

**Proposed Residential Development at
Glenamuck Road, Dublin 18**

Stage 1 Surface Water Audit

November 2020

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Date: 18th November 2020

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Table of Contents

Document Control.....	i
Table of Contents	ii
1 Introduction.....	3
1.1 Purpose of Report	3
1.2 Site Details	3
1.3 Report Details	3
1.4 Drawings & Documents Reviewed (Appendix A)	4
1.5 Drawings & Documents Reviewed (Appendix D)	4
2 Stage 1 Audit Findings.....	5
2.1 Glenamuck Road Residential Development.....	5
2.1.1 Micro Drainage	5
2.1.2 Surcharged Outfall	5
2.1.3 Green Roof Area	5
2.1.4 Permeable Paving	5
2.1.5 Typical Details	5
2.1.6 Sump Manholes	6
2.1.7 Tree Pit Systems.....	6
2.1.8 Bio-Swales, filter drains and Rain Gardens	6
2.1.9 Use of Detention Basins	6
2.1.10 Basement Drainage Layouts.....	6
2.1.11 Basement Ramp	6
2.1.12 Taking in Charge.....	7
2.1.13 Maintenance	7
2.1.14 Utility Survey	7
2.1.15 Existing Natural Features on Site	7
2.1.16 Rainwater Harvesting Tanks	7
2.1.17 Trees and Attenuation Tanks	7
2.1.18 Green Roof	8
2.1.19 Manhole Spacing.....	8
2.1.20 Flooding Provision	8
Appendix A Drawings and Documents Examined by the Auditor	A
Appendix B Site Layout with Stage 1 Audit Findings Highlighted	B
Appendix C Storm Water Audit Feedback Form	C
Appendix D Additional Documents Submitted to Accompany Feedback Form	D

1 Introduction

1.1 Purpose of Report

This report presents a Stage 1 Surface Water Audit carried out for a proposed Mixed-use Development and associated infrastructure at Glenamuck Road, Carrickmines, Dublin 18.

PUNCH Consulting Engineers have been appointed by DBFL Consulting Engineers to carry out an independent Stage 1 Stormwater Audit on the proposal in line with Dún Laoghaire-Rathdown County Council (DLRCC) requirements.

1.2 Site Details

The site is bounded by Glenamuck Road to the west, Golf Lane to the south east and the M50 slip lane to the north. The residential development, Benolagh & Blackberry Hill Residential Development (DLRCC-D06A/1266), is located to the east of the subject and is also accessed from Golf Lane.

The site slopes from south to north towards the River valley, ranging from approximately 80m AOD in the south to 75m AOD in the north with the river valley being 70m AOD at the lowest. There are no overhead electrical power lines running through the site.

The proposed development comprises a residential development of 482 no. units (all apartments), along with ancillary residential amenities, and provision of a childcare facility, gym, and local shop. The proposed development is set out in 7 no. blocks. Two basement levels are proposed, providing car parking, bin stores, plant rooms, bicycle parking, and circulation areas.

The proposed development includes landscaping, public, private and communal open space, a new pedestrian and cycle bridge over the stream at the western side of the site with a new pedestrian cycle crossing of Glenamuck Road South, cycle and pedestrian facilities, bicycle parking, play facilities, and lighting. The proposed buildings include the provision of private open space in the form of balconies and winter gardens to all elevations of the proposed buildings.

Pre-application number: ABP-307010-20

1.3 Report Details

The audit was carried out by Joshua Martin, Marie-Claire Daly and Leonard Brennan between the dates of October 12th and November 17th 2020.

This Stage 1 Audit has been carried out in accordance with the Dún Laoghaire-Rathdown County Council (DLRCC) Stormwater Audit Procedure Rev 0 January 2012. The auditor has examined only those issues within the design relating to surface water drainage implications of the scheme and has therefore not examined or verified the compliance of the design to any other criteria.

- Appendix A contains copies of drawings and documents examined by the auditor.
- Appendix B contains drawings which correspond to the Stage 1 Audit findings outlined in Section 2 of this report.
- Appendix C contains the Surface Water Audit Feedback form.
- Appendix D contains additional documents submitted to accompany the feedback form which provides a response to the audit findings.

All of the findings outlined in Section 2 of this report are considered by the auditor to require action in order to improve the stormwater credentials of the scheme.

1.4 Drawings & Documents Reviewed (Appendix A)

- A. 170063-3100 Site Services Layout
- B. 170063-3105 SUDS Strategy
- C. 170063-3107 Attenuation Tank 1 Details
- D. 170063-3108 Attenuation Tank 2 Details
- E. 170063-3109 Surface Water Outfall
- F. 170063-3141 SUDS Section
- G. 170063-Rep-003 Infrastructure Design Report

1.5 Drawings & Documents Reviewed (Appendix D)

- A. 170063-3100 Site Services Layout
- B. 170063-3101 Basement Level 1 Drainage Layout
- C. 170063-3102 Basement Level 2 Drainage Layout
- D. 170063-3105 SUDS Strategy
- E. 170063-3107 Attenuation Tank 1 Detail
- F. 170063-3108 Attenuation Tank 2 Detail
- G. 170063-3109 Surface Water Outfall
- H. 170063-3110 Typical Drainage Details Sheet 1
- I. 170063-3111 Typical Drainage Details Sheet 2
- J. 170063-3112 Typical Drainage Details Sheet 3
- K. 170063-3120 Surface Water Long Sections
- L. 170063-3141 SUDS Sections
- M. 170063-Rep-003 Infrastructure Design Report

2 Stage 1 Audit Findings

This section should be read in tandem with the drawings in Appendix B.

2.1 Glenamuck Road Residential Development

2.1.1 Micro Drainage

Problem: Micro Drainage calculations for the stormwater network were not submitted in Appendix C of the Infrastructure Design Report.

Recommendation: Please submit Micro Drainage calculations for the stormwater network.

2.1.2 Surcharged Outfall

Problem: Considering the outfall from the site will be to the Golf Stream to the north of the site, and as per CFRAM map no. E10LOU_EXFCD_F1_02 (Shanganagh-Carrickmines River Fluvial Flood Extents) the 1% AEP water level in the stream is 73.07m and 0.1% AEP is 73.15m has the model been simulated with a surcharged outfall? Note the outfall invert level is 72.160m as per drawing 170063-3100.

Recommendation: Please confirm effects on the network when the model is analysed with a surcharged network.

2.1.3 Green Roof Area

Problem: Appendix 16: Green Roofs Guidance Document of DLRCC's County Development Plan 2016-2022 requires a green roof, where required, to cover a minimum of 60% of the roof area. Block B's proposed green roof coverage is 36% as per drawing 170063-3105. Note, this is contradicted in the report in section 5.3 Sustainable Urban Drainage Systems (SUDS).

Recommendation: Green roof coverage of Block B to be a minimum of 60% of the roof area.

2.1.4 Permeable Paving

Problem: The proposed impermeable hardstanding podium surfacing has the potential to increase surface water runoff.

Recommendation: Consider utilising a tanked permeable paving system in this location. This would provide additional storage for the surface water in the stone subbase and then allow surface water sewer to drain to the surface water network in a controlled manner.

2.1.5 Typical Details

Problem: No details provided for proposed SuDS components e.g. filter drains, rain gardens etc.

Recommendation: The above details to be provided.

2.1.6 Sump Manholes

Problem: Silt entering the surface water drainage system including the attenuation tank and the soakaway have the potential to cause blockages.

Recommendation: Consider utilisation of sump manholes upstream of the attenuation tank to capture any excess silt therefore preventing entry into the tanked systems.

2.1.7 Tree Pit Systems

Problem: There is potential to reduce the surface water runoff and to improve runoff quality from the development by providing a greater amount of SuDS measures in the form of tree pit systems.

Recommendation: Consider incorporating tree pit systems in areas in close proximity to the impermeable surfaces. Connect road gullies to these systems rather than directly to the main surface water drainage system.

2.1.8 Bio-Swales, filter drains and Rain Gardens

Problem: 'Section 5.3 Sustainable Urban drainage Systems' in the Infrastructure Design Report states that "*Bio-swales, filter drains and rain gardens have been included in the scheme to provide attenuation*" but these have not been indicated on the SuDS Strategy drawing or the Site Services Layout

Recommendation: Consider incorporating these systems on to the drawings to show how they work within the overall surface water network.

2.1.9 Use of Detention Basins

Problem: Detention Basins have not been utilised within the development despite the large extent of landscaping to north-west and south-west.

Recommendation: Considering the extent of landscaping, it may be feasible to adopt detention basins in these areas, which would promote greater amenity and biodiversity within the development and encourage infiltration of surface water. These also have the potential to reduce the size of the underground storage required.

2.1.10 Basement Drainage Layouts

Problem: No Basement drainage layouts have been provided.

Recommendation: Provide basement drainage layouts showing the underslung drainage.

2.1.11 Basement Ramp

Problem: There is potential for the surface water runoff from Golf Lane to enter the Basement via the ramp.

Recommendation: Provide details on how the surface water runoff from Golf lane will be prevented from entering the basement.

2.1.12 Taking in Charge

Problem: It is not clear which SuDS are proposed to be private and which SuDS devices are proposed to be adopted by DLRCC.

Recommendation: Please confirm which SuDS devices will be proposed to be adopted by DLRCC.

2.1.13 Maintenance

Problem: The report does not make reference to system maintenance relating to blockages.

Recommendation: Set out maintenance/inspection requirements for management of the surface water system. Maintenance management to include lifespan of SuDS measures, inspection/monitoring details, grass and vegetation management, litter removal and excessive sediment removal.

Ensure there are a sufficient amount of inspection chambers/manholes specified for the proposed SuDS measures in order to achieve access for maintenance including rodding, etc.

2.1.14 Utility Survey

Problem: As per Chapter 29.3.6, Section E of The SuDS Manual, the location of all existing utilities and other site infrastructure should be confirmed before locating proposed SuDS measures.

Recommendation: Existing underground services are particularly challenging to locate in construction projects. Asset databases of buried infrastructure should not be considered as definite and should be checked with appropriate utility surveys and on-site checks.

2.1.15 Existing Natural Features on Site

Problem: Existing natural features on site include trees, rivers, hedgerows, or habitats of ecological value. For this proposed development, some of these features may potentially be affected.

Recommendation: Existing trees, hedgerows and habitats should be subject to pre-development surveys in accordance with relevant standards and undertaken by a qualified and competent person. If required, based on the relevant pre-development surveys, the construction of SuDS measures are to be co-ordinated with the existing features of the site.

2.1.16 Rainwater Harvesting Tanks

Problem: In lieu of utilising green roofs in some areas, there is potential to install rainwater harvesting facilities for the proposed units. The rainwater collected can be used for toilet flushing within the new units.

Recommendation: Consider incorporating rainwater harvesting tanks.

2.1.17 Trees and Attenuation Tanks

Problem: There are trees proposed above the attenuation systems. This has the potential for root ingress and damage to the systems. See Appendix B for mark-ups.

Recommendation: Consider relocating the proposed trees which are in close proximity to the attenuation systems. Provide root protection barriers where required.

2.1.18 Green Roof

Problem: The green roof is required to cover a minimum of 60%, there is no maximum. Large areas of the roof appear to be underutilised. See Appendix B for mark-ups.

Recommendation: Consider extending the green roof coverage if rainwater harvesting is not being adopted and providing plant (e.g. PV Solar Panels) is not proposed on these areas.

2.1.19 Manhole Spacing

Problem: It is unclear if manholes are 3m from the external face of the buildings. See Appendix B for mark-ups.

Recommendation: As per the GSDS, normally a 3m distance would be kept between proposed buildings and assets with the potential to be taken in charge.

2.1.20 Flooding Provision

Problem: The Infrastructure Design Report notes: *For storms greater than the design storm of 100-year design event + climate change provisions have been discussed in the Site Specific Flood Risk Assessment, DBFL Report 170063-Rep-002 -SSFRA.*

Recommendation: Please submit this for review.

Appendix A Drawings and Documents Examined by the Auditor

Appendix B Site Layout with Stage 1 Audit Findings Highlighted

Appendix C Storm Water Audit Feedback Form

STORM WATER AUDIT FEEDBACK FORM

Scheme: Proposed Residential Development at: Glenamuck Road, Carrickmines, Dublin 18

Area: Mixed-Use Development

Audit Stage: 1 Date Audit Completed: 18/10/2020 Our Ref : 202246

Paragraph No. in Audit Report	Problem Accepted (Yes/No)	Recommended Measure Accepted (Yes/No)	Alternative Measures (described) [or reason problem not accepted]	Alternative Measures Accepted by Auditors (Yes/No)
2.1.1	Yes	Yes	<p>The Micro Drainage calculations for the stormwater network have been included under Appendix C of the updated Infrastructure Design Report.</p> <p>Simulations have been carried out for an unsubmerged outfall and an outfall submerged during the 0.1% AEP event. No flooding occurs when the outfall is unsubmerged, however there is flooding reported upstream of attenuation tank 2, when the outfall is submerged during the 0.1% AEP event at the Golf Stream, reaching a max level of 74.987. This is an exceedance event and the proposed site levels direct all overland flows away from buildings and towards downstream open space / flood zone areas. Furthermore, the FFLs of the buildings are set at 79.450 which is well clear of any flooding.</p>	
2.1.2	Yes	Yes	<p>The Micro Drainage calculations that have been included under Appendix C include the simulations for the submerged outfall during the 0.1% AEP event.</p>	
2.1.3	No	No	<p>The green roof area coverage was calculated based on the combined roof area of all the blocks within the proposed development. The nett green roof coverage for the entire development exceeds the 60% minimum requirement. These proposals were submitted during the pre-application, which were reviewed by DLRCC, and no concerns were raised on the coverage per block.</p>	Yes

STORM WATER AUDIT FEEDBACK FORM

Paragraph No. in Audit Report	Problem Accepted (Yes/No)	Recommended Measure Accepted (Yes/No)	Alternative Measures (described) [or reason problem not accepted]	Alternative Measures Accepted by Auditors (Yes/No)
2.1.4	No	No	Permeable paving has not been recommended for the hardstanding podium surfacing as these areas all drain to the green podium. This is expected to provide equivalent or greater storage within the green podium medium.	Yes
2.1.5	Yes	Yes	The details for the proposed SuDS components have been included under DBFL drawings 170063-3141. The details of the membrane surrounding the tanks, in consideration with the water table, will be reviewed during detailed design.	
2.1.6	Yes	Yes	The manholes immediately upstream of the attenuation tanks shall be sump manholes to capture excess silt.	
2.1.7	Yes	Yes	Most trees at podium level will be planted on mounds that will ultimately drain via the build-up to the slung drainage system at basement level. At ground level, hardstanding areas shall drain to green areas before draining to the surface water drainage network. Therefore the need for tree pit systems are not necessary.	
2.1.8	Yes	Yes	DBFL drawing no. 170063-3105 (SUDS Strategy) has been updated to indicate the location of the proposed SUDS features.	
2.1.9	No	No	Detention basins have not been recommended for the proposed development due to the spatial constraints presented by the Golf Stream, other proposed infrastructure and trees to be retained. Other SUDS measures have been included as part of the proposals to promote biodiversity.	Yes
2.1.10	Yes	Yes	The basement drainage layouts are shown on DBFL drawing no. 170063-3101 and 170063-3102. Note that all incidental runoff from the basement is passed through a Class 1 separator before being discharged to the foul network. The separator has been placed in a location that is suitable for maintenance without disruption to traffic flow.	

STORM WATER AUDIT FEEDBACK FORM

Paragraph No. in Audit Report	Problem Accepted (Yes/No)	Recommended Measure Accepted (Yes/No)	Alternative Measures (described) [or reason problem not accepted]	Alternative Measures Accepted by Auditors (Yes/No)
2.1.11	Yes	Yes	A mound will be provided between Golf Land and the basement ramp to prevent surface water from Golf Lane entering the basement. Furthermore, a line drain will be included at the basement ramp.	
2.1.12	Yes	Yes	All SUDS features that are proposed will be privately owned.	
2.1.13	Yes	Yes	Section 5.10 has been added to DBFL Report 170063-REP-003 - Infrastructure Design Report which summarises maintenance requirements to prevent blockages.	
2.1.14	Yes	Yes	Utility records show no infrastructure within the subject site and topographical surveys have not located any chambers/manholes to contradict this. Further utility surveys will be undertaken during the detailed design stages to confirm this.	
2.1.15	Yes	Yes	A tree survey was carried out for the subject site and an arborist consulted. All SUDS measures have been coordinated with existing features on site.	
2.1.16	No	No	The benefits of rainwater harvesting (RWH) were considered at an early stage in the design process, however this water can only be used for limited purposes; therefore the introduction of additional plant, increased maintenance due to the system and additional pipework for each unit, the option of RWH was discounted for this development.	Yes
2.1.17	Yes	Yes	The landscape proposals have been updated to ensure that no trees are proposed above the attenuation tanks. All other trees in proximity to the drainage infrastructure will be lined with root barriers to protect the infrastructure from any root ingress.	
2.1.18	Yes	Yes	The proposed green roof coverage for the development has been increased to 75% of the total roof area. Refer to DBFL drawing 170063-3105 for updates.	

STORM WATER AUDIT FEEDBACK FORM

Paragraph No. in Audit Report	Problem Accepted (Yes/No)	Recommended Measure Accepted (Yes/No)	Alternative Measures (described) [or reason problem not accepted]	Alternative Measures Accepted by Auditors (Yes/No)
2.1.19	No	No	All manholes in proximity to the building are proposed to be privately owned. It is not envisaged that any loads from the building will be transferred to the pipes as they will be founded on rock. If any exposure to the pipes does arise during detail designs, then they will be adjusted to suit.	Yes

Signed:



Nick Fenner MEng (Hons) CEng MIEI,
Associate

Design Team Project Manager

Date: 18/11/20

Please complete and return to the auditor

Auditor Signed Off:

Date: 18/11/2020



Joshua Martin
MEng
Engineer

Appendix D Additional Documents Submitted to Accompany Feedback Form