

FURNESS PARTNERSHIP

Job Title: Littlehampton Leisure Centre
Date: 14th June 2017

Job Ref: L1953
Rev. N

Drainage Strategy

This document sets out the drainage strategy for a proposed leisure facility on Sea Road, Littlehampton, BN16 2NA and should be read in conjunction with the following documentation:

- Furness Partnership drainage drawings: L1953/D10(E), L1953/D11(B), L1953/D12(D), L1953/D13(B) L1953/D14(A).
- Flood Risk Assessment carried out by Scott White & Hookins dated October 2016.
- Topographical & Utilities survey dated 29/07/16 carried out by Sumo Services Ltd.
- CCTV survey dated 21/12/16 carried out by Site Vision Surveys Ltd.
- Southern Water record sewer drawings.

Flood Risk Assessment

A Flood Risk Assessment (FRA) has been carried out for the site by Scott White & Hookins and the reader is referred this report for further detail.

The FRA carried out indicates that the site is in a Flood Zone 3a area which is defined as high risk and having a 1 in 100 (1%) or greater annual probability of river flooding and 1 in 200 (0.5%) or greater annual probability of sea flooding. However as the development is classed as 'less vulnerable' in accordance with PPS25 it is deemed appropriate to be located within a Flood Zone 3a area.

The FRA notes that as the new development is to be constructed further away from the sea front than the existing leisure centre it does not pose any greater risk of coastal flooding.

Although the development does not increase the flood risk on site it is recommended in the FRA that the finished floor level is raised to 3.71m AOD to match the 1 in 200 year flood level (with climate change) and provide a minimum 400mm freeboard over the current 1 in 1000 year flood level as modelled by the Environment Agency. This is recommended to mitigate any residual risk as the surrounding area is defined as a 'wet spot' due to its proximity to the coastline.

Proposed Development and Existing Site Details

The site currently comprises a 2900m² leisure centre and perimeter hardstanding (2280m² building footprint) and 5640m² of associated car parking. There is a sports dome complex to the north of the existing leisure centre however no surface water drainage has been traced in this area. The total existing impermeable area is shown in Table 1.

Table 1: Existing Impermeable Area

	Area (m ²)
Leisure Centre (incl. perimeter hardstanding)	2900
Car Parking	5640
Total	8540

The new scheme involves demolishing the existing leisure centre and sports dome complex and replacing it with a new 3200m² leisure centre with associated hardstanding and a new service road located in place of the existing sports dome complex to the north of the site. The existing leisure centre will be returned to green space however the original car parking facilities are to be retained and will be largely unchanged. There will be a new 690m² area of overflow car parking to the west of the site comprising a Bodpave cellular porous paving grid and is therefore not classed as impermeable. The total proposed impermeable area is 9600m² as shown in Table 2 which represents a net increase of 1060m² as a result of the development.

Table 2: Proposed Impermeable Area

	Area (m ²)
New Leisure Centre	3200
New Service Road/Yard & Hardstanding	760
Car Parking/Hardstanding	5640
Total	9600

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Surface Water Drainage

Existing

Following the completion of a comprehensive drainage survey on site it has been shown that the existing surface water drainage from the car park and leisure centre discharges directly into Mewsbrook Boating Lake to the east of the site via its own 300mm diameter sewer and outfall. The local authority responsible for Mewsbrook Boating lake is Arun District Council (ADC) who have been consulted on all surface water proposals for approval. Surface water drainage surrounding the sports dome complex was not able to be traced and as such is not assumed to contribute to the surface water discharge from site.

Based on the above impermeable areas and recommended design rainfall intensities in the Building Regulations Document H the existing peak flow from site is calculated as approx. 128 l/s as shown in Table 3 below.

Table 3: Calculation of Existing Flow From Site

	Rainfall Intensity (l/s/m ²)	Area (m ²)	Flow (l/s)
Roof Area (Existing Leisure Centre)	0.018	2280	41
Paved Areas	0.014	5640 + 620 = 6260	87.6
Total			128.6

Proposed

The surface water discharge from site will be made up from run-off from the following elements of the development proposal:-

- Roofs
- Paved Areas around new development
- Access Roads
- Car Parking Bays

The standard hierarchy of drainage solutions states that surface water discharge should initially be considered via sustainable methods such as infiltration. Soil infiltration tests have been carried out by AP Geotechnics and have shown that due to the high groundwater level on site soakaways are not feasible.

Alternatively as the end-use of the site is unchanged it is assumed that the existing sewer system will have sufficient capacity to accommodate the new development provided the rate at which surface water discharges from site does not increase. It is therefore proposed that surface water run-off from the new leisure centre will be limited to ensure that the total discharge rate from site remains the same or less than the total existing site discharge rate for all conditions. See Furness Partnership drawing L1953/D10 for more information.

The new leisure centre surface water run-off will discharge via a separate network at a restricted rate of 30 l/s before connecting into the existing 300mm diameter surface water sewer just before the outfall into Mewsbrook Boating Lake. It has been agreed with ADC that the section of existing sewer from the proposed connection point to the outfall in the lake will be CCTV surveyed to confirm its suitability for continued operation. When this flow is added to the unrestricted flow from the existing car park it results in a 15% or greater betterment on the total flow from site for the 1, 30 and 100 year return period. Suitably sized surface water attenuation will be provided in the form of an attenuation tank to ensure that the new leisure centre does not flood in a 1 in 100 year storm event plus 30% climate change allowance as agreed with Arun District Council following a meeting with the ADC drainage division on 31st January 2017. See Furness Partnership drawing L1953/D10 for more information. The proposed peak flow from site for a 1 year return period using recommended design rainfall intensities in Building Regulations Document H is calculated as 108.9l/s, a betterment of 15% from existing as shown in Table 4 below.

Table 4: Calculation of Proposed Flow From Site

	Rainfall Intensity (l/s/m ²)	Area (m ²)	Flow (l/s)
New Leisure Centre & Access Road	-	3960	30*
Existing Car Parking/Paved Area	0.014	5640	78.9
Total			108.9
Betterment			15%

*flow limited via Hydrobrake

All surface water run-off from the new service road/yard within the new development will be treated using trapped gully pots in accordance with PPG 3 prior to discharge into Mewsbrook Boating Lake.

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Flood Risk Management in Temporary Condition

The existing leisure centre is due to be demolished after the new centre has been completed to allow for continued operation. There will therefore be a period where both centres are in-situ resulting in an increase in impermeable area in the temporary condition. Arun District Council have stipulated that due to the increased flood risk posed by the additional volume of run-off during construction. Mewsbrook Lake levels will be monitored with a trigger level agreed in advance between the main contractor and client. If the trigger level is exceeded then flood risk management protocol will be implemented by the main contractor to temporarily restrict surface water discharge and/or divert water from the lake to an alternative temporary storage location. The flood risk management strategy and protocol is to be agreed between main contractor and client prior to installation of proposed drainage.

Foul Water Drainage

Existing

The CCTV drainage survey carried out indicates that the existing foul water drainage on site discharges into the dedicated Southern Water foul sewer in 2No. locations in Hendon Avenue. It is also assumed that the trade effluent from the existing swimming pool on site discharges into the foul sewer in Hendon Avenue however this should be confirmed prior to works commencing on site.

Proposed

As the end-use of the site is unchanged it is assumed that the existing sewer system will have sufficient capacity to accommodate the new development, this is to be confirmed via. a capacity check that has been submitted to Southern Water. Drains will be provided to serve all foul producing appliances within the new building. The drains will be designed in accordance with BS EN 752. All foul water arising from the development of the site will be collected by a foul water network that will connect into the existing Southern Water foul sewer in Hendon Avenue. See Furness Partnership drawing L1953/D10 for more information.

The swimming pool within the proposed leisure centre complex will contain a suitably sized backwash facility which should have a separate foul network and connection to the new on-site foul drainage system. It is proposed that this flow will be limited so as not to exceed the existing trade effluent license discharge conditions of 70m³ per day at 2l/s subject to agreement with Southern Water. It is proposed that any excess trade effluent will be stored using an oversized 600mm diameter pipe run to give 15m³ of on-site attenuation however this needs to be confirmed with the filtration specialist.

Southern Water Foul Rising Mains

There are 2No. existing buried Southern Water foul rising mains surrounding the proposed site. A 600mm dia. rising main with a 6m easement either side of the edge of pipe and a 300mm dia. rising main with a 4m easement either side of the edge of pipe. Following the completion of specialist site investigation works to determine the exact location of the 300mm dia. rising main, it has been determined that there is a conflict between the proposed building location and that of the existing buried pipe. The surveyed route of the pipe passes under the south east corner of the building footprint meaning the minimum pipe easements required by Southern Water cannot be provided. Following consultation with Southern Water it has been agreed in principle that the 300mm dia. rising main can be locally diverted, if the required easements cannot be achieved, with a new alignment to the east of its current position. At the time of writing there is an ongoing dialogue with Southern Water regarding the proposed diversion and protection of existing rising mains during construction.

The proposed drainage scheme is designed to provide a minimum 500mm clearance above the buried foul rising main diversion based on the invert level of the existing rising main recorded from the additional survey and in accordance with Southern Water recommendations. The design is to be reviewed following confirmation of diversion location and depth from Southern Water to ensure the clearance requirements are met.

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