BRH architecture engineering

Phoenix House, Monahan Road
Cork, Ireland. T12 H1XY
+353 21 2376150
info@brh.ie

DRAINAGE IMPACT ASSESSMENT (DIA) AND SUDS STATEMENT

(Incorporating FLOOD RISK SCREENING ASSESSMENT)

FOR PROPOSED RESIDENTIAL DEVELOPMENT

AT ELM GROVE, BALLYNAMONA, FERMOY, CORK.

PREPARED BY:

BRH DESIGN PARTNERS,

PHOENIX HOUSE,

MONAHAN ROAD, CORK

PREPARED FOR:

COOLEENEY DEVELOPMENTS LTD ON BEHALF OF CORK COUNTY COUNCIL

JULY, 2023

Document Control

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Contents

1 Introduction

Having regard to Objective WM 11-10 of the Cork County Development Plan 2022 which requires that all new developments incorporate sustainable drainage systems (SuDS) storm water attenuation and treatment measures utilising Nature Based Drainage Solutions, SuDS best management practices have been incorporated into the proposed storm water system.

This DIA is part of a Part 8 application to complete the existing estate. 26 houses are not at wallplate level and the planning has lapsed for these houses (Planning Ref: 15/5973). The stormwater system will tie back into storm system under construction as permitted under Planning permission ref: 15/5973 at S2.04. This DIA explores the impact of the development and any additional measures that can be provided.

This Drainage Impact Assessment (DIA) and SUDS statement demonstrates a net biodiversity gain by the implementation of Nature-Based Solutions (NBS) into the overall drainage solution.

The DIA utilises the guidance on the Design of SuDS as contained in The Greater Dublin Strategic Drainage Study (GDSDS) (2005) and Nature-based Solutions to the Management of Rainwater and Surface Water Runoff in Urban Areas – Best Practice Interim Guidance Document (DHLG,2022).

The surface water system ties into the overall estate infiltration area which has been designed to take the surface water from these 26 houses and infiltrate to ground. This existing stormtech system is designed using an isolator row to provide further treatment before going to ground. No water from this development will be discharged to a watercourse.

In addition to this existing system a new full retention fuel / oil separator will be provided such that the discharge of the 26 houses and associated road network will go through this oil separator before discharge to the sewer and then the stormtec system.

Surface water runoff from the site's road network will be directed to the proposed pipe network via conventional road gullies with additional surface water runoff from driveways and roofs also routed to the proposed surface water pipe network.

Refer to Drawing 23041-BRH-ZZ-00-DR-C-0301_A for details of the proposed surface water details.

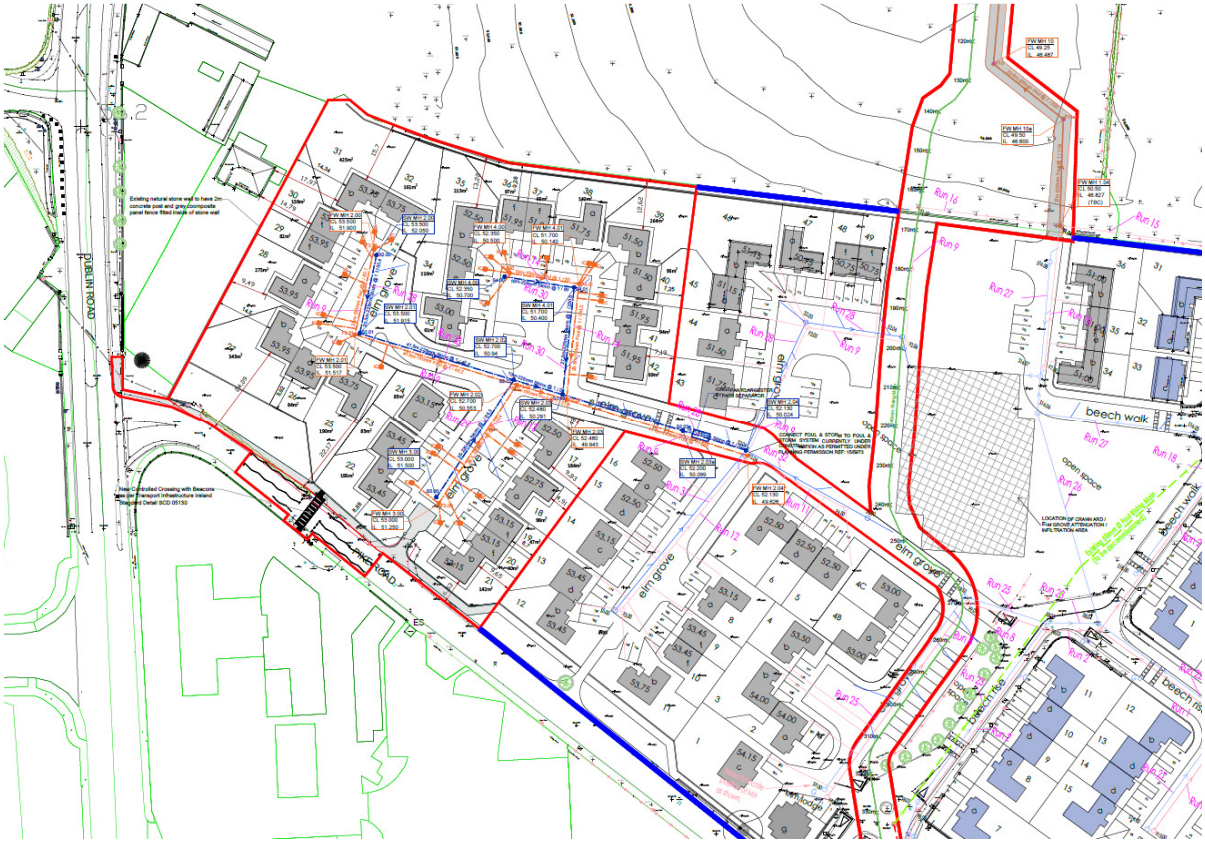


Figure 1 Overall Site Storm Layout – Drawing 23041-BRH-ZZ-00-DR-C-0301_A

2 Compliance with GDSDS Surface Water Drainage Policy

The site's surface water management infrastructure has been designed in accordance with the Greater Dublin Strategic Drainage Study (CDSDS). The GDSDS (Vol. 2, Chapter 6.3.4) requires that the following design criteria are applied to all sites.

Criterion 1: River Water Quality Protection
Satisfied by providing treatment of surface water run off by SUDS features such as full retention fuel/oil separators at surface water discharge point. The surface water system then ties into the overall estate infiltration area which has been designed to take the surface water from these 26 houses and infiltrate to ground. This existing stormtech system is designed using an isolator row to provide further treatment before going to ground. No water from this development will be discharged to a watercourse.

Criterion 2: River Regime Protection
Satisfied by providing stormwater attenuation tanks that infiltrate to ground eliminating any direct discharge to rivers.

Criterion 3: Level of Service (Flooding) for the Site
This site is not liable to flooding. See Section 3.3.

Criterion 4: River Flood Protection
Satisfied by providing stormwater attenuation tanks that infiltrate to ground eliminating any direct discharge to rivers, addressing flood risk associated with the 1 in 100-year storm and avoiding development in flood plains
Following a comprehensive review of the design of the storm water drainage system we considered options under the SuDS guidance policies referred to in the Greater Dublin Drainage Strategy. A preliminary feasibility of the applicable SuDs Techniques was carried out. The preliminary analysis indicated that the following techniques were possibly suitable Attenuation Tanks, Permeable Paving, Green Roofs, Tree Pits, Petrol Interceptors, and Rainwater Harvesting.
Each proposal was examined and evaluated on its merits / suitability under site specific constraints for use in the proposed development site. The design approach summary is as follows:

SUDS Appraisal
The SUDS selection process used for this site is in accordance with SUDS selection flow chart. Volume 3, Section 6.5, Figure 48 of the GDSDS. The characteristics of the site are utilised to select the various SUDS techniques that would be applicable.

The following methodologies are being implemented as part of a SuDS treatment train approach:

Permeable Pavement
Permeable pavement reduces the overall impermeable area of the hard-standing area.

A desktop study of the site notes that there are potential karst features nearby. A walkdown of the unfinished estate was completed and there is potential evidence of karst activity due to the removal of topsoil of these areas. Permeable paving is not recommended for use in potential karst areas due to the potential creation of dolines. In such areas best practice is to take all water to ground in a controlled manner away from road and paving. This is what is being proposed.

Green Roofs
Green roofs are typically installed in apartment blocks and buildings with flat roofs for the purposes of improving the quality of the surface water runoff. This development contains houses only and no green roofs are proposed for this development.

Rainwater Harvesting
In relation to rainwater harvesting, an option is to provide a water butt with each individual dwelling. This will be located to the rear of each unit. This water butt will only have the ability to catch the rear sloping side of the dwelling and the reuse would be for watering plants.

Tree Pits
Similar to the review of permeable paving, tree pits are not recommended for use in potential karst areas due to the potential creation of dolines. In such areas best practice is to take all water to ground in a controlled manner away from road and paving. This is what is being proposed.

Attenuation System
The existing attenuation system in Elm Grove infiltrates surface water to ground. This ensures the development will not give rise to any impact downstream of the site.

Petrol Interceptor
It is proposed to provide a new petrol interceptor before the discharge to the storm sewer under construction. This additional measure will increase the quality of water discharging to the storm sewer and from there to ground. It is proposed to provide a Klargester Bypass Separator or similar approved.

In conclusion the water quality from this catchment should be of a high quality due to the above mentioned measures, which are applied in a treatment train to the water before discharge to the proposed sewer connection (and from there discharge to ground).

The above measures ensure a suitable management train is provided.

Management Train
The management train commences with source control through the provision of rainwater butts, where selected, in the rear gardens. This will also reduce the water consumption required of each housing unit.

The second stage of the management train, site control, is provided by the introduction of the hydrocarbon interceptors, which provide a degree of treatment before discharging to the attenuation system.

The existing attenuation systems offer a third stage of treatment, regional control, by slowing the storm water discharge down and removing additional silts which may remain in the storm water. In addition the storm tech system has been designed with the Stormtech System Isolator Row which enhances Total Suspended Solids (TSS) removal.

Maintenance Regime for SUDS Devices
The Elm Grove attenuation system will require regular maintenance to ensure continuing operation to design performance standards. It is noted that this system is already in place and operational and is not part of this application. The Stormtech System Isolator Row provides for easier maintenance. Figure 2 is a stormwater network maintenance plan and schedule.

Stormwater Network Maintenance Plan and Schedule				
Item	Inspection Type	Inspection Frequency	Cleaning mechanism	Cleaning Frequency
Road Gullies	Visual	Quarterly or after significant storm event	Remove silt and solids by hand	Minimum every 2 years
Manholes and Chambers	Visual	Quarterly or after significant storm event	Open manhole/chamber cover. Remove any debris. Maintenance and commissioning agreement to be agreed with supplier should there be any pipework blockage	Minimum every 2 years
Pipe Runs	Visual (CCTV)	Only if Manholes or Chambers are showing signs of blockages	Jetting	Minimum every 5 years
Petrol Interceptor	Visual	Every 6 months or in the event of a spill	Maintenance and commissioning agreement to be agreed with supplier to empty the Petrol Interceptor. Retained pollutants must be emptied from the separator once the level of oil is reached, or the oil level alarm is activated.	Yearly
Attenuation Tank	Visual	Quarterly or after significant storm event	Open manhole/chamber cover. Remove any debris. Maintenance and commissioning agreement to be agreed with supplier should there be any appearance of blockages	Minimum every 2 years

Figure 2 Stormwater Network Maintenance Plan & Schedule

2.1 Surface Water System

The surface water sewer connection from Elm Grove shall be made at S2.04 as can be seen in Figure 3 below.

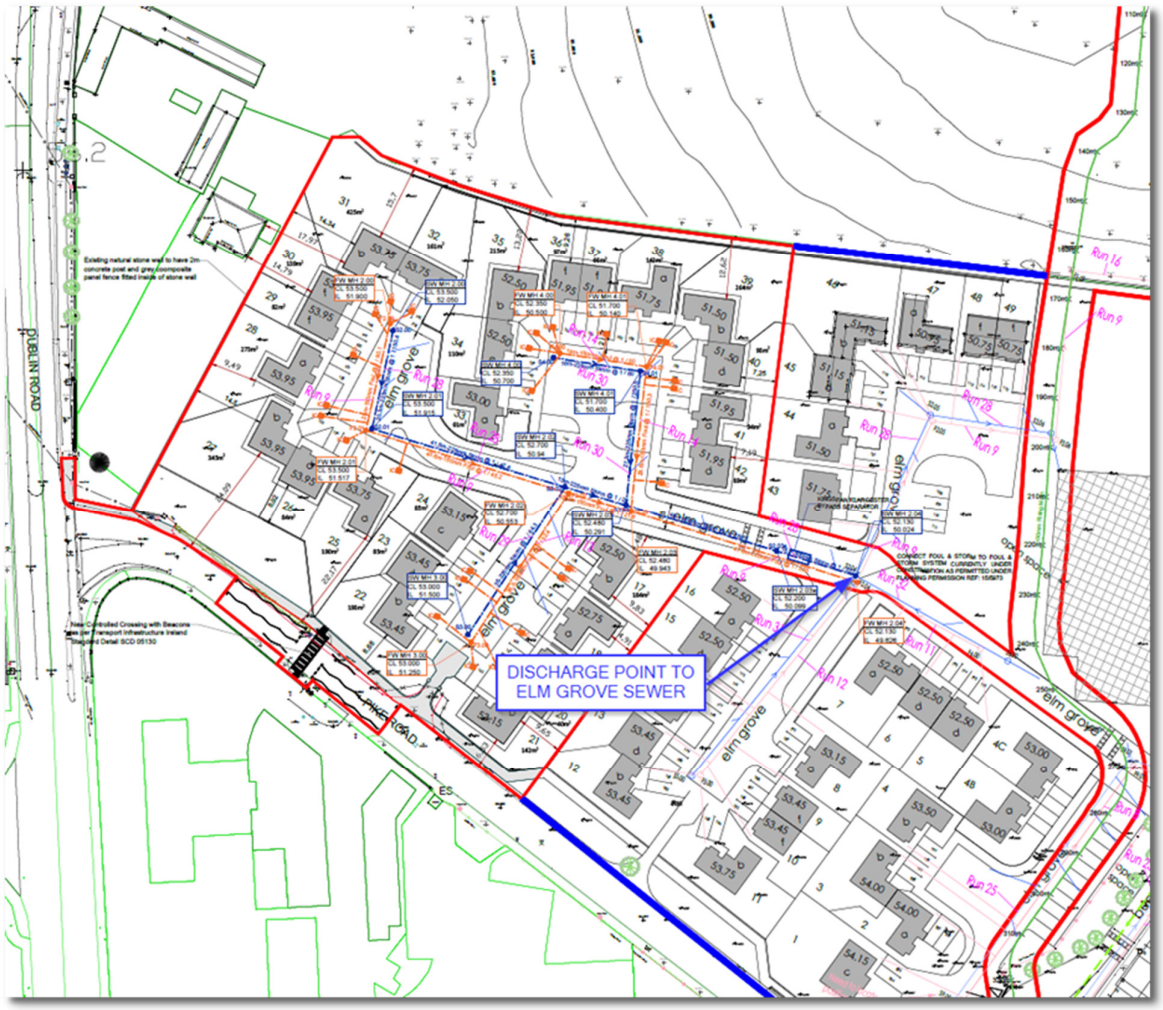


Figure 3 Storm Water Connection Point

Surface Water Drainage Network

The surface water drainage network calculations are included in the appendix. The proposed surface water drains have been designed in accordance with the Greater Dublin Strategic Drainage Study (GDSDS), the Department of the Environment's Recommendations for Site Development Works for Housing Areas, the Department of the Environment's Building Regulations "Technical Guidance Document Part H Drainage and Wastewater Disposal" and BS EN 752-2008 Drain and Sewer Systems Outside Buildings. Please refer to the accompanying infrastructure report which includes the detail and calculations of the design of the surface water network.

The layout of the proposed storm water network is shown on drawing 22004-BRH-ZZ-00-DR-C-0301.

Hydrocarbon Treatment

A petrol interceptor is a trap used to filter out hydrocarbon pollutants from rainwater runoff. It is used in construction to prevent fuel contamination of streams carrying away the runoff.

Petrol interceptors work on the premise that some hydrocarbons such as petroleum and diesel float on the top of water. The contaminated water enters the interceptor typically after flowing off roads or hardstanding areas before being deposited into the first tank inside the interceptor.

A Klargester/Clearwater/Kingspan NSBE015 Bypass Separator is proposed for the development. This unit can cater for Areas up to 8,335 sq/m

The Klargester range of Bypass separators from Kingspan, provide the ideal solution for low-risk floods – when there is little possibility of a combined heavy rainfall and large spillage.

Bypass separators are used when it is considered an acceptable risk not to provide full treatment, for very high flows, and are used, for example, where the risk of a large spillage and heavy rainfall occurring at the same time is small, e.g. Surface car parks, roadways, lightly contaminated commercial areas.

Each bypass separator design includes the necessary volume requirements for:

Oil separation capacity
Oil storage volume
Silt storage capacity
Coalescer
Features

Light and easy to install
Class I and Class II designs
Inclusive of silt storage volume
Fitted inlet/outlet connectors
Vent points within necks
Oil alarm system available (required by EN 858-1 and PPG3)
Extension access shafts for deep inverts
Maintenance from ground level
GRP or rotomoulded construction (subject to model)

2.13 Silt Control

The proposed petrol interceptor from Klargester also includes a silt storage capacity in addition to the oil storage capacity that allow silt to be collected in the interceptor prior to discharge.

3 Compliance with Nature-based Solutions to the Management of Rainwater and Surface Water Runoff in Urban Areas – Best Practice Interim Guidance Document (DHLG,2022).

The DHLG document is not a technical manual but, rather, a high-level best practice interim guidance document for all those whose work impacts on the urban environment. The document highlights a need for a significant change in the way we plan, design, build and maintain our urban areas which is driven by three main factors. These Environmental, Climate Change and Flood Risk Factors are dealt with below.

3.1 Environmental

Housing Estate Discharge Water Quality
Silt Capture and Hydrocarbon treatment is outlined in the SUDS section of this report.

Construction & Operational Stage Run-Off
Where surface-water run-off occurs at the site during the construction phase, it will be managed and controlled prior to discharge into the environment by implementing standard environmental controls. Drawing 23041-BRH-ZZ-00-DR-C-0306_A outlines the management controls for surface water during the construction phase.

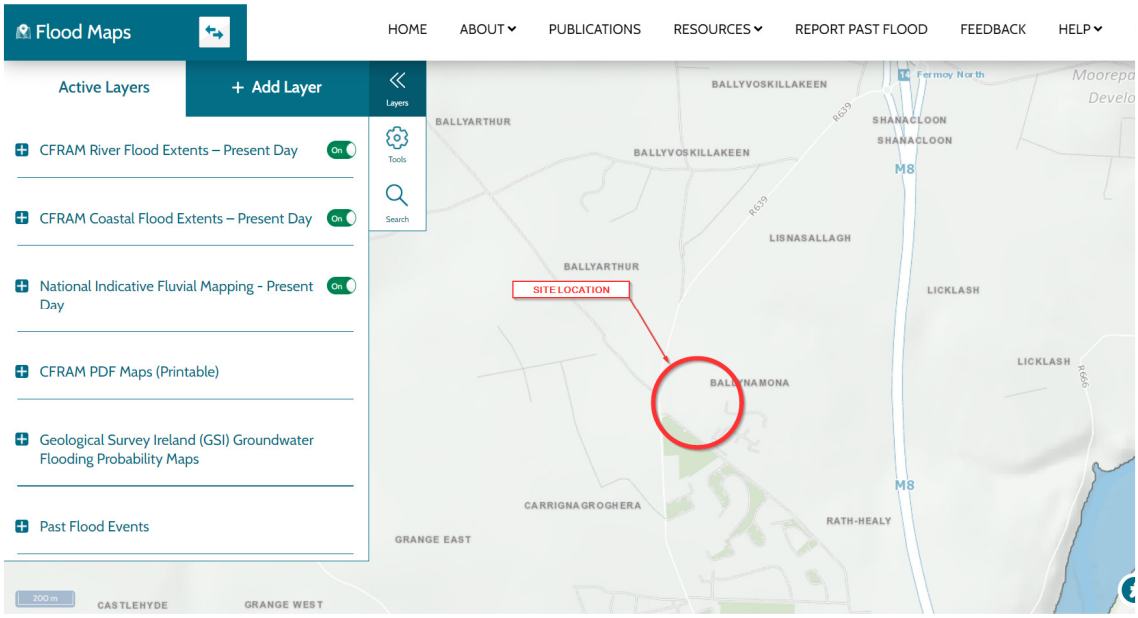
Biodiversity
The site is currently a brownfield site, with no internal ditches or trees. All topsoil is removed and there are foundations and half built houses in place. It is proposed to protect the existing boundary head rows while also planting trees as per the landscaping layout. Lawns and small grassed public areas will also be provided. These measures, in addition to the SUDS measures which have been noted in the previous section provide a net biodiversity gain by the implementation of Nature-Based Solutions (NBS) into the overall drainage solution.

3.2 Climate Change

The stormwater design uses the guidance of the GDSDS. To account for climate change a 20% increase in rainfall has been added to the Met Eireann rainfall data used in the calculation of the stormwater storage system. The design of the attenuation/infiltration system, located outside the application area, was completed previously and a letter is included in the appendix from Chartered Engineer Hilliard Tanner of Tanner Structural Design Ltd who worked on the existing estate. The letter confirms the sizing of the tank taking into account a 1:100 year event, climate change and all the inputs to the system.

3.3 Flood Risk Screening Assessment

This site is not liable to flooding. The OPW Flood Maps with lowest probability turned on for River, Costal and Fluvial Extents shows there is currently no flood risk. Low Probability flood events have an indicative 1-in-a-1000 chance of occurring or being exceeded in any given year. This is also referred to as an Annual Exceedance Probability (AEP) of 0.1%.
There is also no record of any flood event within a kilometre of the site on floodmaps.ie. The site itself is elevated with a large fall down into Fermoy town. Based on all available information this site is not liable to flooding. This development will have no impact on surround lands in terms of flooding as all water is dealt with on site and taken to ground.



4 Appendix

Infiltration Letter -Crann Ard Consulting Engineer

23041-BRH-ZZ-00-C-0301_A_Combined Foul & Storm

23041-BRH-ZZ-00-C-0306_A_Construction Management

23041-BRH-ZZ-ZZ-C-0307_A_Suds Layout

TANNER STRUCTURAL DESIGNS LTD

Unit 2 | Connolly House | Connolly St | Fermoy | Co. Cork | P61 X009 | T: (025) 51000 | E: info@tsd.ie | W: www.tsd.ie

BRH Design Partners
Pheonix House
Monahan Road
Cork

F.A.O. **Willie O'Regan**

Ref: *1666/1.0/23-597*

Date: 01 August 2023

RE: **CRANN ARD COMPLETION**
Existing Stormwater Attenuation Area

Dear Willie,

Further to recent correspondence, we can confirm that the existing stormwater attenuation and percolation area constructed under the large green area in the middle of the Crann Ard estate has sufficient capacity to handle the stormwater runoff from the existing 106 no. houses and associated roads and hardstanding areas and the 26 no. houses that are the subject of the Part 8 application. The attenuation and percolation area has sufficient capacity to cater for a 1 in 100 year storm, including a 20% allowance for climate change.

Yours sincerely,

Hilliard Tanner
HILLIARD TANNER
Chartered Engineer