	3.6	0.357	0.374	0.1150	
15 minute summer	S211	3.000	S212	72.8	0.884	0.557	6.0930	
720 minute summer	S212	3.001	S213	17.2	0.787	0.134	6.9470	
720 minute summer	S213	3.002	S214	33.2	0.925	0.159	1.4079	
720 minute summer	S214	3.003	S215	19.2	0.174	0.107	6.7460	
720 minute summer	S215	3.004	Basin 2b	18.7	0.236	0.039	0.6237	
1440 minute winter	PP	9.000	S227	2.1	0.181	0.019	7.9853	
1440 minute winter	S227	9.001	Basin 2b	1.8	0.166	0.024	0.0874	
15 minute winter	S231	4.000	S232	190.3	0.432	0.414	18.7967	
15 minute summer	S232	4.001	S233	320.5	0.840	0.697	25.0873	
15 minute summer	S233	4.002	S234	401.5	1.019	0.881	25.5270	
30 minute summer	S234	4.003	S239	441.1	1.107	0.399	6.6018	
30 minute summer	S235	5.000	S236	14.2	0.549	0.196	1.6409	
30 minute summer	S236	5.001	S238	20.7	0.427	0.289	1.1758	
15 minute summer	S237	6.000	S238	66.3	1.574	0.402	2.1541	
15 minute summer	S238	5.002	S239	115.4	1.046	0.508	3.1682	
30 minute summer	S239	4.004	S240	557.9	1.268	1.187	12.0034	

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Results for 30 year +40% CC Critical Storm Duration. Lowest mass balance: 99.74%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	S240	19	1.527	1.257	602.9	3.9217	0.0000	SURCHARGED
30 minute summer	S241	19	1.873	1.273	93.5	3.9046	0.0000	SURCHARGED
15 minute summer	S242	12	1.872	1.362	155.0	3.1216	0.0000	SURCHARGED
15 minute summer	S243	12	1.817	1.357	188.9	3.3120	0.0000	SURCHARGED
30 minute summer	S244	19	1.718	1.368	388.1	7.9443	0.0000	SURCHARGED
15 minute summer	S247	12	1.657	1.417	598.5	7.3186	0.0000	SURCHARGED
15 minute summer	S248	12	1.474	1.334	1035.3	3.3956	0.0000	SURCHARGED
10080 minute winter	Crates	9720	1.433	0.683	15.3	2275.4980	0.0000	SURCHARGED
480 minute summer	S251	320	1.464	0.714	78.3	1.8174	0.0000	OK
480 minute summer	S252	320	1.464	1.444	229.8	3.6756	0.0000	SURCHARGED
480 minute winter	S253	320	1.464	1.564	124.7	3.9815	0.0000	SURCHARGED
720 minute summer	S299 (Pump)	735	1.552	1.722	3.6	2.4645	0.0000	SURCHARGED
60 minute summer	Outfall	11	1.350	0.050	3.4	0.0569	0.0000	OK
60 minute winter	Ditch	12	1.297	0.047	3.4	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	S240	4.005	S248	599.2	1.362	1.278	39.1787	
30 minute summer	S241	7.000	S242	96.7	0.681	0.594	5.5560	
15 minute summer	S242	7.001	S243	149.1	0.941	0.989	3.5881	
15 minute summer	S243	7.002	S244	188.6	0.873	0.834	10.7682	
30 minute summer	S244	7.003	S247	378.9	0.736	0.612	38.0039	
15 minute summer	S247	7.004	S248	605.9	1.137	1.065	40.8881	
15 minute summer	S248	4.006	S252	1015.0	1.904	0.719	8.0679	
10080 minute winter	Crates	8.000	S251	18.7	-0.395	0.264	9.3011	
480 minute summer	S251	8.001	S252	-78.3	-0.178	-0.022	3.9410	
480 minute summer	S252	4.007	S253	194.1	0.602	0.268	30.2820	
480 minute winter	S253	4.008	Basin 2b	130.4	0.710	0.139	4.5172	
720 minute summer	S299 (Pump)	Pump	Outfall	3.4				
60 minute summer	Outfall	1.009	Ditch	3.4	0.685	0.217	0.0318	59.1

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.70%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S201	9	2.700	1.360	331.8	10.2204	4.1203	FLOOD
15 minute summer	S202	9	2.683	1.393	654.1	10.0459	0.0000	FLOOD RISK
15 minute summer	S203	9	2.548	1.318	984.3	9.2543	0.0000	FLOOD RISK
15 minute summer	S204	9	2.201	1.051	1039.5	3.3829	0.0000	SURCHARGED
15 minute winter	S205	8	2.017	0.907	1039.3	2.8181	0.0000	SURCHARGED
1440 minute summer	Basin 2a	1470	1.779	0.679	65.0	757.2087	0.0000	SURCHARGED
15 minute summer	S206	11	1.897	0.597	63.8	1.2115	0.0000	SURCHARGED
1440 minute summer	S207	1470	1.779	1.079	39.1	1.2203	0.0000	SURCHARGED
1440 minute summer	Basin 2b	1470	1.779	1.929	103.2	2153.0350	0.0000	SURCHARGED
15 minute summer	S211	11	2.450	1.220	107.0	3.9260	0.9941	FLOOD
15 minute summer	S212	11	2.349	1.359	189.7	4.0116	0.0000	FLOOD RISK
1440 minute summer	S213	1470	1.779	1.049	16.4	2.3066	0.0000	SURCHARGED
1440 minute summer	S214	1470	1.779	1.189	26.0	1.7014	0.0000	SURCHARGED
1440 minute summer	S215	1470	1.779	1.679	15.7	2.4027	0.0000	SURCHARGED
1440 minute winter	PP	1410	2.485	0.435	27.8	833.9257	0.0000	FLOOD RISK
1440 minute winter	S227	1410	2.485	0.885	2.1	1.2659	0.0000	FLOOD RISK
30 minute winter	S231	16	1.771	1.121	148.8	5.6935	0.0000	SURCHARGED
30 minute winter	S232	16	1.550	0.960	610.4	11.8829	144.2361	FLOOD
600 minute summer	S233	330	1.550	1.040	113.4	8.5062	58.0372	FLOOD
10080 minute winter	S234	7260	1.550	1.120	38.3	7.8702	423.7617	FLOOD
15 minute summer	S235	11	1.836	0.986	17.7	1.3591	0.0000	SURCHARGED
15 minute summer	S236	11	1.840	1.090	37.0	1.3647	0.0000	SURCHARGED
15 minute summer	S237	11	2.068	0.718	91.2	2.0265	0.0000	SURCHARGED
15 minute summer	S238	11	1.838	1.158	163.0	2.4243	0.0000	SURCHARGED
30 minute summer	S239	17	1.559	1.249	616.6	4.1468	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S201	1.000	S202	331.2	0.753	0.661	13.1270	
15 minute summer	S202	1.001	S203	661.4	1.503	1.285	15.0402	
15 minute summer	S203	1.002	S204	986.6	2.242	1.894	19.5797	
15 minute summer	S204	1.003	S205	1042.6	1.976	2.041	20.2281	
15 minute winter	S205	1.004	Basin 2a	1066.2	3.948	1.614	1.7482	
1440 minute summer	Basin 2a	1.005	S207	39.1	1.363	0.445	4.4787	
15 minute summer	S206	2.000	Basin 2a	61.7	1.693	1.625	1.4811	
1440 minute summer	S207	1.006	Basin 2b	50.5	0.872	0.150	0.5845	
1440 minute summer	Basin 2b	1.007	S299 (Pump)	3.6	0.254	0.374	0.1150	
15 minute summer	S211	3.000	S212	85.9	0.919	0.658	6.1749	
15 minute summer	S212	3.001	S213	179.2	1.625	1.399	6.9470	
1440 minute summer	S213	3.002	S214	26.0	0.708	0.124	1.4079	
1440 minute summer	S214	3.003	S215	15.7	0.142	0.087	6.7460	
1440 minute summer	S215	3.004	Basin 2b	15.6	0.676	0.033	0.6237	
1440 minute winter	PP	9.000	S227	2.1	0.178	0.019	8.9804	
1440 minute winter	S227	9.001	Basin 2b	1.9	0.169	0.025	0.1641	
30 minute winter	S231	4.000	S232	274.6	0.624	0.597	18.7967	
30 minute winter	S232	4.001	S233	286.8	0.778	0.624	25.0873	
600 minute summer	S233	4.002	S234	111.9	0.699	0.245	25.5270	
10080 minute winter	S234	4.003	S239	-37.3	0.372	-0.034	6.6018	
15 minute summer	S235	5.000	S236	17.1	0.582	0.236	1.6409	
15 minute summer	S236	5.001	S238	27.1	0.440	0.379	1.1758	
15 minute summer	S237	6.000	S238	87.7	1.550	0.532	2.1541	
15 minute summer	S238	5.002	S239	167.5	1.519	0.737	3.1682	
30 minute summer	S239	4.004	S240	576.2	1.309	1.226	12.0034	

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.70%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S240	11	1.562	1.292	681.4	4.0319	0.0000	SURCHARGED
15 minute summer	S241	11	2.300	1.700	136.7	5.2139	2.0297	FLOOD
30 minute summer	S242	18	2.273	1.763	186.3	4.0417	0.0000	FLOOD RISK
15 minute summer	S243	11	2.180	1.720	255.1	4.1979	0.0000	FLOOD RISK
15 minute summer	S244	11	2.042	1.692	514.8	9.8265	0.0000	FLOOD RISK
15 minute summer	S247	11	1.894	1.654	823.7	8.5436	0.0000	SURCHARGED
15 minute summer	S248	11	1.603	1.463	1138.9	3.7239	0.0000	SURCHARGED
2880 minute winter	Crates	2580	1.558	0.808	56.7	2665.7210	0.0000	SURCHARGED
240 minute winter	S251	172	1.571	0.821	91.4	2.0887	0.0000	SURCHARGED
240 minute winter	S252	172	1.572	1.552	379.2	3.9502	0.0000	SURCHARGED
240 minute winter	S253	172	1.577	1.677	331.4	4.2673	0.0000	SURCHARGED
1440 minute summer	S299 (Pump)	1470	1.775	1.945	3.6	2.7839	0.0000	SURCHARGED
60 minute winter	Outfall	11	1.350	0.050	3.4	0.0569	0.0000	OK
30 minute summer	Ditch	9	1.297	0.047	3.4	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S240	4.005	S248	687.0	1.561	1.465	39.1787	
15 minute summer	S241	7.000	S242	128.8	0.813	0.791	5.5560	
30 minute summer	S242	7.001	S243	196.3	1.239	1.301	3.5881	
15 minute summer	S243	7.002	S244	268.8	1.244	1.188	10.7682	
15 minute summer	S244	7.003	S247	570.5	1.070	0.921	38.0039	
15 minute summer	S247	7.004	S248	800.5	1.502	1.407	40.8881	
15 minute summer	S248	4.006	S252	1109.9	2.082	0.786	8.0679	
2880 minute winter	Crates	8.000	S251	-50.0	-0.760	-0.707	9.3011	
240 minute winter	S251	8.001	S252	-91.4	-0.208	-0.026	3.9752	
240 minute winter	S252	4.007	S253	331.4	0.715	0.457	30.2820	
240 minute winter	S253	4.008	Basin 2b	330.2	0.839	0.351	4.5172	
1440 minute summer	S299 (Pump)	Pump	Outfall	3.4				
60 minute winter	Outfall	1.009	Ditch	3.4	0.685	0.217	0.0318	59.1

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Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	2	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	0.600
Time of Entry (mins)	6.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	x
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
Basin 3a	0.031	6.00	2.800	1350	524491.337	319976.339	1.550	1.250
Basin 3b	0.031	6.00	2.900	1350	524499.619	319999.821	1.650	1.250
S301	0.141	6.00	2.700	1350	524487.127	319993.412	1.510	1.190
S302	0.191	6.00	1.700	1350	524461.776	320004.987	0.600	1.100
S303	0.092	6.00	2.000	1350	524426.071	320021.289	1.000	1.000
S304	0.265	6.00	1.700	1350	524384.216	320040.399	0.850	0.850
Crates	0.000	6.00	2.630	1350	524447.195	320031.035	1.830	0.800
S306	0.000		2.630	1350	524373.415	320064.721	1.830	0.800
S307	0.000		2.370	1350	524366.088	320048.675	1.640	0.730
Basin 3c	0.000		2.500	1500	524351.067	320053.818	1.900	0.600
PP1	0.153	6.00	2.750	1200	524449.264	319872.012	0.350	2.400
S312	0.000		2.750	1200	524389.646	319899.232	1.000	1.750
S313	0.019	6.00	2.850	1200	524379.092	319896.850	1.050	1.800
S314	0.179	6.00	2.900	1500	524384.237	319908.118	1.400	1.500
PP2	0.105	6.00	2.750	1200	524389.701	319911.299	0.350	2.400
S316	0.000		2.800	1200	524341.908	319933.120	1.100	1.700
S317	0.000		2.950	1500	524333.159	319931.439	1.650	1.300
S318	0.101	6.00	2.850	1500	524330.066	319945.273	1.750	1.100
S319	0.433	6.00	2.850	1500	524332.781	319974.093	1.850	1.000
S320	0.392	6.00	2.850	1500	524344.179	319999.057	1.950	0.900
S321	0.226	6.00	2.500	1500	524340.706	320030.812	1.700	0.800
Pump	0.000	6.00	2.500	1200	524363.645	320110.292	1.950	0.550
399	0.000		2.500	1200	524352.871	320115.211	1.250	1.250
DD1			2.500	1200	524348.214	320118.364	1.300	1.200

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	Basin 3a	S301	16.800	0.600	1.250	1.190	0.060	280.0	375	6.26	49.2
2.000	Basin 3b	S301	12.900	0.600	1.250	1.190	0.060	215.0	375	6.17	49.5
1.001	S301	S302	27.869	0.600	1.190	1.100	0.090	309.7	375	6.71	47.6
1.002	S302	S303	39.251	0.600	1.100	1.000	0.100	392.5	375	7.43	45.2

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.078	119.0	5.5	1.175	1.135	0.031	0.0	55	0.557
2.000	1.231	136.0	5.5	1.275	1.135	0.031	0.0	51	0.610
1.001	1.024	113.1	34.9	1.135	0.225	0.203	0.0	142	0.905
1.002	0.908	100.3	64.4	0.225	0.625	0.394	0.0	219	0.962

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Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.003	S303	S304	46.011	0.600	1.000	0.850	0.150	306.7	375	8.18	43.0
1.004	S304	S307	19.928	0.600	0.850	0.730	0.120	166.1	375	8.42	42.4
3.000	Crates	S306	81.106	0.600	0.800	0.800	0.000	0.0	375	7.35	45.5
3.001	S306	S307	17.640	0.600	0.800	0.730	0.070	252.0	375	7.61	44.7
1.005	S307	Basin 3c	14.740	0.600	0.730	0.640	0.090	163.8	450	8.57	42.0
4.000	PP1	S312	65.538	0.600	2.400	1.750	0.650	100.8	300	6.70	47.6
4.001	S312	S314	10.403	0.600	1.750	1.500	0.250	41.6	300	6.77	47.4
5.000	S313	S314	12.387	0.600	1.800	1.500	0.300	41.3	150	6.13	49.6
4.002	S314	S317	56.150	0.600	1.500	1.300	0.200	280.8	525	7.47	45.1
6.000	PP2	S316	52.539	0.600	2.400	1.700	0.700	75.1	225	6.58	48.0
6.001	S316	S317	8.909	0.600	1.700	1.300	0.400	22.3	225	6.63	47.9
4.003	S317	S318	14.176	0.600	1.300	1.100	0.200	70.9	525	7.56	44.9
4.004	S318	S319	28.948	0.600	1.100	1.000	0.100	289.5	600	7.90	43.8
4.005	S319	S320	27.443	0.600	1.000	0.900	0.100	274.4	600	8.21	43.0
4.006	S320	S321	31.944	0.600	0.900	0.800	0.100	319.4	600	8.60	41.9
4.007	S321	Basin 3c	9.300	0.600	0.800	0.700	0.100	93.0	600	8.66	41.8
1.006	Basin 3c	Pump	8.400	0.600	0.600	0.550	0.050	168.0	225	8.80	41.4
1.007	Pump	399	11.844	0.600	0.550	1.250	-0.700	-16.9	90	30.00	19.4
1.008	399	DD1	3.300	0.600	1.250	1.200	0.050	66.0	150	30.00	19.4

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.003	1.029	113.6	75.6	0.625	0.475	0.486	0.0	224	1.098
1.004	1.403	154.9	115.1	0.475	1.265	0.751	0.0	241	1.531
3.000	1.000	110.4	0.0	1.455	1.455	0.000	0.0	0	0.000
3.001	1.137	125.5	0.0	1.455	1.265	0.000	0.0	0	0.000
1.005	1.586	252.2	114.0	1.190	1.410	0.751	0.0	212	1.548
4.000	1.565	110.7	26.3	0.050	0.700	0.153	0.0	99	1.291
4.001	2.444	172.8	26.2	0.700	1.100	0.153	0.0	78	1.776
5.000	1.570	27.8	3.4	0.900	1.250	0.019	0.0	35	1.070
4.002	1.332	288.2	57.2	0.875	1.125	0.351	0.0	158	1.047
6.000	1.511	60.1	18.2	0.125	0.875	0.105	0.0	85	1.329
6.001	2.784	110.7	18.2	0.875	1.425	0.105	0.0	61	2.064
4.003	2.663	576.4	73.9	1.125	1.225	0.456	0.0	126	1.858
4.004	1.426	403.2	88.2	1.150	1.250	0.557	0.0	190	1.152
4.005	1.465	414.2	153.7	1.250	1.350	0.990	0.0	252	1.360
4.006	1.357	383.6	209.4	1.350	1.100	1.382	0.0	316	1.385
4.007	2.525	714.0	242.7	1.100	1.200	1.608	0.0	241	2.295
1.006	1.006	40.0	352.9	1.675	1.725	2.359	0.0	225	1.024
1.007	0.004	0.0	165.4	1.860	1.160	2.359	0.0	90	0.000
1.008	1.239	21.9	165.4	1.100	1.150	2.359	0.0	150	1.263

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Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	16.800	280.0	375	Circular	2.800	1.250	1.175	2.700	1.190	1.135
2.000	12.900	215.0	375	Circular	2.900	1.250	1.275	2.700	1.190	1.135
1.001	27.869	309.7	375	Circular	2.700	1.190	1.135	1.700	1.100	0.225
1.002	39.251	392.5	375	Circular	1.700	1.100	0.225	2.000	1.000	0.625
1.003	46.011	306.7	375	Circular	2.000	1.000	0.625	1.700	0.850	0.475
1.004	19.928	166.1	375	Circular	1.700	0.850	0.475	2.370	0.730	1.265
3.000	81.106	0.0	375	Circular	2.630	0.800	1.455	2.630	0.800	1.455
3.001	17.640	252.0	375	Circular	2.630	0.800	1.455	2.370	0.730	1.265
1.005	14.740	163.8	450	Circular	2.370	0.730	1.190	2.500	0.640	1.410
4.000	65.538	100.8	300	Circular	2.750	2.400	0.050	2.750	1.750	0.700
4.001	10.403	41.6	300	Circular	2.750	1.750	0.700	2.900	1.500	1.100
5.000	12.387	41.3	150	Circular	2.850	1.800	0.900	2.900	1.500	1.250
4.002	56.150	280.8	525	Circular	2.900	1.500	0.875	2.950	1.300	1.125
6.000	52.539	75.1	225	Circular	2.750	2.400	0.125	2.800	1.700	0.875
6.001	8.909	22.3	225	Circular	2.800	1.700	0.875	2.950	1.300	1.425
4.003	14.176	70.9	525	Circular	2.950	1.300	1.125	2.850	1.100	1.225
4.004	28.948	289.5	600	Circular	2.850	1.100	1.150	2.850	1.000	1.250
4.005	27.443	274.4	600	Circular	2.850	1.000	1.250	2.850	0.900	1.350
4.006	31.944	319.4	600	Circular	2.850	0.900	1.350	2.500	0.800	1.100
4.007	9.300	93.0	600	Circular	2.500	0.800	1.100	2.500	0.700	1.200
1.006	8.400	168.0	225	Circular	2.500	0.600	1.675	2.500	0.550	1.725
1.007	11.844	-16.9	90	Circular	2.500	0.550	1.860	2.500	1.250	1.160
1.008	3.300	66.0	150	Circular	2.500	1.250	1.100	2.500	1.200	1.150

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	Basin 3a	1350	Manhole	Adoptable	S301	1350	Manhole	Adoptable
2.000	Basin 3b	1350	Manhole	Adoptable	S301	1350	Manhole	Adoptable
1.001	S301	1350	Manhole	Adoptable	S302	1350	Manhole	Adoptable
1.002	S302	1350	Manhole	Adoptable	S303	1350	Manhole	Adoptable
1.003	S303	1350	Manhole	Adoptable	S304	1350	Manhole	Adoptable
1.004	S304	1350	Manhole	Adoptable	S307	1350	Manhole	Adoptable
3.000	Crates	1350	Manhole	Adoptable	S306	1350	Manhole	Adoptable
3.001	S306	1350	Manhole	Adoptable	S307	1350	Manhole	Adoptable
1.005	S307	1350	Manhole	Adoptable	Basin 3c	1500	Manhole	Adoptable
4.000	PP1	1200	Manhole	Adoptable	S312	1200	Manhole	Adoptable
4.001	S312	1200	Manhole	Adoptable	S314	1500	Manhole	Adoptable
5.000	S313	1200	Manhole	Adoptable	S314	1500	Manhole	Adoptable
4.002	S314	1500	Manhole	Adoptable	S317	1500	Manhole	Adoptable
6.000	PP2	1200	Manhole	Adoptable	S316	1200	Manhole	Adoptable
6.001	S316	1200	Manhole	Adoptable	S317	1500	Manhole	Adoptable
4.003	S317	1500	Manhole	Adoptable	S318	1500	Manhole	Adoptable
4.004	S318	1500	Manhole	Adoptable	S319	1500	Manhole	Adoptable
4.005	S319	1500	Manhole	Adoptable	S320	1500	Manhole	Adoptable
4.006	S320	1500	Manhole	Adoptable	S321	1500	Manhole	Adoptable
4.007	S321	1500	Manhole	Adoptable	Basin 3c	1500	Manhole	Adoptable
1.006	Basin 3c	1500	Manhole	Adoptable	Pump	1200	Manhole	Adoptable
1.007	Pump	1200	Manhole	Adoptable	399	1200	Manhole	Adoptable
1.008	399	1200	Manhole	Adoptable	DD1	1200	Manhole	Adoptable

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Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	1.000	Drain Down Time (mins)	240	Check Discharge Volume	x
Winter CV	1.000	Additional Storage (m³/ha)	20.0		

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
30	0	0	0
30	40	0	0
100	40	0	0

Node Pump Online Pump Control

Flap Valve	x	Design Depth (m)	1.650	Switch off depth (m)	0.000
Replaces Downstream Link	✓	Design Flow (l/s)	3.0		
Invert Level (m)	0.550	Switch on depth (m)	0.050		

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.050	3.000	1.650	3.000

Node S316 Online Orifice Control

Flap Valve	x	Design Depth (m)	0.350	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	5.0		
Invert Level (m)	1.700	Diameter (m)	0.065		

Node S312 Online Orifice Control

Flap Valve	x	Design Depth (m)	0.350	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	4.0		
Invert Level (m)	1.750	Diameter (m)	0.058		

Node S307 Online Orifice Control

Flap Valve	✓	Design Depth (m)	1.000	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	350.0		
Invert Level (m)	0.730	Diameter (m)	0.435		

Node Basin 3a Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	1.250
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	0

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	26.0	0.0	1.100	144.0	0.0	1.101	0.0	0.0

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Node Basin 3b Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	1.250
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	0

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	28.0	0.0	1.100	156.0	0.0	1.101	156.0	0.0

Node Basin 3c Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	0.600
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	80.5	0.0	0.151	842.0	0.0	1.701	0.0	0.0
0.150	80.5	0.0	1.700	1574.0	0.0			

Node Crates Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	0.800
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	940.0	0.0	0.800	940.0	0.0	0.801	0.0	0.0

Node PP2 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	2.400
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)	130

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	840.0	840.0	0.350	840.0	876.0	0.351	0.0	876.0

Node PP1 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	2.400
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	1139.0	0.0	0.350	1139.0	0.0	0.351	0.0	0.0

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Results for 1 year Critical Storm Duration. Lowest mass balance: 99.64%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	Basin 3a	14	1.281	0.031	3.2	0.9257	0.0000	OK
15 minute summer	Basin 3b	13	1.280	0.030	3.4	0.9627	0.0000	OK
15 minute summer	S301	13	1.278	0.088	14.4	0.2895	0.0000	OK
15 minute summer	S302	12	1.244	0.144	30.3	1.1214	0.0000	OK
15 minute summer	S303	12	1.148	0.148	37.8	0.4826	0.0000	OK
15 minute summer	S304	12	1.029	0.179	60.3	1.3688	0.0000	OK
2160 minute winter	Crates	2220	0.916	0.116	3.9	103.5137	0.0000	OK
480 minute summer	S306	280	0.985	0.185	10.9	0.2653	0.0000	OK
480 minute summer	S307	280	0.988	0.258	18.9	0.3692	0.0000	OK
480 minute summer	Basin 3c	480	1.050	0.450	51.4	286.3786	0.0000	SURCHARGED
240 minute summer	PP1	144	2.434	0.034	6.2	12.0245	0.0000	OK
240 minute summer	S312	160	1.930	0.180	3.1	0.2035	0.0000	OK
15 minute summer	S313	11	1.826	0.026	1.8	0.0387	0.0000	OK
15 minute summer	S314	11	1.592	0.092	18.3	0.3985	0.0000	OK
240 minute summer	PP2	144	2.430	0.030	4.2	7.7361	0.0000	OK
240 minute summer	S316	148	1.796	0.096	2.3	0.1086	0.0000	OK
15 minute summer	S317	12	1.363	0.063	18.2	0.1118	0.0000	OK
15 minute summer	S318	12	1.203	0.103	27.0	0.3010	0.0000	OK
15 minute summer	S319	12	1.172	0.172	66.2	1.1074	0.0000	OK
15 minute summer	S320	12	1.115	0.215	100.4	1.2445	0.0000	OK
600 minute summer	S321	600	1.054	0.254	48.0	1.1223	0.0000	OK
480 minute summer	Pump	480	1.050	0.500	7.1	0.5652	0.0000	SURCHARGED
15 minute winter	399	8	1.291	0.041	3.0	0.0464	0.0000	OK
120 minute winter	DD1	18	1.237	0.037	3.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	Basin 3a	1.000	S301	1.7	0.196	0.015	0.2008	
15 minute summer	Basin 3b	2.000	S301	1.9	0.206	0.014	0.1532	
15 minute summer	S301	1.001	S302	14.0	0.491	0.124	0.8099	
15 minute summer	S302	1.002	S303	29.8	0.754	0.297	1.5521	
15 minute summer	S303	1.003	S304	37.2	0.823	0.328	2.1150	
15 minute summer	S304	1.004	S307	59.4	1.028	0.383	1.2333	
2160 minute winter	Crates	3.000	S306	-3.9	-0.291	-0.035	2.3406	
480 minute summer	S306	3.001	S307	-10.9	-0.161	-0.087	1.1919	
480 minute summer	S307	1.005	Basin 3c	15.2	0.451	0.060	2.0066	
480 minute summer	Basin 3c	1.006	Pump	7.1	0.531	0.177	0.3341	
240 minute summer	PP1	4.000	S312	3.1	0.258	0.028	1.5786	
240 minute summer	S312	4.001	S314	2.7	0.573	0.016	0.0707	
15 minute summer	S313	5.000	S314	1.8	0.280	0.065	0.0829	
15 minute summer	S314	4.002	S317	18.2	0.920	0.063	1.1207	
240 minute summer	PP2	6.000	S316	2.3	0.304	0.038	0.5050	
240 minute summer	S316	6.001	S317	2.2	0.640	0.020	0.0359	
15 minute summer	S317	4.003	S318	18.1	0.829	0.031	0.3156	
15 minute summer	S318	4.004	S319	27.0	0.558	0.067	1.4274	
15 minute summer	S319	4.005	S320	65.5	0.836	0.158	2.1568	
15 minute summer	S320	4.006	S321	100.6	1.197	0.262	2.6880	
600 minute summer	S321	4.007	Basin 3c	65.3	0.727	0.092	1.3187	
480 minute summer	Pump	Pump	399	3.0				
15 minute winter	399	1.008	DD1	3.0	0.819	0.137	0.0121	44.5

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Results for 30 year Critical Storm Duration. Lowest mass balance: 99.93%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	Basin 3a	23	1.660	0.410	66.9	20.4503	0.0000	SURCHARGED
30 minute summer	Basin 3b	23	1.660	0.410	69.7	21.9888	0.0000	SURCHARGED
30 minute summer	S301	23	1.657	0.467	117.0	1.5403	0.0000	SURCHARGED
30 minute summer	S302	22	1.638	0.538	90.6	4.1984	0.0000	FLOOD RISK
15 minute summer	S303	12	1.588	0.588	103.8	1.9235	0.0000	SURCHARGED
15 minute summer	S304	12	1.509	0.659	197.5	5.0498	0.0000	FLOOD RISK
5760 minute winter	Crates	5580	1.337	0.537	4.6	480.5991	0.0000	SURCHARGED
5760 minute winter	S306	5580	1.337	0.537	4.7	0.7689	0.0000	SURCHARGED
5760 minute winter	S307	5580	1.337	0.607	4.7	0.8691	0.0000	SURCHARGED
960 minute winter	Basin 3c	960	1.635	1.035	82.6	943.7200	0.0000	SURCHARGED
120 minute summer	PP1	88	2.519	0.119	35.0	41.8660	0.0000	OK
30 minute summer	S312	24	2.542	0.792	21.7	0.8955	0.0000	FLOOD RISK
15 minute summer	S313	11	1.859	0.059	9.1	0.0882	0.0000	OK
15 minute summer	S314	13	1.720	0.220	96.1	0.9508	0.0000	OK
60 minute summer	PP2	45	2.492	0.092	36.2	23.9268	0.0000	OK
30 minute summer	S316	24	2.498	0.798	16.3	0.9028	0.0000	SURCHARGED
15 minute summer	S317	12	1.709	0.409	98.3	0.7223	0.0000	OK
15 minute summer	S318	12	1.706	0.606	149.2	1.7715	0.0000	SURCHARGED
15 minute summer	S319	12	1.683	0.683	328.5	4.4064	0.0000	SURCHARGED
960 minute winter	S320	960	1.635	0.735	50.8	4.2549	0.0000	SURCHARGED
960 minute winter	S321	960	1.635	0.835	50.3	3.6968	0.0000	SURCHARGED
960 minute winter	Pump	960	1.635	1.085	6.8	1.2270	0.0000	SURCHARGED
60 minute winter	399	8	1.291	0.041	3.0	0.0464	0.0000	OK
60 minute winter	DD1	8	1.237	0.037	3.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	Basin 3a	1.000	S301	-52.8	-0.684	-0.444	1.8530	
30 minute summer	Basin 3b	2.000	S301	-55.6	-0.730	-0.409	1.4228	
30 minute summer	S301	1.001	S302	66.5	0.707	0.588	3.0739	
30 minute summer	S302	1.002	S303	86.5	0.862	0.863	4.3293	
15 minute summer	S303	1.003	S304	103.4	0.938	0.910	5.0749	
15 minute summer	S304	1.004	S307	190.1	1.724	1.227	2.1980	
5760 minute winter	Crates	3.000	S306	-4.6	-0.273	-0.041	8.9458	
5760 minute winter	S306	3.001	S307	-4.7	-0.112	-0.037	1.9456	
5760 minute winter	S307	1.005	Basin 3c	2.5	0.391	0.010	2.3355	
960 minute winter	Basin 3c	1.006	Pump	6.8	0.494	0.170	0.3341	
120 minute summer	PP1	4.000	S312	16.1	0.317	0.146	3.1605	
30 minute summer	S312	4.001	S314	6.1	0.907	0.035	0.2778	
15 minute summer	S313	5.000	S314	9.1	0.645	0.328	0.1489	
15 minute summer	S314	4.002	S317	96.4	1.410	0.334	7.3427	
60 minute summer	PP2	6.000	S316	15.6	0.506	0.259	1.4475	
30 minute summer	S316	6.001	S317	7.7	1.245	0.069	0.1940	
15 minute summer	S317	4.003	S318	123.2	0.987	0.214	2.8100	
15 minute summer	S318	4.004	S319	174.6	0.709	0.433	8.1537	
15 minute summer	S319	4.005	S320	330.9	1.175	0.799	7.7301	
960 minute winter	S320	4.006	S321	40.9	0.659	0.107	8.9979	
960 minute winter	S321	4.007	Basin 3c	82.6	0.755	0.116	2.6196	
960 minute winter	Pump	Pump	399	3.0				
60 minute winter	399	1.008	DD1	3.0	0.819	0.137	0.0121	52.7

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Results for 30 year +40% CC Critical Storm Duration. Lowest mass balance: 99.29%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	Basin 3a	21	1.761	0.511	102.1	28.1954	0.0000	SURCHARGED
30 minute summer	Basin 3b	22	1.760	0.510	107.6	30.3392	0.0000	SURCHARGED
30 minute summer	S301	22	1.757	0.567	177.1	1.8691	0.0000	SURCHARGED
30 minute summer	S302	18	1.700	0.600	157.4	4.6788	37.6793	FLOOD
15 minute winter	S303	11	1.715	0.715	104.4	2.3378	0.0000	FLOOD RISK
15 minute summer	S304	10	1.700	0.850	236.0	6.5170	0.5415	FLOOD
7200 minute winter	Crates	6900	1.660	0.860	5.4	716.0773	0.0000	SURCHARGED
7200 minute winter	S306	6900	1.660	0.860	5.5	1.2304	0.0000	SURCHARGED
7200 minute winter	S307	6900	1.660	0.930	5.5	1.3305	0.0000	SURCHARGED
1440 minute winter	Basin 3c	1440	1.949	1.349	68.6	1363.4110	0.0000	SURCHARGED
120 minute summer	PP1	100	2.581	0.181	49.1	63.6546	0.0000	OK
30 minute winter	S312	21	2.581	0.831	27.1	0.9400	0.0000	FLOOD RISK
15 minute summer	S313	12	2.480	0.680	12.7	1.0146	0.0000	SURCHARGED
15 minute summer	S314	12	2.415	0.915	134.4	3.9584	0.0000	SURCHARGED
120 minute summer	PP2	84	2.540	0.140	33.7	36.3219	0.0000	OK
30 minute winter	S316	21	2.532	0.832	20.8	0.9405	0.0000	FLOOD RISK
15 minute summer	S317	12	2.365	1.065	141.6	1.8820	0.0000	SURCHARGED
15 minute summer	S318	12	2.351	1.251	217.7	3.6550	0.0000	SURCHARGED
15 minute summer	S319	12	2.312	1.312	453.3	8.4617	0.0000	SURCHARGED
15 minute summer	S320	12	2.127	1.227	697.4	7.1041	0.0000	SURCHARGED
1440 minute winter	S321	1440	1.949	1.149	50.5	5.0875	0.0000	SURCHARGED
1440 minute winter	Pump	1440	1.949	1.399	3.1	1.5823	0.0000	SURCHARGED
30 minute winter	399	6	1.291	0.041	3.0	0.0464	0.0000	OK
120 minute summer	DD1	8	1.237	0.037	3.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	Basin 3a	1.000	S301	-83.2	-0.789	-0.699	1.8530	
30 minute summer	Basin 3b	2.000	S301	-88.6	-0.836	-0.651	1.4228	
30 minute summer	S301	1.001	S302	-90.9	-0.825	-0.804	3.0739	
30 minute summer	S302	1.002	S303	80.7	0.857	0.805	4.3293	
15 minute winter	S303	1.003	S304	102.5	0.929	0.902	5.0749	
15 minute summer	S304	1.004	S307	223.3	2.025	1.441	2.1980	
7200 minute winter	Crates	3.000	S306	-5.4	-0.261	-0.049	8.9458	
7200 minute winter	S306	3.001	S307	-5.5	-0.107	-0.043	1.9456	
7200 minute winter	S307	1.005	Basin 3c	2.0	0.391	0.008	2.3355	
1440 minute winter	Basin 3c	1.006	Pump	3.1	0.524	0.077	0.3341	
120 minute summer	PP1	4.000	S312	14.7	0.316	0.132	3.7638	
30 minute winter	S312	4.001	S314	6.9	0.916	0.040	0.5338	
15 minute summer	S313	5.000	S314	16.5	0.940	0.596	0.2181	
15 minute summer	S314	4.002	S317	127.8	1.424	0.443	12.1302	
120 minute summer	PP2	6.000	S316	13.6	0.451	0.227	1.7277	
30 minute winter	S316	6.001	S317	8.5	0.803	0.077	0.3100	
15 minute summer	S317	4.003	S318	196.3	0.980	0.341	3.0625	
15 minute summer	S318	4.004	S319	240.3	0.863	0.596	8.1540	
15 minute summer	S319	4.005	S320	450.0	1.598	1.087	7.7301	
15 minute summer	S320	4.006	S321	697.7	2.477	1.819	8.9979	
1440 minute winter	S321	4.007	Basin 3c	68.6	0.743	0.096	2.6196	
1440 minute winter	Pump	Pump	399	3.0				
30 minute winter	399	1.008	DD1	3.0	0.819	0.137	0.0121	47.6

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 98.24%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	Basin 3a	21	1.804	0.554	116.2	31.8667	0.0000	SURCHARGED
30 minute summer	Basin 3b	21	1.804	0.554	122.8	34.4138	0.0000	SURCHARGED
30 minute summer	S301	21	1.801	0.611	200.2	2.0152	0.0000	SURCHARGED
7200 minute winter	S302	4560	1.700	0.600	3.7	4.6788	179.0647	FLOOD
30 minute summer	S303	16	1.747	0.747	99.5	2.4444	0.0000	FLOOD RISK
7200 minute winter	S304	4560	1.700	0.850	6.8	6.5170	114.8197	FLOOD
5760 minute winter	Crates	3660	1.705	0.905	8.0	716.1411	0.0000	SURCHARGED
720 minute winter	S306	645	1.706	0.906	49.4	1.2971	0.0000	SURCHARGED
960 minute winter	S307	795	1.702	0.972	39.2	1.3910	0.0000	SURCHARGED
1440 minute winter	Basin 3c	1410	2.462	1.862	60.9	1887.8060	0.0000	FLOOD RISK
120 minute winter	PP1	116	2.651	0.251	43.7	88.1540	0.0000	OK
30 minute summer	S312	19	2.653	0.903	34.5	1.0214	0.0000	FLOOD RISK
15 minute summer	S313	10	2.850	1.050	26.0	1.5677	4.4002	FLOOD
15 minute summer	S314	11	2.900	1.400	185.5	6.0536	3.0326	FLOOD
60 minute summer	PP2	54	2.601	0.201	66.9	51.9885	0.0000	OK
15 minute summer	S316	12	2.625	0.925	25.5	1.0466	0.0000	FLOOD RISK
15 minute winter	S317	11	2.872	1.572	152.9	2.7776	0.0000	FLOOD RISK
15 minute summer	S318	11	2.850	1.750	223.8	5.1118	4.8006	FLOOD
15 minute summer	S319	11	2.836	1.836	541.3	11.8353	0.0000	FLOOD RISK
15 minute summer	S320	11	2.603	1.703	856.1	9.8569	0.0000	FLOOD RISK
1440 minute winter	S321	1410	2.462	1.662	61.1	7.3581	0.0000	FLOOD RISK
1440 minute winter	Pump	1410	2.462	1.912	4.2	2.1625	0.0000	FLOOD RISK
60 minute summer	399	6	1.291	0.041	3.0	0.0464	0.0000	OK
15 minute winter	DD1	5	1.237	0.037	3.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	Basin 3a	1.000	S301	-94.0	-0.865	-0.790	1.8530	
30 minute summer	Basin 3b	2.000	S301	-100.6	-0.927	-0.740	1.4228	
30 minute summer	S301	1.001	S302	104.0	0.943	0.920	3.0739	
7200 minute winter	S302	1.002	S303	3.6	0.393	0.035	4.3293	
30 minute summer	S303	1.003	S304	81.9	0.845	0.721	5.0749	
7200 minute winter	S304	1.004	S307	6.7	0.414	0.043	2.1980	
5760 minute winter	Crates	3.000	S306	-8.0	-0.235	-0.073	8.9458	
720 minute winter	S306	3.001	S307	-49.4	-0.448	-0.394	1.9456	
960 minute winter	S307	1.005	Basin 3c	7.0	0.462	0.028	2.3355	
1440 minute winter	Basin 3c	1.006	Pump	4.2	0.234	0.104	0.3341	
120 minute winter	PP1	4.000	S312	13.1	0.358	0.119	4.3690	
30 minute summer	S312	4.001	S314	-14.4	0.923	-0.083	0.7326	
15 minute summer	S313	5.000	S314	20.4	1.158	0.734	0.2181	
15 minute summer	S314	4.002	S317	150.5	1.350	0.522	12.1302	
60 minute summer	PP2	6.000	S316	19.1	0.603	0.318	2.0273	
15 minute summer	S316	6.001	S317	-19.0	1.085	-0.171	0.3543	
15 minute winter	S317	4.003	S318	180.8	0.854	0.314	3.0625	
15 minute summer	S318	4.004	S319	250.0	0.888	0.620	8.1540	
15 minute summer	S319	4.005	S320	537.0	1.907	1.297	7.7301	
15 minute summer	S320	4.006	S321	863.1	3.065	2.250	8.9979	
1440 minute winter	S321	4.007	Basin 3c	60.9	0.721	0.085	2.6196	
1440 minute winter	Pump	Pump	399	3.0				
60 minute summer	399	1.008	DD1	3.0	0.819	0.137	0.0121	53.0

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Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	2	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	0.900
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	x
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
S401	0.127	5.00	1.700	1350	524612.799	319854.639	0.800	0.900
S402	0.128	5.00	1.700	1350	524595.532	319816.821	0.900	0.800
S403	0.121	5.00	2.450	1350	524590.407	319805.596	1.680	0.770
Basin 4a	0.022	5.00	2.750	1200	524566.568	319785.332	1.550	1.200
S404	0.000		2.850	1350	524572.425	319779.294	2.160	0.690
S405	0.000		2.750	1350	524545.565	319761.558	2.140	0.610
Basin 4b	0.000		2.500	1500	524489.182	319789.520	2.000	0.500
PP	0.168	5.00	2.700	1200	524476.621	319835.636	0.350	2.350
S412	0.000	5.00	2.800	1200	524471.225	319827.075	0.900	1.900
S413	0.129	5.00	2.750	1200	524474.117	319818.632	1.200	1.550
S414	0.129	5.00	2.750	1350	524554.059	319782.132	1.650	1.100
S415	0.251	5.00	2.750	1350	524525.695	319795.082	1.810	0.940
S416	0.251	5.00	2.750	1350	524499.770	319806.919	1.950	0.800
Pump			2.500	1200	524456.591	319803.039	2.050	0.450
S499	0.000	5.00	2.500	1200	524443.747	319808.063	1.193	1.307
Outfall	0.000		2.500	1200	524430.491	319782.964	1.250	1.250

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	S401	S402	41.573	0.600	0.900	0.800	0.100	415.7	450	5.70	50.0
1.001	S402	S403	12.340	0.600	0.800	0.770	0.030	411.3	450	5.91	50.0
2.000	Basin 4a	S404	3.970	0.600	1.200	1.150	0.050	79.4	150	5.06	50.0
1.002	S403	S404	31.861	0.600	0.770	0.690	0.080	400.0	450	6.43	48.6
1.003	S404	S405	32.187	0.600	0.690	0.610	0.080	400.0	450	6.96	46.7
1.004	S405	Basin 4b	17.040	0.600	0.610	0.550	0.060	284.0	450	7.20	46.0
3.000	PP	S412	15.000	0.600	2.350	2.350	0.000	0.0	225	5.25	50.0
3.001	S412	S413	8.925	0.600	1.900	1.550	0.350	25.5	300	5.30	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	0.991	157.5	22.9	0.350	0.450	0.127	0.0	116	0.715
1.001	0.996	158.4	46.1	0.450	1.230	0.255	0.0	166	0.868
2.000	1.129	19.9	4.0	1.400	1.550	0.022	0.0	45	0.883
1.002	1.010	160.7	66.0	1.230	1.710	0.376	0.0	201	0.963
1.003	1.010	160.7	67.2	1.710	1.690	0.398	0.0	203	0.966
1.004	1.201	191.0	66.1	1.690	1.500	0.398	0.0	182	1.096
3.000	1.000	39.8	30.4	0.125	0.225	0.168	0.0	225	0.000
3.001	3.126	220.9	30.4	0.600	0.900	0.168	0.0	75	2.215

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Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
3.002	S413	S416	28.201	0.600	1.550	0.800	0.750	37.6	300	5.48	50.0
4.000	S414	S415	31.180	0.600	1.100	0.940	0.160	194.9	450	5.36	50.0
4.001	S415	S416	28.499	0.600	0.940	0.800	0.140	203.6	450	5.69	50.0
3.003	S416	Basin 4b	19.610	0.600	0.800	0.550	0.250	78.4	450	5.83	50.0
1.005	Basin 4b	Pump	8.171	0.600	0.500	0.450	0.050	163.4	150	7.37	41.6
1.006	Pump	S499	9.000	0.600	1.350	1.307	0.043	209.3	90	7.68	44.5
1.007	S499	Outfall	28.385	0.600	1.350	1.250	0.100	283.8	150	8.48	42.3

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
3.002	2.572	181.8	53.7	0.900	1.650	0.297	0.0	112	2.251
4.000	1.453	231.0	23.3	1.200	1.360	0.129	0.0	95	0.942
4.001	1.421	226.0	68.7	1.360	1.500	0.380	0.0	169	1.251
3.003	2.297	365.3	167.7	1.500	1.500	0.928	0.0	214	2.250
1.005	0.783	13.8	199.4	1.850	1.900	1.326	0.0	150	0.798
1.006	0.492	3.1	213.2	1.060	1.103	1.326	0.0	90	0.505
1.007	0.591	10.5	202.5	1.000	1.100	1.326	0.0	150	0.603

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	41.573	415.7	450	Circular	1.700	0.900	0.350	1.700	0.800	0.450
1.001	12.340	411.3	450	Circular	1.700	0.800	0.450	2.450	0.770	1.230
2.000	3.970	79.4	150	Circular	2.750	1.200	1.400	2.850	1.150	1.550
1.002	31.861	400.0	450	Circular	2.450	0.770	1.230	2.850	0.690	1.710
1.003	32.187	400.0	450	Circular	2.850	0.690	1.710	2.750	0.610	1.690
1.004	17.040	284.0	450	Circular	2.750	0.610	1.690	2.500	0.550	1.500
3.000	15.000	0.0	225	Circular	2.700	2.350	0.125	2.800	2.350	0.225
3.001	8.925	25.5	300	Circular	2.800	1.900	0.600	2.750	1.550	0.900
3.002	28.201	37.6	300	Circular	2.750	1.550	0.900	2.750	0.800	1.650
4.000	31.180	194.9	450	Circular	2.750	1.100	1.200	2.750	0.940	1.360
4.001	28.499	203.6	450	Circular	2.750	0.940	1.360	2.750	0.800	1.500
3.003	19.610	78.4	450	Circular	2.750	0.800	1.500	2.500	0.550	1.500
1.005	8.171	163.4	150	Circular	2.500	0.500	1.850	2.500	0.450	1.900

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	S401	1350	Manhole	Adoptable	S402	1350	Manhole	Adoptable
1.001	S402	1350	Manhole	Adoptable	S403	1350	Manhole	Adoptable
2.000	Basin 4a	1200	Manhole	Adoptable	S404	1350	Manhole	Adoptable
1.002	S403	1350	Manhole	Adoptable	S404	1350	Manhole	Adoptable
1.003	S404	1350	Manhole	Adoptable	S405	1350	Manhole	Adoptable
1.004	S405	1350	Manhole	Adoptable	Basin 4b	1500	Manhole	Adoptable
3.000	PP	1200	Manhole	Adoptable	S412	1200	Manhole	Adoptable
3.001	S412	1200	Manhole	Adoptable	S413	1200	Manhole	Adoptable
3.002	S413	1200	Manhole	Adoptable	S416	1350	Manhole	Adoptable
4.000	S414	1350	Manhole	Adoptable	S415	1350	Manhole	Adoptable
4.001	S415	1350	Manhole	Adoptable	S416	1350	Manhole	Adoptable
3.003	S416	1350	Manhole	Adoptable	Basin 4b	1500	Manhole	Adoptable
1.005	Basin 4b	1500	Manhole	Adoptable	Pump	1200	Manhole	Adoptable

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Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.006	9.000	209.3	90	Circular	2.500	1.350	1.060	2.500	1.307	1.103
1.007	28.385	283.8	150	Circular	2.500	1.350	1.000	2.500	1.250	1.100

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.006	Pump	1200	Manhole	Adoptable	S499	1200	Manhole	Adoptable
1.007	S499	1200	Manhole	Adoptable	Outfall	1200	Manhole	Adoptable

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	1.000	Drain Down Time (mins)	240	Check Discharge Volume	x
Winter CV	1.000	Additional Storage (m³/ha)	20.0		

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
30	0	0	0
30	40	0	0
100	40	0	0

Node Pump Online Pump Control

Flap Valve	x	Design Depth (m)	1.950	Switch off depth (m)	0.000
Replaces Downstream Link	✓	Design Flow (l/s)	3.0		
Invert Level (m)	1.350	Switch on depth (m)	0.050		

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.050	3.000	1.950	3.000

Node S412 Online Orifice Control

Flap Valve	x	Design Depth (m)	0.350	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	1.6		
Invert Level (m)	1.900	Diameter (m)	0.036		

Node S405 Online Orifice Control

Flap Valve	✓	Design Depth (m)	1.400	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	450.0		
Invert Level (m)	0.610	Diameter (m)	0.445		

Node Basin 4b Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	0.500
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

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Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	101.0	0.0	0.151	796.0	0.0	1.601	0.0	0.0
0.150	101.0	0.0	1.600	1550.0	0.0			

Node Basin 4a Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	1.200
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	0

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	84.0	0.0	1.050	237.0	0.0	1.051	0.0	0.0

Node PP Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	2.350
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	1384.0	1384.0	0.350	1384.0	1430.2	0.351	0.0	1430.2

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Results for 1 year Critical Storm Duration. Lowest mass balance: 98.99%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
10080 minute summer	S401	7680	1.164	0.264	4.1	1.2155	0.0000	OK
10080 minute summer	S402	7680	1.166	0.366	5.0	1.5647	0.0000	OK
10080 minute summer	S403	7680	1.166	0.396	5.5	1.1378	0.0000	OK
180 minute summer	Basin 4a	108	1.217	0.017	1.0	1.4955	0.0000	OK
10080 minute summer	S404	7680	1.166	0.476	5.1	0.6817	0.0000	SURCHARGED
10080 minute summer	S405	7680	1.166	0.556	5.8	0.7963	0.0000	SURCHARGED
10080 minute summer	Basin 4b	10320	1.206	0.706	7.4	539.1420	0.0000	SURCHARGED
600 minute summer	PP	375	2.402	0.052	3.5	21.9739	0.0000	OK
600 minute summer	S412	390	2.104	0.204	1.2	0.2306	0.0000	OK
15 minute summer	S413	10	1.604	0.054	13.4	0.1786	0.0000	OK
10080 minute summer	S414	10200	1.206	0.106	0.4	0.3186	0.0000	OK
10080 minute summer	S415	10260	1.206	0.266	1.1	1.1198	0.0000	OK
10080 minute summer	S416	10320	1.206	0.406	5.2	1.6277	0.0000	OK
10080 minute summer	Pump	10260	1.206	0.756	0.0	0.8555	0.0000	OK
15 minute summer	S499	1	1.307	0.000	0.0	0.0000	0.0000	OK
15 minute summer	Outfall	1	1.250	0.000	0.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
10080 minute summer	S401	1.000	S402	4.9	0.135	0.031	4.8775	
10080 minute summer	S402	1.001	S403	5.4	0.189	0.034	1.7638	
10080 minute summer	S403	1.002	S404	5.1	0.200	0.032	4.8787	
180 minute summer	Basin 4a	2.000	S404	0.5	0.475	0.026	0.0043	
10080 minute summer	S404	1.003	S405	5.8	0.055	0.036	5.0998	
10080 minute summer	S405	1.004	Basin 4b	6.6	0.042	0.034	2.6999	
10080 minute summer	Basin 4b	1.005	Pump	0.0	0.040	0.003	0.1438	
600 minute summer	PP	3.000	S412	1.2	0.252	0.029	0.0715	
600 minute summer	S412	3.001	S413	1.2	0.666	0.005	0.0186	
15 minute summer	S413	3.002	S416	13.2	0.640	0.073	0.6226	
10080 minute summer	S414	4.000	S415	0.4	0.189	0.002	1.9678	
10080 minute summer	S415	4.001	S416	1.4	0.280	0.006	3.5381	
10080 minute summer	S416	3.003	Basin 4b	5.5	0.410	0.015	3.0305	
10080 minute summer	Pump	Pump	S499	0.0				
15 minute summer	S499	1.007	Outfall	0.0	0.000	0.000	0.0000	0.0

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Results for 30 year Critical Storm Duration. Lowest mass balance: 99.71%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
10080 minute summer	S401	6300	1.456	0.556	4.7	2.5597	0.0000	FLOOD RISK
10080 minute summer	S402	6300	1.456	0.656	5.2	2.8041	0.0000	FLOOD RISK
10080 minute summer	S403	6300	1.456	0.686	6.2	1.9695	0.0000	SURCHARGED
10080 minute summer	Basin 4a	6300	1.456	0.256	2.1	26.5942	0.0000	SURCHARGED
10080 minute summer	S404	6300	1.456	0.766	9.2	1.0958	0.0000	SURCHARGED
10080 minute summer	S405	6300	1.456	0.846	10.2	1.2104	0.0000	SURCHARGED
10080 minute summer	Basin 4b	6360	1.458	0.958	15.5	829.2150	0.0000	SURCHARGED
240 minute winter	PP	232	2.517	0.167	15.7	71.3193	0.0000	OK
240 minute winter	S412	232	2.517	0.617	2.8	0.6979	0.0000	FLOOD RISK
15 minute summer	S413	10	1.677	0.127	69.6	0.4171	0.0000	OK
15 minute summer	S414	11	1.521	0.421	69.4	1.2601	0.0000	OK
15 minute summer	S415	11	1.507	0.567	187.7	2.3857	0.0000	SURCHARGED
10080 minute summer	S416	6240	1.458	0.658	5.9	2.6368	0.0000	SURCHARGED
10080 minute summer	Pump	6360	1.455	1.005	3.0	1.1365	0.0000	SURCHARGED
960 minute summer	S499	915	1.407	0.100	3.0	0.1128	0.0000	OK
960 minute summer	Outfall	915	1.299	0.049	3.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
10080 minute summer	S401	1.000	S402	-3.9	0.110	-0.025	6.5870	
10080 minute summer	S402	1.001	S403	5.6	0.152	0.035	1.9552	
10080 minute summer	S403	1.002	S404	4.6	0.200	0.029	5.0482	
10080 minute summer	Basin 4a	2.000	S404	6.8	0.386	0.341	0.0699	
10080 minute summer	S404	1.003	S405	10.2	0.203	0.063	5.0998	
10080 minute summer	S405	1.004	Basin 4b	10.9	0.320	0.057	2.6999	
10080 minute summer	Basin 4b	1.005	Pump	3.0	0.171	0.217	0.1438	
240 minute winter	PP	3.000	S412	2.8	0.322	0.070	0.4748	
240 minute winter	S412	3.001	S413	2.1	0.926	0.009	0.0494	
15 minute summer	S413	3.002	S416	69.1	1.200	0.380	1.3933	
15 minute summer	S414	4.000	S415	68.5	0.668	0.297	4.8728	
15 minute summer	S415	4.001	S416	186.1	1.282	0.823	4.5155	
10080 minute summer	S416	3.003	Basin 4b	7.4	0.437	0.020	3.1071	
10080 minute summer	Pump	Pump	S499	3.0				
960 minute summer	S499	1.007	Outfall	3.0	0.539	0.287	0.1581	57.3

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Results for 30 year +40% CC Critical Storm Duration. Lowest mass balance: 99.58%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S401	10	1.700	0.800	95.6	3.6848	4.9017	FLOOD
15 minute summer	S402	10	1.700	0.900	160.2	3.8484	1.3472	FLOOD
2880 minute winter	S403	2700	1.686	0.916	11.2	2.6317	0.0000	SURCHARGED
2880 minute winter	Basin 4a	2700	1.686	0.486	5.1	58.7546	0.0000	SURCHARGED
2880 minute winter	S404	2700	1.686	0.996	21.1	1.4257	0.0000	SURCHARGED
2880 minute winter	S405	2700	1.686	1.076	19.9	1.5402	0.0000	SURCHARGED
10080 minute summer	Basin 4b	6720	1.692	1.192	13.7	1128.7340	0.0000	SURCHARGED
360 minute winter	PP	344	2.597	0.247	16.0	105.0438	0.0000	FLOOD RISK
360 minute winter	S412	344	2.596	0.696	2.2	0.7875	0.0000	FLOOD RISK
15 minute summer	S413	11	2.069	0.519	97.1	1.7040	0.0000	SURCHARGED
15 minute summer	S414	11	2.148	1.048	97.1	3.1386	0.0000	SURCHARGED
15 minute summer	S415	11	2.113	1.173	276.2	4.9340	0.0000	SURCHARGED
15 minute summer	S416	11	1.832	1.032	543.8	4.1328	0.0000	SURCHARGED
10080 minute summer	Pump	6720	1.689	1.239	3.0	1.4014	0.0000	SURCHARGED
180 minute winter	S499	184	1.407	0.100	3.0	0.1128	0.0000	OK
180 minute winter	Outfall	188	1.299	0.049	3.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S401	1.000	S402	73.1	0.494	0.464	6.5870	
15 minute summer	S402	1.001	S403	149.9	0.946	0.946	1.9552	
2880 minute winter	S403	1.002	S404	11.6	0.295	0.072	5.0482	
2880 minute winter	Basin 4a	2.000	S404	9.6	0.543	0.479	0.0699	
2880 minute winter	S404	1.003	S405	19.9	0.277	0.124	5.0998	
2880 minute winter	S405	1.004	Basin 4b	16.6	0.328	0.087	2.6999	
10080 minute summer	Basin 4b	1.005	Pump	3.0	0.171	0.218	0.1438	
360 minute winter	PP	3.000	S412	2.2	0.307	0.056	0.5966	
360 minute winter	S412	3.001	S413	2.2	0.943	0.010	0.0503	
15 minute summer	S413	3.002	S416	94.8	1.347	0.521	1.9859	
15 minute summer	S414	4.000	S415	92.5	0.651	0.400	4.9403	
15 minute summer	S415	4.001	S416	273.0	1.723	1.208	4.5155	
15 minute summer	S416	3.003	Basin 4b	542.9	3.427	1.486	3.0756	
10080 minute summer	Pump	Pump	S499	3.0				
180 minute winter	S499	1.007	Outfall	3.0	0.539	0.287	0.1581	41.0

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.81%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
7200 minute summer	S401	3960	1.700	0.800	3.2	3.6848	54.8286	FLOOD
8640 minute summer	S402	4680	1.700	0.900	5.3	3.8484	179.3386	FLOOD
960 minute winter	S403	675	1.701	0.931	21.1	2.6752	0.0000	SURCHARGED
960 minute winter	Basin 4a	675	1.702	0.502	6.4	61.1654	0.0000	SURCHARGED
960 minute winter	S404	675	1.704	1.014	22.9	1.4506	0.0000	SURCHARGED
960 minute winter	S405	675	1.707	1.097	22.0	1.5694	0.0000	SURCHARGED
2880 minute winter	Basin 4b	2760	1.884	1.384	28.2	1395.2070	0.0000	SURCHARGED
480 minute winter	PP	456	2.684	0.334	16.5	142.4630	0.0000	FLOOD RISK
480 minute winter	S412	456	2.684	0.784	2.4	0.8868	0.0000	FLOOD RISK
15 minute summer	S413	11	2.731	1.181	126.6	3.8736	0.0000	FLOOD RISK
15 minute summer	S414	11	2.750	1.650	126.6	4.9418	1.9057	FLOOD
15 minute summer	S415	11	2.714	1.774	355.1	7.4585	0.0000	FLOOD RISK
15 minute summer	S416	11	2.314	1.514	679.6	6.0663	0.0000	SURCHARGED
2880 minute winter	Pump	2760	1.881	1.431	3.0	1.6183	0.0000	SURCHARGED
120 minute summer	S499	94	1.407	0.100	3.0	0.1128	0.0000	OK
120 minute summer	Outfall	94	1.299	0.049	3.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
7200 minute summer	S401	1.000	S402	6.0	0.135	0.038	6.5870	
8640 minute summer	S402	1.001	S403	5.0	0.202	0.031	1.9552	
960 minute winter	S403	1.002	S404	21.2	0.424	0.132	5.0482	
960 minute winter	Basin 4a	2.000	S404	-5.5	0.564	-0.274	0.0699	
960 minute winter	S404	1.003	S405	22.0	0.386	0.137	5.0998	
960 minute winter	S405	1.004	Basin 4b	22.3	0.431	0.117	2.6999	
2880 minute winter	Basin 4b	1.005	Pump	3.0	0.172	0.219	0.1438	
480 minute winter	PP	3.000	S412	2.4	0.309	0.059	0.5966	
480 minute winter	S412	3.001	S413	2.4	0.553	0.011	0.2022	
15 minute summer	S413	3.002	S416	119.7	1.700	0.659	1.9859	
15 minute summer	S414	4.000	S415	113.1	0.714	0.489	4.9403	
15 minute summer	S415	4.001	S416	331.6	2.093	1.467	4.5155	
15 minute summer	S416	3.003	Basin 4b	679.7	4.290	1.861	3.1071	
2880 minute winter	Pump	Pump	S499	3.0				
120 minute summer	S499	1.007	Outfall	3.0	0.539	0.287	0.1581	49.1

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Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	2	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	0.900
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	x
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
S501	0.035	5.00	2.600	1350	524632.053	319803.633	0.900	1.700
S502	0.016	5.00	2.700	1350	524615.904	319781.918	1.080	1.620
S503	0.030	5.00	2.800	1350	524594.291	319775.423	1.260	1.540
S504	0.039	5.00	2.700	1350	524555.642	319775.048	1.280	1.420
S505	0.039	5.00	2.700	1350	524509.636	319796.053	1.430	1.270
S506	0.123	5.00	2.750	1200	524486.189	319915.535	1.250	1.500
S507	0.031	5.00	2.700	1200	524451.843	319840.308	1.540	1.160
S508	0.063	5.00	2.650	1350	524432.493	319831.275	1.650	1.000
S509	0.011	5.00	3.000	1350	524389.603	319869.061	2.140	0.860
S510	0.036	5.00	2.460	1200	524328.272	319849.086	1.110	1.350
S511	0.020	5.00	2.750	1200	524338.286	319869.764	1.540	1.210
S512	0.012	5.00	3.000	1200	524362.415	319881.036	1.950	1.050
S513	0.000		3.250	1350	524376.885	319874.867	2.430	0.820
Basin 5	0.000		2.800	1350	524372.837	319862.232	2.050	0.750
Pump			2.550	1200	524402.856	319836.958	1.750	0.800
S599	0.000		2.550	1200	524426.478	319817.151	1.200	1.350
Outfall	0.000		2.500	1200	524422.769	319787.604	1.250	1.250

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	S501	S502	27.062	0.600	1.700	1.620	0.080	338.3	375	5.46	50.0
1.001	S502	S503	22.568	0.600	1.620	1.540	0.080	282.1	375	5.81	50.0
1.002	S503	S504	38.651	0.600	1.540	1.420	0.120	322.1	375	6.45	48.5
1.003	S504	S505	50.574	0.600	1.420	1.270	0.150	337.2	375	7.31	45.6
1.004	S505	S508	84.803	0.600	1.270	1.000	0.270	314.1	375	8.70	41.7
2.000	S506	S507	82.697	0.600	1.500	1.160	0.340	243.2	300	6.37	48.8
2.001	S507	S508	21.355	0.600	1.160	1.000	0.160	133.5	300	6.64	47.8
1.005	S508	S509	57.161	0.600	1.000	0.860	0.140	408.3	450	9.66	39.4

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	0.979	108.2	6.3	0.525	0.705	0.035	0.0	61	0.542
1.001	1.074	118.6	9.2	0.705	0.885	0.051	0.0	70	0.644
1.002	1.004	110.9	14.2	0.885	0.905	0.081	0.0	90	0.695
1.003	0.981	108.3	19.8	0.905	1.055	0.120	0.0	108	0.752
1.004	1.017	112.3	23.9	1.055	1.275	0.159	0.0	117	0.813
2.000	1.003	70.9	21.7	0.950	1.240	0.123	0.0	113	0.884
2.001	1.359	96.1	26.6	1.240	1.350	0.154	0.0	108	1.167
1.005	1.000	159.0	53.5	1.200	1.690	0.376	0.0	180	0.906

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Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.006	S509	S513	13.981	0.600	0.860	0.820	0.040	349.5	450	9.87	38.9
3.000	S510	S511	22.975	0.600	1.350	1.210	0.140	164.1	225	5.38	50.0
3.001	S511	S512	26.632	0.600	1.210	1.050	0.160	166.5	225	5.82	50.0
3.002	S512	S513	15.730	0.600	1.050	0.820	0.230	68.4	225	5.98	50.0
1.007	S513	Basin 5	13.268	0.600	0.820	0.790	0.030	442.3	450	10.10	38.4
1.008	Basin 5	Pump	8.050	0.600	0.750	0.800	-0.050	-161.0	150	30.00	19.4
1.009	Pump	S599	7.800	0.600	0.800	1.350	-0.550	-14.2	90	30.00	19.4
1.010	S599	Outfall	26.000	0.600	1.350	1.250	0.100	260.0	150	30.00	19.4

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.006	1.081	172.0	54.4	1.690	1.980	0.387	0.0	174	0.964
3.000	1.018	40.5	6.5	0.885	1.315	0.036	0.0	61	0.752
3.001	1.010	40.2	10.1	1.315	1.725	0.056	0.0	77	0.845
3.002	1.583	63.0	12.3	1.725	2.205	0.068	0.0	67	1.235
1.007	0.960	152.7	63.1	1.980	1.560	0.455	0.0	202	0.917
1.008	0.007	0.1	31.9	1.900	1.600	0.455	0.0	150	0.000
1.009	0.004	0.0	31.9	1.660	1.110	0.455	0.0	90	0.000
1.010	0.618	10.9	31.9	1.050	1.100	0.455	0.0	150	0.630

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	27.062	338.3	375	Circular	2.600	1.700	0.525	2.700	1.620	0.705
1.001	22.568	282.1	375	Circular	2.700	1.620	0.705	2.800	1.540	0.885
1.002	38.651	322.1	375	Circular	2.800	1.540	0.885	2.700	1.420	0.905
1.003	50.574	337.2	375	Circular	2.700	1.420	0.905	2.700	1.270	1.055
1.004	84.803	314.1	375	Circular	2.700	1.270	1.055	2.650	1.000	1.275
2.000	82.697	243.2	300	Circular	2.750	1.500	0.950	2.700	1.160	1.240
2.001	21.355	133.5	300	Circular	2.700	1.160	1.240	2.650	1.000	1.350
1.005	57.161	408.3	450	Circular	2.650	1.000	1.200	3.000	0.860	1.690
1.006	13.981	349.5	450	Circular	3.000	0.860	1.690	3.250	0.820	1.980
3.000	22.975	164.1	225	Circular	2.460	1.350	0.885	2.750	1.210	1.315
3.001	26.632	166.5	225	Circular	2.750	1.210	1.315	3.000	1.050	1.725
3.002	15.730	68.4	225	Circular	3.000	1.050	1.725	3.250	0.820	2.205

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	S501	1350	Manhole	Adoptable	S502	1350	Manhole	Adoptable
1.001	S502	1350	Manhole	Adoptable	S503	1350	Manhole	Adoptable
1.002	S503	1350	Manhole	Adoptable	S504	1350	Manhole	Adoptable
1.003	S504	1350	Manhole	Adoptable	S505	1350	Manhole	Adoptable
1.004	S505	1350	Manhole	Adoptable	S508	1350	Manhole	Adoptable
2.000	S506	1200	Manhole	Adoptable	S507	1200	Manhole	Adoptable
2.001	S507	1200	Manhole	Adoptable	S508	1350	Manhole	Adoptable
1.005	S508	1350	Manhole	Adoptable	S509	1350	Manhole	Adoptable
1.006	S509	1350	Manhole	Adoptable	S513	1350	Manhole	Adoptable
3.000	S510	1200	Manhole	Adoptable	S511	1200	Manhole	Adoptable
3.001	S511	1200	Manhole	Adoptable	S512	1200	Manhole	Adoptable
3.002	S512	1200	Manhole	Adoptable	S513	1350	Manhole	Adoptable

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Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.007	13.268	442.3	450	Circular	3.250	0.820	1.980	2.800	0.790	1.560
1.008	8.050	-161.0	150	Circular	2.800	0.750	1.900	2.550	0.800	1.600
1.009	7.800	-14.2	90	Circular	2.550	0.800	1.660	2.550	1.350	1.110
1.010	26.000	260.0	150	Circular	2.550	1.350	1.050	2.500	1.250	1.100

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.007	S513	1350	Manhole	Adoptable	Basin 5	1350	Manhole	Adoptable
1.008	Basin 5	1350	Manhole	Adoptable	Pump	1200	Manhole	Adoptable
1.009	Pump	1200	Manhole	Adoptable	S599	1200	Manhole	Adoptable
1.010	S599	1200	Manhole	Adoptable	Outfall	1200	Manhole	Adoptable

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	1.000	Drain Down Time (mins)	240	Check Discharge Volume	x
Winter CV	1.000	Additional Storage (m³/ha)	20.0		

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
30	0	0	0
30	40	0	0
100	40	0	0

Node S599 Online Pump Control

Flap Valve	x	Design Depth (m)	1.400	Switch off depth (m)	0.000
Replaces Downstream Link	✓	Design Flow (l/s)	3.0		
Invert Level (m)	1.350	Switch on depth (m)	0.050		

Depth (m)	Flow (l/s)
0.050	3.000

Node Basin 5 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	0.750
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	0

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	78.0	78.0	0.151	523.0	523.3	1.601	0.0	1201.1
0.150	78.0	82.7	1.600	1186.0	1201.1			

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Results for 1 year Critical Storm Duration. Lowest mass balance: 99.43%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S501	11	1.746	0.046	3.6	0.1015	0.0000	OK
15 minute summer	S502	11	1.672	0.052	5.2	0.0904	0.0000	OK
15 minute summer	S503	12	1.606	0.066	8.1	0.1260	0.0000	OK
15 minute summer	S504	12	1.502	0.082	11.6	0.1666	0.0000	OK
15 minute summer	S505	13	1.356	0.086	14.5	0.1692	0.0000	OK
15 minute summer	S506	11	1.586	0.086	12.8	0.2662	0.0000	OK
15 minute summer	S507	11	1.240	0.080	15.6	0.1224	0.0000	OK
15 minute summer	S508	13	1.136	0.136	32.8	0.2981	0.0000	OK
10080 minute winter	S509	8640	1.103	0.243	0.8	0.3730	0.0000	OK
15 minute summer	S510	10	1.395	0.045	3.7	0.0806	0.0000	OK
15 minute summer	S511	11	1.269	0.059	5.7	0.0819	0.0000	OK
10080 minute winter	S512	9480	1.103	0.053	0.1	0.0666	0.0000	OK
10080 minute winter	S513	8760	1.103	0.283	0.9	0.4051	0.0000	OK
10080 minute winter	Basin 5	8700	1.103	0.353	0.9	127.5183	0.0000	SURCHARGED
10080 minute winter	Pump	8700	1.103	0.303	0.0	0.3430	0.0000	SURCHARGED
15 minute summer	S599	1	1.350	0.000	0.0	0.0000	0.0000	OK
15 minute summer	Outfall	1	1.250	0.000	0.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S501	1.000	S502	3.5	0.428	0.033	0.2297	
15 minute summer	S502	1.001	S503	5.1	0.459	0.043	0.2516	
15 minute summer	S503	1.002	S504	7.7	0.511	0.070	0.5926	
15 minute summer	S504	1.003	S505	11.3	0.628	0.104	0.9090	
15 minute summer	S505	1.004	S508	13.2	0.488	0.118	2.3256	
15 minute summer	S506	2.000	S507	12.5	0.790	0.176	1.3073	
15 minute summer	S507	2.001	S508	15.1	0.743	0.157	0.4837	
15 minute summer	S508	1.005	S509	31.4	0.753	0.197	2.3845	
10080 minute winter	S509	1.006	S513	0.8	0.178	0.005	1.3447	
15 minute summer	S510	3.000	S511	3.6	0.530	0.090	0.1602	
15 minute summer	S511	3.001	S512	5.7	0.772	0.142	0.1970	
10080 minute winter	S512	3.002	S513	0.1	0.015	0.002	0.3690	
10080 minute winter	S513	1.007	Basin 5	0.9	0.236	0.006	1.4775	
10080 minute winter	Basin 5	1.008	Pump	0.0	0.002	0.303	0.1417	
10080 minute winter	Pump	1.009	S599	0.0	0.000	0.000	0.0247	
15 minute summer	S599	Pump	Outfall	0.0				0.0

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Results for 30 year Critical Storm Duration. Lowest mass balance: 99.52%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S501	10	1.807	0.107	18.8	0.2357	0.0000	OK
15 minute summer	S502	11	1.747	0.127	27.1	0.2195	0.0000	OK
15 minute summer	S503	11	1.704	0.164	42.3	0.3129	0.0000	OK
15 minute summer	S504	11	1.629	0.209	62.4	0.4269	0.0000	OK
15 minute summer	S505	13	1.522	0.252	81.3	0.4986	0.0000	OK
15 minute summer	S506	10	1.728	0.228	66.0	0.7077	0.0000	OK
15 minute summer	S507	12	1.550	0.390	81.3	0.5984	0.0000	SURCHARGED
15 minute summer	S508	12	1.439	0.439	180.2	0.9639	0.0000	OK
8640 minute summer	S509	7140	1.400	0.540	2.7	0.8286	0.0000	SURCHARGED
15 minute summer	S510	10	1.460	0.110	19.3	0.1959	0.0000	OK
5760 minute winter	S511	5040	1.400	0.190	0.3	0.2638	0.0000	OK
7200 minute winter	S512	5400	1.400	0.350	0.4	0.4387	0.0000	SURCHARGED
10080 minute winter	S513	7860	1.400	0.580	2.8	0.8299	0.0000	SURCHARGED
2880 minute summer	Basin 5	2880	1.399	0.649	7.1	330.4817	0.0000	SURCHARGED
2880 minute summer	Pump	2880	1.400	0.600	1.3	0.6781	0.0000	SURCHARGED
2880 minute summer	S599	2880	1.400	0.050	1.3	0.0563	0.0000	OK
15 minute summer	Outfall	1	1.250	0.000	0.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S501	1.000	S502	18.5	0.640	0.171	0.7863	
15 minute summer	S502	1.001	S503	26.9	0.682	0.227	0.8928	
15 minute summer	S503	1.002	S504	42.4	0.775	0.383	2.1151	
15 minute summer	S504	1.003	S505	61.4	0.944	0.567	3.4684	
15 minute summer	S505	1.004	S508	73.7	0.756	0.656	8.0189	
15 minute summer	S506	2.000	S507	64.6	1.102	0.911	5.2546	
15 minute summer	S507	2.001	S508	74.0	1.051	0.771	1.5038	
15 minute summer	S508	1.005	S509	162.5	1.051	1.022	8.9795	
8640 minute summer	S509	1.006	S513	2.7	0.144	0.015	2.2152	
15 minute summer	S510	3.000	S511	19.2	0.809	0.474	0.5434	
5760 minute winter	S511	3.001	S512	0.4	0.311	0.010	1.0052	
7200 minute winter	S512	3.002	S513	0.5	0.018	0.008	0.6256	
10080 minute winter	S513	1.007	Basin 5	2.3	0.236	0.015	2.1022	
2880 minute summer	Basin 5	1.008	Pump	1.3	0.073	10.737	0.1417	
2880 minute summer	Pump	1.009	S599	1.3	0.284	46.158	0.0387	
2880 minute summer	S599	Pump	Outfall	1.3				14.1

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Results for 30 year +40% CC Critical Storm Duration. Lowest mass balance: 99.53%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S501	13	1.912	0.212	26.4	0.4678	0.0000	OK
15 minute summer	S502	13	1.852	0.232	54.3	0.4001	0.0000	OK
15 minute summer	S503	12	1.861	0.321	59.0	0.6124	0.0000	OK
15 minute summer	S504	12	1.871	0.451	89.9	0.9203	0.0000	SURCHARGED
15 minute summer	S505	11	1.809	0.539	107.3	1.0654	0.0000	SURCHARGED
15 minute summer	S506	12	2.412	0.912	92.6	2.8271	0.0000	SURCHARGED
15 minute summer	S507	12	1.957	0.797	102.8	1.2220	0.0000	SURCHARGED
15 minute summer	S508	11	1.709	0.709	207.4	1.5558	0.0000	SURCHARGED
960 minute winter	S509	930	1.442	0.582	15.3	0.8929	0.0000	SURCHARGED
15 minute summer	S510	12	1.672	0.322	27.1	0.5733	0.0000	SURCHARGED
15 minute summer	S511	12	1.617	0.407	38.8	0.5668	0.0000	SURCHARGED
15 minute summer	S512	12	1.470	0.420	43.9	0.5272	0.0000	SURCHARGED
960 minute winter	S513	930	1.442	0.622	17.6	0.8901	0.0000	SURCHARGED
960 minute winter	Basin 5	930	1.442	0.692	17.4	362.9198	0.0000	SURCHARGED
960 minute winter	Pump	930	1.440	0.640	2.6	0.7235	0.0000	SURCHARGED
360 minute winter	S599	336	1.399	0.049	1.5	0.0559	0.0000	OK
15 minute summer	Outfall	1	1.250	0.000	0.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S501	1.000	S502	29.2	0.678	0.270	1.8338	
15 minute summer	S502	1.001	S503	37.3	0.709	0.315	1.9057	
15 minute summer	S503	1.002	S504	63.1	0.813	0.569	4.0717	
15 minute summer	S504	1.003	S505	78.0	0.967	0.720	5.5782	
15 minute summer	S505	1.004	S508	92.5	0.899	0.823	9.3535	
15 minute summer	S506	2.000	S507	80.5	1.143	1.135	5.8235	
15 minute summer	S507	2.001	S508	102.1	1.451	1.063	1.5038	
15 minute summer	S508	1.005	S509	206.8	1.305	1.301	9.0568	
960 minute winter	S509	1.006	S513	14.9	0.372	0.087	2.2152	
15 minute summer	S510	3.000	S511	24.6	0.848	0.607	0.9137	
15 minute summer	S511	3.001	S512	35.6	1.119	0.887	1.0592	
15 minute summer	S512	3.002	S513	42.7	1.073	0.678	0.6256	
960 minute winter	S513	1.007	Basin 5	17.4	0.423	0.114	2.1022	
960 minute winter	Basin 5	1.008	Pump	2.6	0.146	21.518	0.1417	
960 minute winter	Pump	1.009	S599	2.6	0.478	92.361	0.0369	
360 minute winter	S599	Pump	Outfall	1.5				20.1

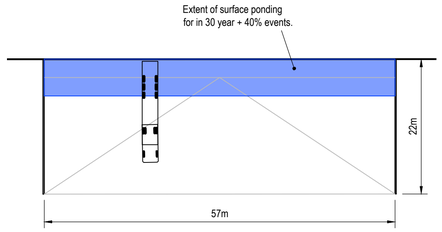
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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.34%

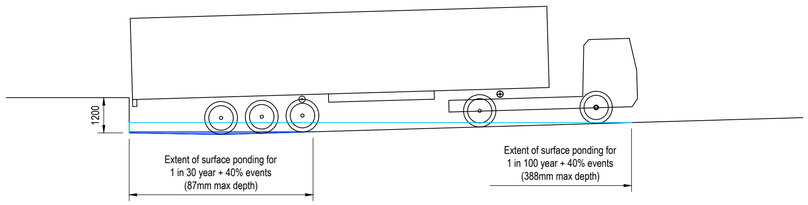
Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S501	12	2.446	0.746	72.9	1.6475	0.0000	FLOOD RISK
15 minute summer	S502	12	2.468	0.848	78.8	1.4659	0.0000	FLOOD RISK
15 minute summer	S503	12	2.494	0.954	76.0	1.8206	0.0000	SURCHARGED
15 minute summer	S504	12	2.378	0.958	98.1	1.9547	0.0000	SURCHARGED
15 minute summer	S505	12	2.340	1.070	114.4	2.1152	0.0000	SURCHARGED
15 minute summer	S506	10	2.750	1.250	120.6	3.8738	4.3602	FLOOD
15 minute summer	S507	12	2.273	1.113	121.7	1.7067	0.0000	SURCHARGED
15 minute summer	S508	12	2.047	1.047	260.4	2.2984	0.0000	SURCHARGED
15 minute summer	S509	12	1.594	0.734	263.3	1.1264	0.0000	SURCHARGED
15 minute summer	S510	11	2.036	0.686	35.3	1.2202	0.0000	SURCHARGED
15 minute summer	S511	12	1.934	0.724	49.5	1.0077	0.0000	SURCHARGED
15 minute summer	S512	12	1.670	0.620	58.5	0.7770	0.0000	SURCHARGED
1440 minute winter	S513	1260	1.572	0.752	16.8	1.0763	0.0000	SURCHARGED
1440 minute winter	Basin 5	1350	1.572	0.822	16.2	466.9165	0.0000	SURCHARGED
1440 minute winter	Pump	1350	1.569	0.769	3.0	0.8692	0.0000	SURCHARGED
1440 minute winter	S599	1350	1.526	0.176	3.0	0.1995	0.0000	SURCHARGED
15 minute summer	Outfall	1	1.250	0.000	0.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S501	1.000	S502	-40.1	0.705	-0.370	2.9849	
15 minute summer	S502	1.001	S503	-63.8	0.725	-0.538	2.4892	
15 minute summer	S503	1.002	S504	71.1	0.821	0.641	4.2631	
15 minute summer	S504	1.003	S505	87.8	0.987	0.810	5.5782	
15 minute summer	S505	1.004	S508	111.5	1.011	0.993	9.3535	
15 minute summer	S506	2.000	S507	91.3	1.297	1.287	5.8235	
15 minute summer	S507	2.001	S508	115.1	1.635	1.198	1.5038	
15 minute summer	S508	1.005	S509	254.8	1.608	1.603	9.0568	
15 minute summer	S509	1.006	S513	259.9	1.641	1.511	2.2152	
15 minute summer	S510	3.000	S511	30.8	0.857	0.761	0.9137	
15 minute summer	S511	3.001	S512	47.6	1.196	1.184	1.0592	
15 minute summer	S512	3.002	S513	57.7	1.450	0.916	0.6256	
1440 minute winter	S513	1.007	Basin 5	16.2	0.409	0.106	2.1022	
1440 minute winter	Basin 5	1.008	Pump	3.0	0.172	25.451	0.1417	
1440 minute winter	Pump	1.009	S599	3.0	0.531	108.719	0.0494	
1440 minute winter	S599	Pump	Outfall	3.0				157.6

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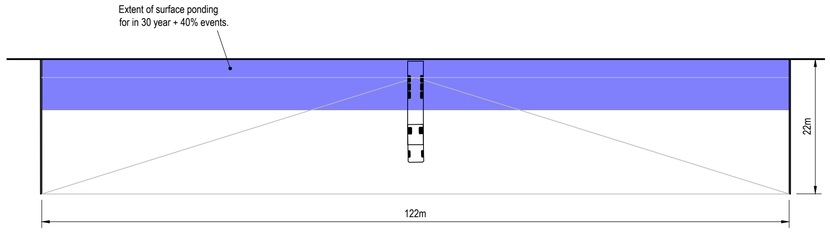


PLAN ON LOADING DOCK
1:500

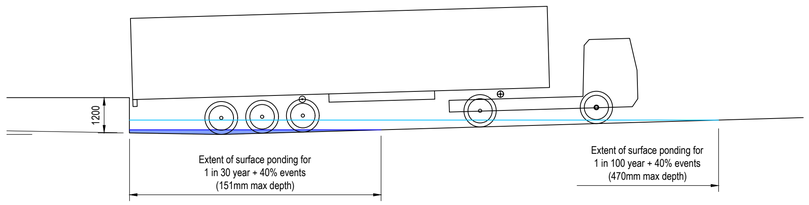


SECTION THROUGH LOADING DOCK
1:100

UNIT 100 - EXTENT OF SURFACE PONDING

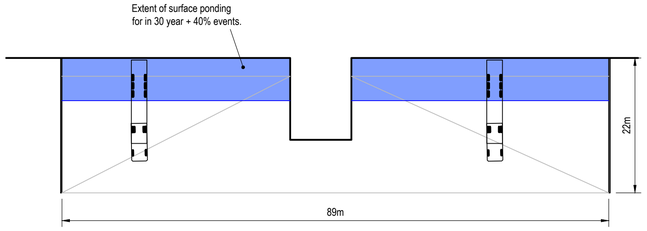


PLAN ON LOADING DOCK
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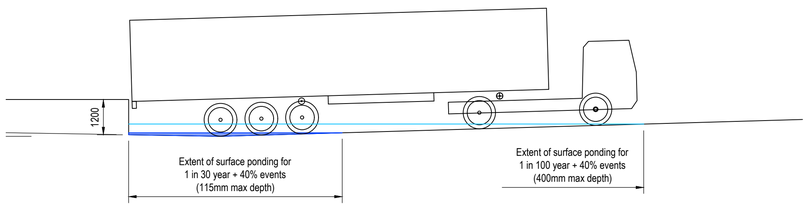


SECTION THROUGH LOADING DOCK
1:100

UNIT 200 - EXTENT OF SURFACE PONDING

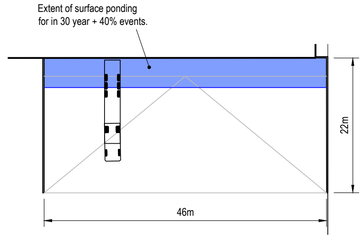


PLAN ON LOADING DOCK
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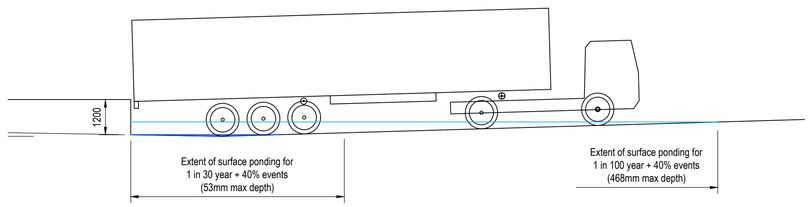


SECTION THROUGH LOADING DOCK
1:100

UNIT 300 - EXTENT OF SURFACE PONDING



PLAN ON LOADING DOCK
1:500



SECTION THROUGH LOADING DOCK
1:100

UNIT 400 - EXTENT OF SURFACE PONDING

1. This drawing to be read in conjunction with Eastwood Consulting Engineers Drg. No. 46934-ECE-XX-XX-DR-C-0012.

REV	DESCRIPTION	SIG	CHK	DATE
P01	First issue.	MW	AP	18.12.2025

ALCAN PROPERTIES LTD.

LINCS GATEWAY
SPALDING

LOADING DOCK PONDING

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ECE PROJECT No	SCALE AT A1	STATUS	SUITABLE FOR
46934	As Noted	S0	Initial

DRAWING NUMBER: 46934 - ECE - XX - XX - DR - C - 0017 REV: P01
Project Originator Zone Level Type Role Number



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