



CROUCH  
WATERFALL

# Outline Flood Risk Assessment & Drainage Strategy

## Haven Allhallows Holiday Park

**CLIENT:** Haven

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## Document Control Sheet

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# 1. Introduction

## 1.1. Scope of Works

Crouch Waterfall has been commissioned by Haven to compile an outline drainage strategy for the proposed development at Haven All Hallows.

The proposed works are to extend the existing pool facilities, which includes the following items:

- An extension on the Southside of the existing indoor pool to contain a splash pad, confidence pool and enlarged plant room.
- Alternatives to the existing external pool to make it beach entry and allow for a new external terrace surrounding the pool on the north side.

## 1.2. Source of Information

A review of the relevant information from a range of sources has used to compile this report:

- Digital Terrain Surveys LLP – DTS290419-35A
- Select Surveys – 19-AMA-2231
- Southern Water Records
- EA flood Maps
- LFA Flood Maps

## 1.3. Proposed Development

The site that is to be developed is adjacent to the main complex at Allhallows which is solely used for leisure purposes of the Haven guests and the proposed development extends these facilities.

The proposed development is to extend and upgrade the existing pool facilities, to include a new splash pad and confidence pool and additional plant room to serve the increased pool requirements.

The proposed masterplan is provided in Appendix A.

## 2. The Site

### 2.1. Site Location

The proposed development can be found along the East Coast of England, Kent within the county of Medway, on the Haven Allhallows leisure park. This site contains a central complex, which is to be extended, that currently contains entertainment, leisure and dining facilities for the holiday park guests. The accommodation provided is typically in static caravans.

The Ordnance Survey (OS) grid reference for the Application Site is 583748, 178695 and the postcode is ME3 9QD.

Figure 2.1: Site Location



### 2.2. Site Description

The area surrounding the existing pool, which is to be redeveloped is primarily used as soft landscaping. Several areas on the proposed site are currently impermeable that include the existing pool, the pool surround and an isolated footpath. It is believed that the pool surround has its own surface water drainage that will be retained, with some minor rerouting of pipe work. The footpaths are believed to drain into the soft areas for the surface water to infiltrate into the ground or runoff toward the road's drainage system.

The Application Site has a gross area of 3338m<sup>2</sup> Approx. which contains the proposed development extensions and development to the external pool.

Adjacent to the site a recent development has taken place to create a new Show bar, car park and an external activity equipment area. This has had new below ground drainage infrastructure which our proposed scheme will connect into.

### 2.3. Topography

Locally to the site the footprint of the building lies on a slope between 15m and 12.30m above the AoD. For the proposal the ground level will be lower than the existing ground profile, and several retaining walls will be used to create the structure.

Generally, the Haven Allhallows site slopes towards to sea/ Thames Estuary at the north with the level appearing to varying between 23m and 4m above Ordnance survey level.

Away from the site the slope continues the southwest and south, with marsh land the east which appears to be below 5 AoD.

Figure 2.3.1: OS Levels

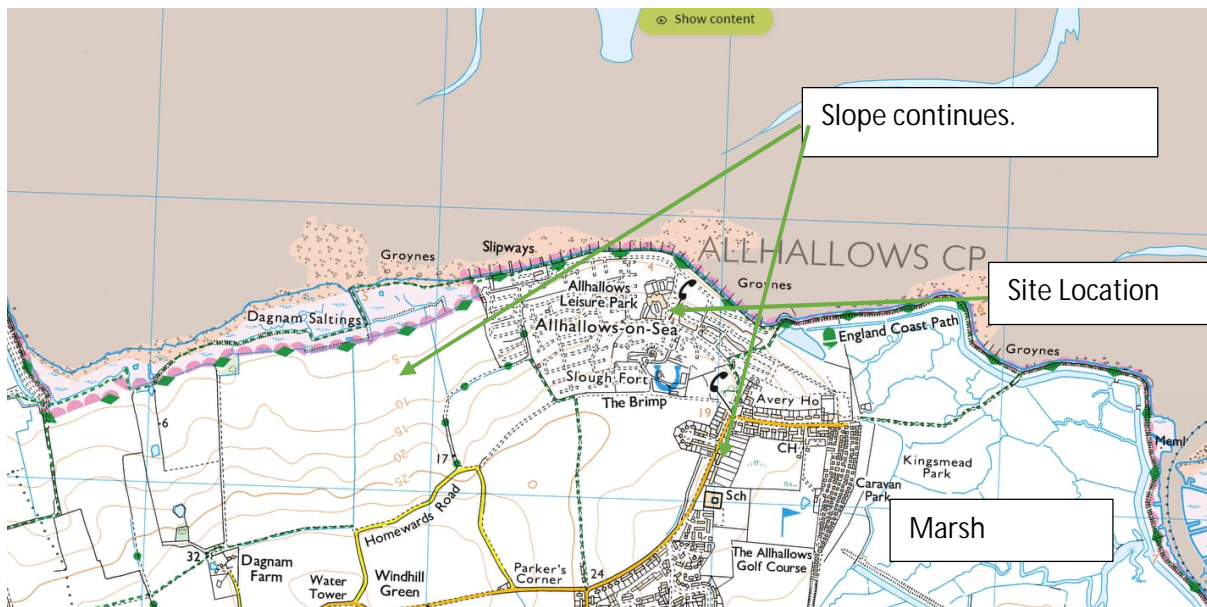
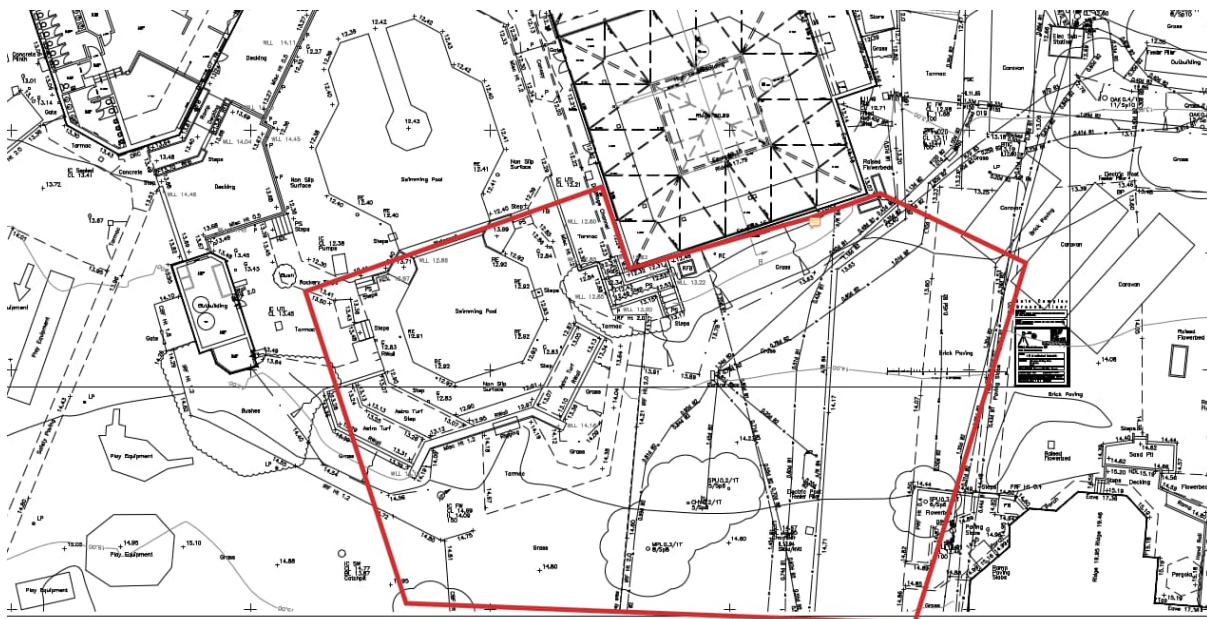


Figure 2.3.2: Local Site Levels



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## 2.4. Watercourses

From the information on the OS maps and from site observations, there appears to be no watercourses on site. However, the does sit to the south of the Thames Estuary

Figure 2.4.1: Water Course



## 2.5. Geology

Based on the British geological survey (BGS) maps, it indicates that the superficial deposits beneath the site potentially comprise of Head or River Deposits. The site appears to sit on the boundary between the two different deposits.

From ground investigations carried out for the proposed development, several boreholes were carried out indicating made ground for 1.8m, Head deposits 0.5m thick then changing into weathered London clay which extended to the London clay.

With the clay material it is assumed that there will be limited potential for infiltration for the proposed development.



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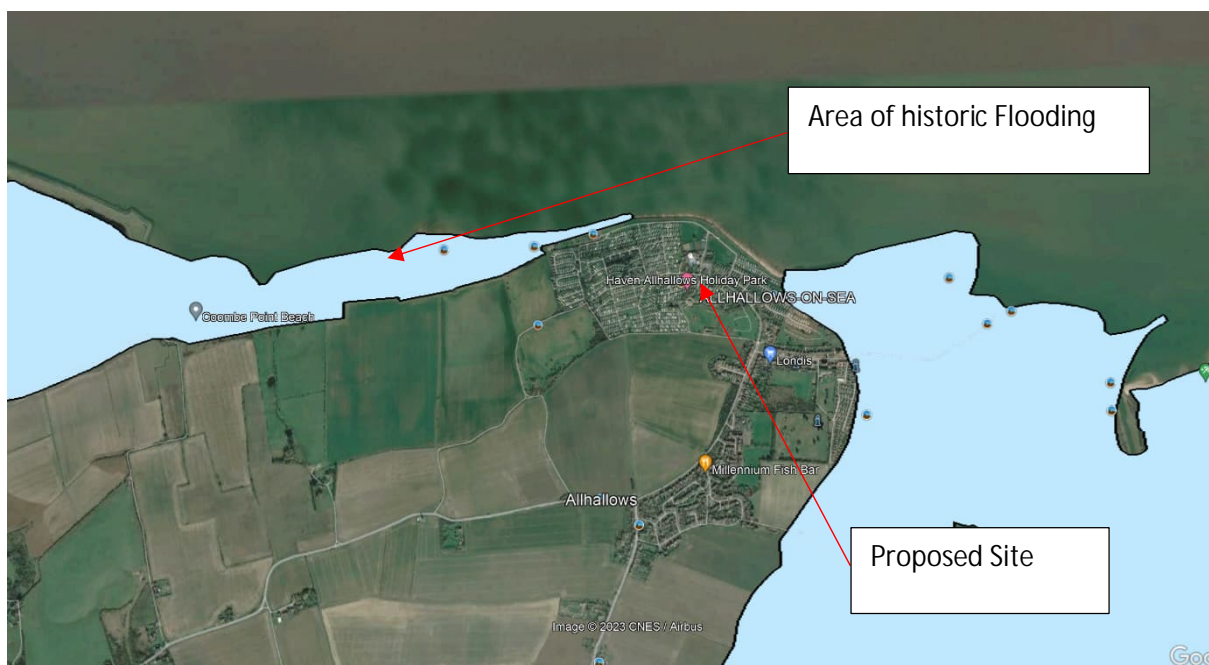
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## 2.6. Historic Records of Flooding

Based on the historical flooding maps supplied by the Environment Agency last updated on the 17th of February 2023, the figure below shows the flooding vicinity of the proposed development. This appears to show the site is not affected from flooding.

The site is protected from the Thames defences which were completed in the 1950's, preventing the flooding of the site.

Figure 2.6.1 – Historic Flooding



### 3. Preliminary Existing Flood Risk Assessment

#### 3.1. Fluvial and Tidal Flood Risk

Based on the Environment Agency flood risk data, the proposed site falls within flood zone 1 which has a probability of flooding of 0.1% due to fluvial or tidal flooding, or a very low risk of flooding.,

Figure 3.1.1 – Surface Water Flooding



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### 3.2. Surface Water Flood Risk

Based on information from the lead local authorities who are responsible for managing the flood records of surface water, and from the records that are readily available, the proposed extension would fall into a very low risk zone as shown on the image below.

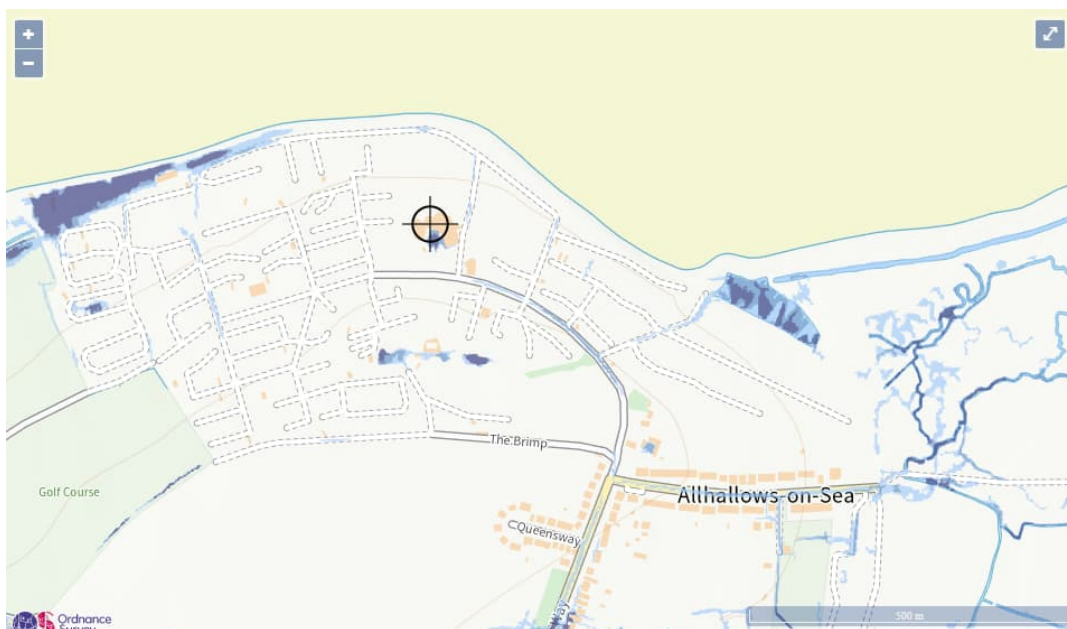
However immediately adjacent to the extension this is a pool area of medium risk this is at a lower level than the proposed development the ground in this area typically at 12.4m the proposed FFL is at 13.2m, there is a basement at 10.2m but this will have waterproofing up to the proposed FFL, so will not be at risk of flooding.

There is a small section of floor that will match the existing FFL at 12.2m, but no door thresholds are provided at this level, and this will have concrete upstands to prevent water ingress.

For this external area the area indicated as medium risk is currently impermeable area, and no major alterations in terms of changing falls or locations of outfalls will be made to the existing drainage infrastructure directly serving this area and the strategy of draining this area will may remain unchanged.

Generally, elsewhere around the site, the external levels fall to the north away from the building, towards The Thames, so it is unlikely that the building will be at risk for surface water flooding with water flowing overland will flow into the road drainage and avoid the proposed scheme.

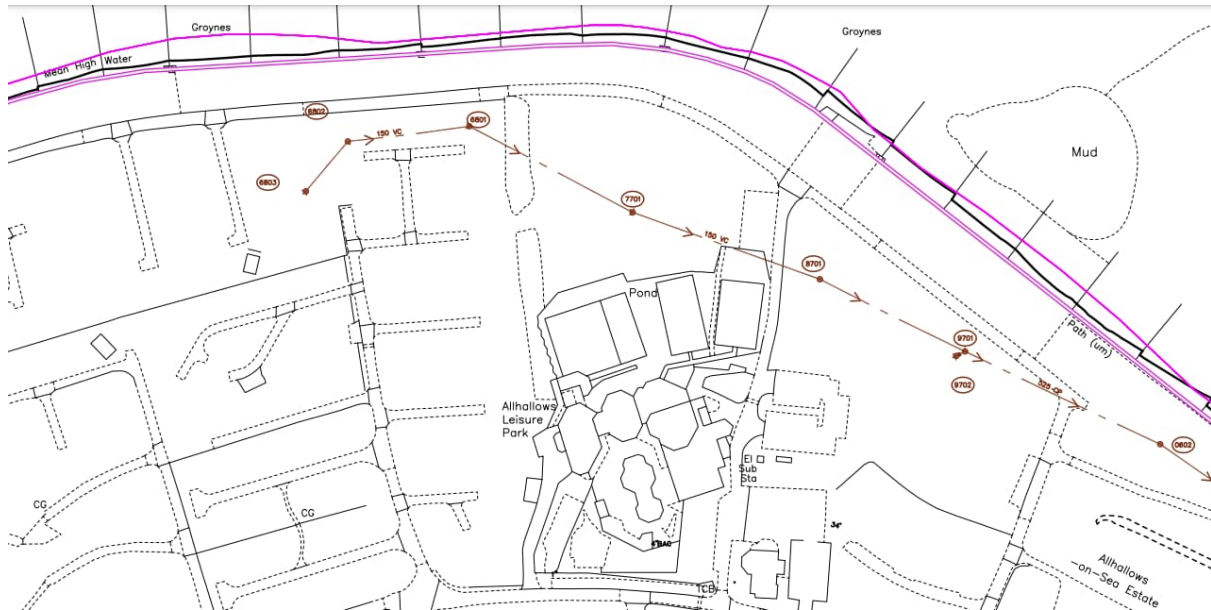
Figure 3.2.1 – Surface Water Flooding



### 3.3.Flood Risk from Sewers

The existing foul drains on site are believed to be private and connect to a public drain on the east of the site, as shown in the imagine below:

Figure 3.3.1 – Public Foul Drain



The extent and condition of these are currently unknown and they may need future investigation to confirm they are suitable for reuse and to design any improvements necessary.

The public drain is located at a lower level and not risk the proposed development. Any discharge from the public sewer would flow to the north and not impact the development. The drains will be located into the surrounding roads and any flooding will flow down the slope away from the proposed development, so there would be a low risk in flooding.

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### **3.4. Groundwater Flood Risk**

There are no significant local aquifers that could give rise to a risk from ground water flooding.

### **3.5. Reservoirs Flood Risk**

There are no significant local reservoirs that could give rise to a risk to flooding.

### **3.6. History of Flooding**

It has not been identified to CWP that there has been any historic flooding of the site around to proposed development.

## 4. Planning policy and guidance

### 4.1. National Planning Policy / Guidance

Under the town and county planning order a major development is defined as:

- The winning and working of minerals or the use of land for mineral-working deposits.
- Waste development.
- The provision of dwelling houses where:
  - o the number of dwellings to be provided is 10 or more; or
  - o the development is to be carried out on a site having an area of 0.5 hectares or more and it is not known whether the development falls within the above sub-paragraph.
- The provision of a building or buildings where the floor space to be created by the development is 1,000 square metres or more: or,
- Development carried out on a site having an area of 1 hectare or more.

Therefore, based on the red line boundary provided by Space & Place the development will be classed as a minor development due to the floor area is smaller than 1000m<sup>2</sup> squared and the site is under one hector.

### 4.2. National Planning policy framework

The National Planning Policy Framework (NPPF) sets out the Government's planning policies for England and how they are expected to be applied. This document replaces the previous national planning policy document relevant to flood risk 'Planning Policy Statement: Development and Flood Risk'.

The policy aims to avoid inappropriate development by directing it away from the areas that are at highest risk. Where development is necessary within the floodplain, it must be demonstrated to be safe without increasing flood risk elsewhere.

The NPPF requires that an FRA should be undertaken:

- o For all developments greater than 1 Hectare (ha) in size in Flood Zone 1.
- o All proposals for new development (including minor development and change of use) in Flood Zones 2 and 3, or in an area within Flood Zone 1 which has a critical drainage problem.
- o Where proposed development or a change of use (e.g., from commercial to residential) to a more vulnerable class may be subject to other sources of flooding (e.g., surface water drains, reservoirs).

The site is located within Flood Zone 1 and a Minor development, an FRA is believed not to be required for the redevelopment and extension of the existing pool as the site area is 3482m<sup>2</sup>.

### 4.3. Medway Council

The Medway County Council has published a local flood risk management strategy, dated at the July 2014. Which outlines the approach that should be taken to manage local flood risk.

Objectives:

1. Work with stakeholders to develop a collective understanding of local flood risk to enable successful local flood risk management.
2. Monitor flood risk.
3. Ensure local policy is consistent with wider flood risk management policies and legislation. Promote the use of Sustainable Drainage Systems SuDS in accordance with the forthcoming role as SuDS Advisory Body
4. Take account of the cumulative effect of development and climate change on the risk of flooding throughout Medway
5. Ensure that all development has a positive or nil effect on the risk of flooding to and arising from proposed development.
6. Use flood risk information to implement a risk-based approach to capital investment decisions and maintenance programmes and activities.
7. Consider how future infrastructure improvements (e.g., highways/rail/public realm works) and/or changes could be used to deliver local flood risk benefits.
8. Share flood risk information in Medway with all Risk Management Authorities and the public.
9. Increase public awareness with respect to flood risk and responsibility for flood risk management.
10. Use information on flood risk as a tool for flood prediction and warning.

### 4.4. North Kent Marshes Internal Drainage Boards

The North Kent Marshes Internal drainage boards who overseeing the management of water levels and flood risk within the North Kent Marshes district. The board will make an assessment for the proposed application to ensure no inappropriate development of the land and ensure the management of the surface water is carried out in a way that meets its objectives.

Based on the policy statement their main objectives are as follows:

1. Understand the risks of flooding and coastal erosion, working together to put in place long-term sustainable plans to manage these risks and making sure that other plans take account of them.
2. Seek to avoid inappropriate development in areas of flood and coastal erosion risk and being careful to manage land elsewhere to avoid increasing risks.
3. Build, maintain and improve flood and coastal erosion management infrastructure and systems to reduce the likelihood of harm to people and damage to the economy, environment and society as well as achieving wider environmental benefits.
4. Increase public awareness of the risk that remains and engaging with people at risk to encourage them to take action to manage the risks that they face and to make their property more resilient; and
5. Improve the detection, forecasting and issue of warnings of flooding, co-ordinating a rapid response to flood emergencies and promoting faster recovery from flooding.

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#### 4.5. Climate Change & Peak Rainfall Intensity

In February 2016, the Environment Agency released 'Flood risk assessments: climate change allowances'<sup>1</sup> guidance to support the NPPF (further updated in May 2022).

The Application Site is located within the Medway Management Catchment for peak rainfall allowances. Table 4.4.1 and Table 4.4.2

Table 4.4.1 - 3.3% Annual Exceedance Rainfall Event

<i>Epoch</i>	<b>Central Allowance</b>	<b>Upper Allowance</b>
2050's	+20% (peak rainfall intensity)	+35% (peak rainfall intensity)
2070's	+20% (peak rainfall intensity)	+35% (peak rainfall intensity)

Table 4.4.2 - 1% Annual Exceedance Rainfall Event

<i>Epoch</i>	<b>Central Allowance</b>	<b>Upper Allowance</b>
2050's	+20% (peak rainfall intensity)	+45% (peak rainfall intensity)
2070's	+20% (peak rainfall intensity)	+40% (peak rainfall intensity)

As the scheme is scheduled to be operational by 2024 and deemed to have a 75-year design life (2061 -2100) the buildings lifespan will be within the 2070's epoch with the central rainfall allowance has been used for the 3.3% AEP Rainfall Event (40% respectively) and 1% AEP Rainfall Event (40% respectively)



## 5. Consultations

### 5.1. Medway County Council

As lead local flood authority Medways County Council will be consulted on proposed drainage strategy.

### 5.2. North Kent Marshes Internal Drainage Boards

North Kent Marshes Internal Drainage Board has a supervisory duty over all matters relating to surface water drainage within the district.

### 5.3. Environment Agency

As the surface water will eventually discharge into The River Thames, the environmental agency/LLFA we need to be consulted due as this is a public water course.

## 6. Surface Water Design

### 6.1. Existing Site Drainage

Much of the existing site that is to be developed, is believed to have no formal surface water drainage. With any surface water being dealt with by infiltration into the topsoil or via over land flows to the existing hardstanding drainage. This existing hardstanding surrounds the pool and has several channel drains which feed into the existing network that is believed to discharge into the Thames Estuary

Near the proposed site, a new show bar and activity equipment have been recently constructed with new below ground infrastructure for the surface water, based on the previous drainage strategy the total impermeable area is 4787m<sup>2</sup>. The information available appears to show the creation of a new surface water network from site to the northeast of the show bar that appears to eventually discharge into the estuary. The site appears to have several inlets into a swale, the outlet consists of a 150mm diameter pipe that has no flow control device attached.

A second outlet that appears to discharge into the Thames Estuary is located to the north of the show bar and this appears to serve the remaining half of the external areas and the recently constructed car park which was part of the show bar project. This network also appears to connect to the existing building. There is no evidence showing any flow control devices and no attenuation on this network.

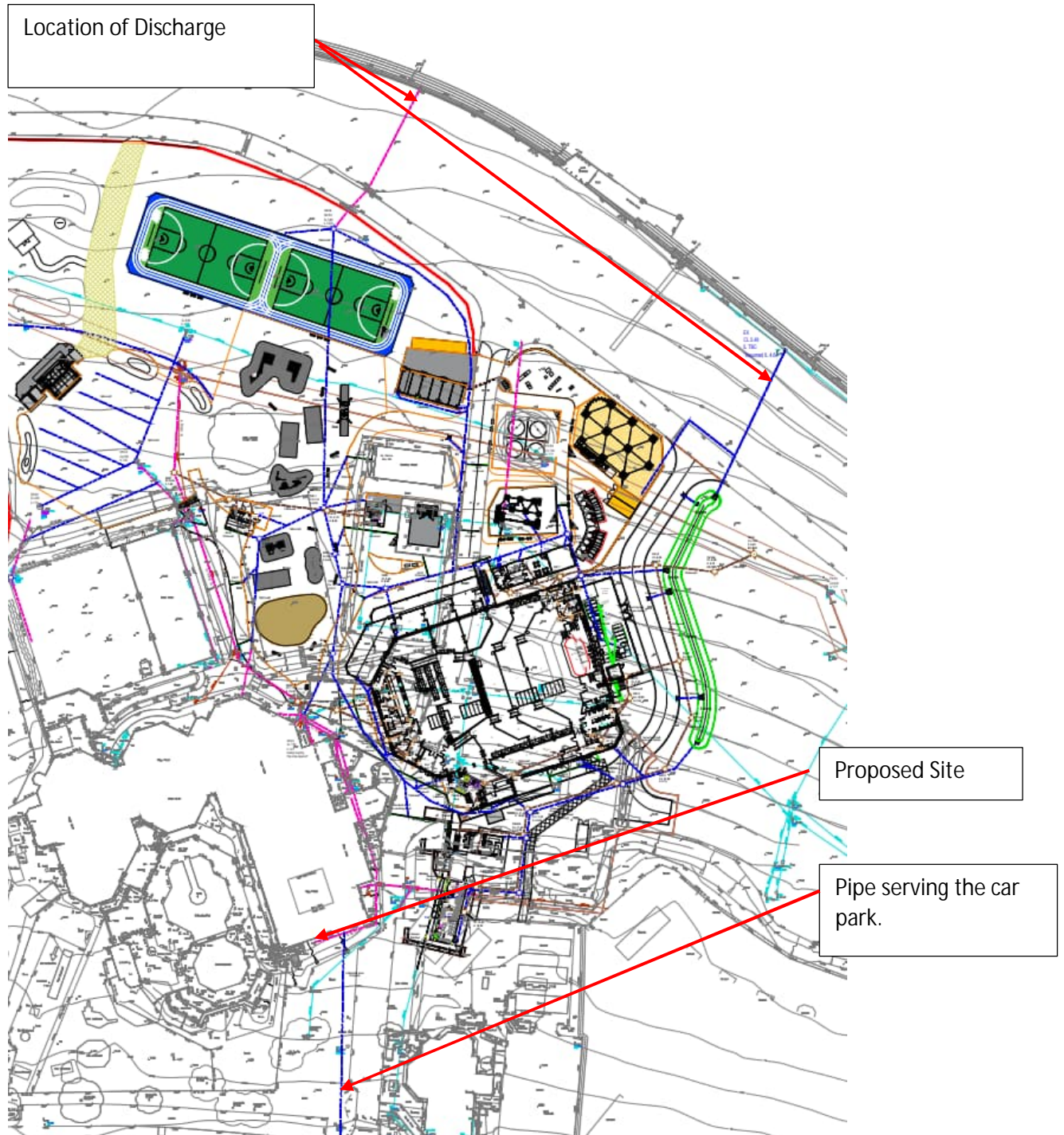
Consequently, it assumed the existing impermeable areas on site is discharging into the Thames Estuary at an unrestricted rate limited to the connection pipes maximum flow rate.

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Figure 6.1.1 – Location of Discharge



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## 6.2.Potential For Soakaway

Based on the assumed underlying ground conditions it is believed that infiltration is not viable for the main structure for this scheme, due to the extended thickness of clay materials underlying the site.

The paths tend to be of small cross section are assumed to infiltrate into the soft verges if impermeable or to be of permeable construction.

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### 6.3.Existing Surface Water Run Off Rates

The green field run off rates were calculation use Wallingford HR online calculator and a summary of the rates for the Site area are shown below:

Table 1: Greenfield rates

<i>Return Period</i>	<i>IH124 (l/s)</i>
1 Year	0.38
30 Year	1.04
100 Year	1.44

### 6.4.Catchments

The total proposed site area is Approx 3338m<sup>2</sup> with the new proposed impermeable areas totalling 1184m<sup>2</sup> this is broken down to the area beneath:

New Plant Room & Swimming Pool – 770m<sup>2</sup>

External Decking – 167m<sup>2</sup>

New Service Path & Path – 228m<sup>2</sup>

For the design a total area of 1200m<sup>2</sup> has been used.

Existing Show bar Development Impermeable area into Swale 3740m<sup>2</sup>

It is believed there will not be any additional catchment that would flow onto the proposed site, as the road above the site will redirect any surface water into road drainage and bypass the proposed site. Any Existing drainage beneath the proposed development will be rerouted to maintain the existing connections and outfalls.

### 6.5.Proposed Discharge

The proposal is to use the existing discharge that into the Thames via the northeast outlet which was installed as part of the recent show bar development, it is assumed this will be achieved by gravity drains via connecting into the recently constructed swale. The preliminary design is based on limiting the discharge to the maximum flow rate of the existing outlet.

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## 6.6. Attenuation

For the proposed project that will use an existing outlet to the Thames Estuary, the storage and drainage calculations will be based on the impermeable areas of the new development plus the existing show bar development, that is discharging into swale and outlet. For these areas the storage requirement will be based on not exceeding of the as built network capacity, in dealing with the recently developed show bar. Please note this assessment has been based on the limited information provided on the recent project.

For this it is assumed the scheme for the existing scenario allows for no flooding for the 3.33% + CC, but for the 1% AEP + CC there appears to be approximately 44m<sup>3</sup> over land flooding, which originates at the bottom of the swale and would flow downhill onto the access road and eventually into the road drainage which is assumed to discharge into the Thames.

This volume has been based on an uncontrolled discharge rate to the Thames estuary, which is assumed to be approved in the previous application. A conservative estimate has been made on the existing swale volumes for these calculations.

For the scenario of the proposed project plus the show bar development, the methods used to ensure that there is no increased flooding in the 1% AEP + CC and the 3.33% AEP + CC will be achieved by:

- Increasing the outfall diameter, currently is a 150mm pipe. However, the previous drainage strategy allowed for a 225mm diameter connection, with this increase it will ensure that there is no flooding for the 3.33% AEP + CC and only 33m<sup>3</sup> in the 1% AEP + CC.
- In addition to increasing the outlets diameter, weirs will be installed in the existing swale to increase the storage volumes, as currently the swale is sloping downhill, this results in poor efficiency of storing surface water and the additional weirs in the swale would drastically increase its storage volume, detailed measurements are to be taken next stage to fully analyse the existing geometry and develop the modifications required. However, it can be assumed this will further reduce the flooding and improve the current flooding event for the 1% AEP + CC.

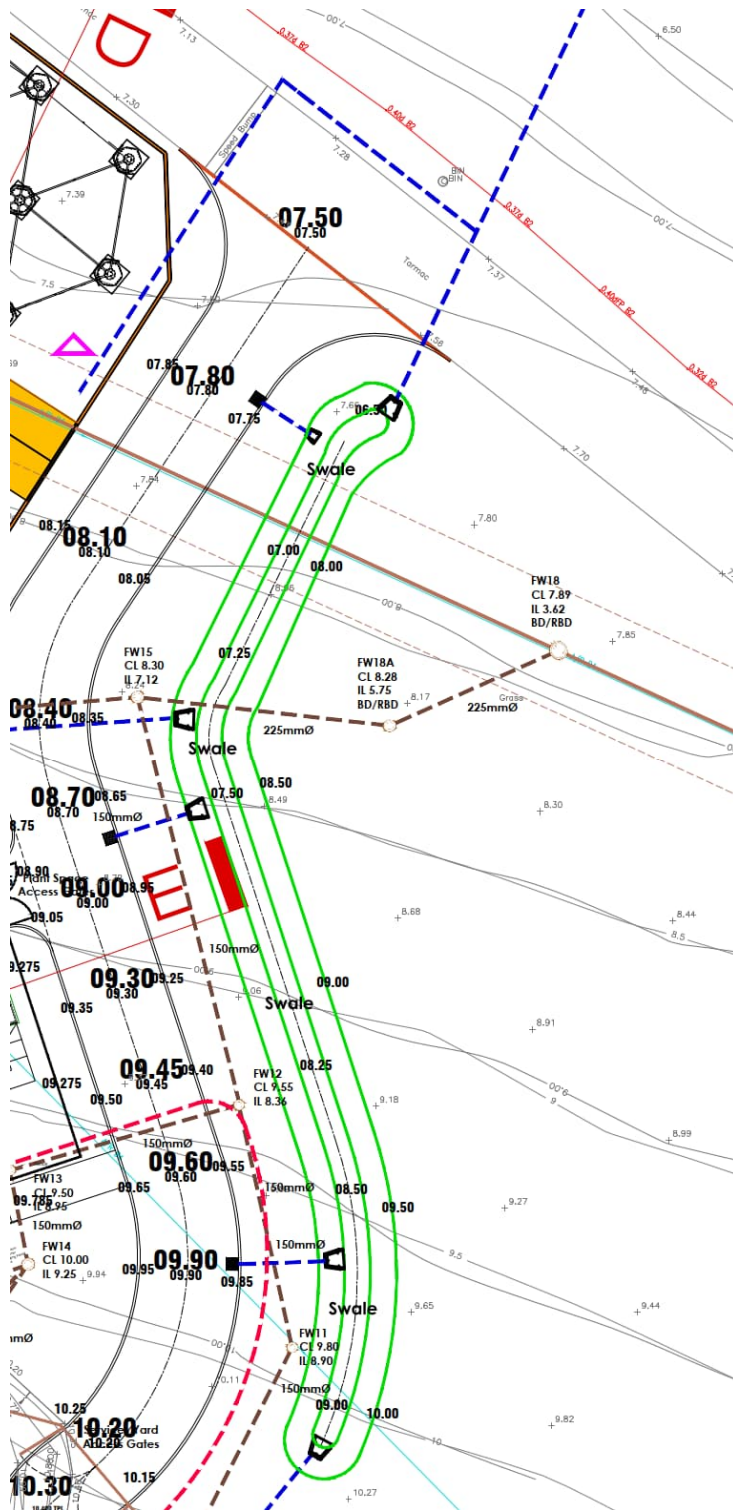
The work to the existing swale and outfall will be done of the existing planning application and within the boundary of the show bar development.

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Figure 6.6.1 – Details of Existing Swale



## 7. Foul Drainage Design

### 7.1. General Foul Design

The arrangement of the existing foul network is currently unknown at this stage and the design will be developed at the next stage.

However, it is understood that the existing foul drainage that serves the main complex flows to the north via gravity drains to a public sewer the runs along its north boundary.

Figure 6.1.1 – Location of Public Sewer



With the proposed site there are several existing drains crossing the proposed site that will be rerouted to avoid the proposed extension initial indications show that the drainage will connect to the public sewer via gravity. There is a deep basement that it is assumed will have a sump and pump system installed that will lift the water into the local gravity foul network.

Based on the proposed development it is believed that this development will not increase the site occupancy, therefore the overall foul flows generated by the wider site would not increase. Consequently, it is anticipated that the existing public sewer will have sufficient capacity and the flows will remain unchanged for continued use.



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## 7.2.Backwash

Currently there is an existing above ground backwash tank that appears to discharge into the existing on-site drainage network, the discharge rate of this tank is unknown. This tank is to be replaced with new backwash storage tanks, that are to be designed to serve the existing and proposed pools and will be connected into the existing drainage system. The exact connection point, rate and details will be developed at the next stage.

For the proposed development an assumption of 5l/s has been taken for allowable discharge rate which the network currently can accommodate. There is a lack of information on the exact arrangement of this on the existing network in terms of how the backwash is currently connected which is needs to be confirmed by site inspections and surveys.

A new trade waste licence will be required for the discharge as the connection is likely to be into a public foul drain. This will be subject to approval, that may include dichlorination prior to discharge, and agreement on discharge rates and times with the local water authority (Southern Water). Limited details of existing licences have been received, to date, and it is assumed that new licences for connection to a public network, or discharge to ground or surface water feature may need to be applied for as the design develops.

## 7. Adoption and Maintenance

The following section sets out the anticipated ownership/adoption routes for each drainage feature within the Proposed Development and their maintenance requirement(s).

### Attenuation Swale – Surface Water

- Ownership / adoption: Haven
- Maintenance requirements: Operational and maintenance requirements for Attenuation Storage Tanks can be found within Table 21.3 of The SuDS Manual (CIRICA C753).

### Onsite Private Sewer Network

- Ownership / adoption: Haven
- Maintenance requirements: Operational and maintenance requirements for the private sewer network will be undertaken in accordance with the specification of the maintenance company.

### Onsite Public Sewer Network

- Ownership / adoption: Southern Water
- Maintenance requirements: Operational and maintenance requirements for the public sewer network will be undertaken by Southern Water.

Haven is a well-respected and knowledgeable client who have many sites with private and complex drainage systems. They have permanent maintenance teams on site and have in place management contracts to maintain and service their systems and these would be extended to the new systems.

## 8. Conclusion And Recommendations

Crouch Waterfall (CWP) was commissioned by Haven to produce an Outline Flood Risk Assessment and Drainage Strategy (DS) report to support the proposed alterations of the southern section of the existing main complex at Haven Allhallows Resort.

This preliminary drainage strategy and outline flood risk assessment has been prepared to support the proposed development through the planning process only.

Investigations into the sources of flooding at the development site indicate that it is at low to very low risk of flooding. As the site is in flood zone 1 and less than 1 hectare a formal Flood risk assessment is not required.

The drainage strategy produced by CWP is for the surface and foul water design of the new extensions to contain the new splash pad and Plantroom, and for the alterations of the original show to a changing village.

In summary, it is deemed disposal of surface water via infiltration is unlikely to be viable, therefore we propose to discharge the surface water into the Thames Estuary via an existing outlet which was installed as part of the recent constructed show bar development. The proposed storm water will be discharged at uncontrolled flowrate, only limited by the pipe diameter. Our new pipework will discharge into the existing swale on site. Improvements will be made to the swale to increase its water storage capacity.

In accordance with National and Local design guides, the surface water drainage design has been designed to accommodate the 3.3% AEP and the 1% AEP rainfall event being below ground.

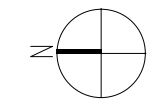
The proposed drainage is to connect into the existing swale for the show bar development and reuse the existing outlet to the Thames which is an uncontrolled flow rate. To ensure there is no increase in the flooding from the site with the increased impermeable area. The outfall will be increased to a 225mm pipe, this size was described in the previous drainage strategy as part of the show bar. Also, to increase the storage capacity weirs are to be installed in the existing sloping swale to increase the storage volume and ensure there is a reduction in the volume of flooding in the 1% AEP rainfall event for the site.

Foul drainage will connect to the public drain to the north of the site, via gravity. The overall volume of foul drainage will remain unchanged as the overall occupancy of site will not be increased as part of the works. New backwash arrangements and discharge requirements will be negotiated with Southern Water.

It is proposed that attenuation features and private drainage within the development will be maintained by a private management firm. All elements of the proposed drainage will be maintained in accordance with the manufacture's specifications.

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## Appendix 1- Proposed Plans



NOTE  
— Planning Boundary  
— Line

Revision	Date	Description	By/Ch
R01	11.05.23	Issued for Planning	SP

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STATUS: Based for Planning

PROJECT  
**Haven Holiday Parks  
Allhallows**

DRAWING  
**Site Plan As Proposed**

SCALE: 1:200 - SHEET SIZE: A1 - DRAWN BY: GM - CHECKED BY: SP - DATE: 09.10.2022

PROJECION: DRAWING NO.: 3893-ASP-ZZ-XX-DR-A-0823-P01 REGION:

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