

## RESIDENTIAL DEVELOPMENT AT LEHAUNSTOWN LAND, CHERRYWOOD, COUNTY DUBLIN

### STORMWATER AUDIT REPORT STAGE 1 (PRE-PLANNING STAGE)



Project No.	Originator	Volume	Level	Type	Role	Serial No.	Suitability
24018	DOW	XX	XX	RP	C	0001	AP
Revision	Description				Prepared	Checked	Date
P01	Draft issued to Designer				AD	PD	12.04.24
C01	Final Report with Designer's feedback form appended				AD		17.04.24

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- 
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## 1.0 INTRODUCTION

- 1.1 Downes Associates has been appointed by Punch Consulting Engineers to carry out a Stage 1 (pre-planning stage) stormwater audit for the proposed residential development of lands at Lehaunstown, Cherrywood, County Dublin. Downes Associates is listed on Dun Laoghaire Rathdown County Council's (DLRCC's) approved list of stormwater auditors.
- 1.2 The Stage 1 audit has been carried out in accordance with DLRCC's Stormwater Audit Procedure as set out in Section 7.1.5 of Appendix 7 of the County Development Plan 2022-2028. The audit comprised an examination of the reports, drawings and calculations relating to the stormwater drainage scheme prepared by Punch Consulting Engineers.
- 1.3 This Stage 1 audit makes reference to the following documents:
- Greater Dublin Strategic Drainage Study.
  - Greater Dublin Regional Code of Practice.
  - DLRCC County Development Plan 2022-2028 Appendix 7: Sustainable Drainage System Measures
  - The SuDS Manual (CIRIA C753)
  - Guide for the Drainage of Development Sites – DETR
  - National Standards for Sustainable Drainage Systems – Defra.gov.uk
  - <http://www.uksuds.com> (website)
  - Notes of project pre-planning consultation with DLR
- 1.4 The audit team has examined only those issues within the design relating to the sustainable surface water implications of the scheme, and has therefore not examined or verified the compliance of the design to any other criteria.
- 1.5 As set out in DLRCC's audit procedures, the audit team has focussed on the SuDS management train and whether the Applicant has carefully considered all suitable SuDS techniques and applied the most appropriate type(s) for the site that will ensure improved water quality, biodiversity, a reduction of run-off rates, volume storage and volume control.
- 1.6 The Audit includes:
- A review of local data used in the assessment including Soil Type, SAAR, Rainfall data, run-off factors, and climate change factors.
  - Verification that interception and/or treatment has been provided across the entire site.
  - Verification of the appropriateness of the SuDS measures proposed.
  - Recommendation of potential measures that should be considered.
  - Identification of issues

## **2.0 DESCRIPTION OF DEVELOPMENT & STORM WATER SYSTEM**

2.1 The proposed development is located within the Cherrywood Planning Scheme (CPS). The subject site is currently a greenfield site, with low intensity agricultural use. The Cabinteely River runs north to south along the eastern boundary of the site. The site is currently bounded by greenfield sites to the south, west and northeast. The north-western corner of the site shares a boundary with a private residence. The site within the Applicant's ownership has an area of approximately 3.58 hectares in total. The proposed development covers an area of 2.16 hectares in the western portion of this site. The remaining eastern portion of the site is allocated to landscape infrastructure and Regional Attenuation Pond 2A. The proposed works are outlined in a series of architectural drawings prepared by ABK Architects and engineering drawings prepared by PUNCH Consulting Engineers. The proposed development is a residential development of terraced houses, duplex apartments, and multi storey apartments. On grade and basement parking, communal space and public open space is also included. Vehicular and pedestrian access will be provided from the proposed Lehaunstown Neighbourhood Road to the west of the site.

A new regional pond is proposed adjacent to the site, with associated surface water drainage. The attenuation pond will form part of the Cherrywood Strategic Development (SDZ) Storm Water Infrastructure, as identified in Chapter 4 of the Cherrywood Planning Scheme (CPS). It is proposed by the Applicant that surface water generated from the proposed development shall be conveyed through a new surface water system to the proposed Regional Attenuation Pond 2A, which shall be constructed in advance of the development. The proposed stormwater system incorporates a number of sustainable urban drainage systems (SuDS) measures, which are the subject of this audit.

2.2 Details of the proposed development are set out in the documents and drawings prepared by the Applicant.

2.3 Details of the proposed SuDS measures and components for the development are set out in the Engineering Planning Report and accompanying drawings prepared by Punch Consulting Engineers.



*Site Location Map*

### 3.0 DOCUMENTS RECEIVED AND EXAMINED

There follows the schedule of the initial documents received and examined by the audit team as part of the stormwater audit.

#### 3.1 Drawings:

Drawing Reference	Title
232250-PUNCH-XX-XX-DR-C-0151-P03	Proposed SUDS Layout
232250-PUNCH-XX-XX-DR-C-0201-P04	Proposed Drainage Layout
232250-PUNCH-XX-XX-DR-C-0301-P02	Proposed Watermain Layout
232250-PUNCH-XX-XX-DR-C-0403-P03	Proposed Road Layout & Levels
232250-PUNCH-XX-XX-DR-C-0461-P04	Proposed Road Markings & Signage
232250-PUNCH-XX-XX-DR-C-0501-P01	Proposed Drainage Details
232250-PUNCH-XX-XX-DR-C-0601-P02	Autotrack Swept Path Analysis
232250-PUNCH-XX-XX-DR-C-0602-P02	Autotrack Private Car
232250-PUNCH-XX-XX-DR-C-0603-P02	Autotrack Private Car – Basement Car Park

#### 3.2 Reports:

Report Reference	Title
232250-PUNCH-XX-XX-RP-C-0003-P01	Engineering Planning Report

#### 4.0 ADOPTED SUDS COMPONENTS SUMMARY

The Proposed SuDS layout for the development is set out on Punch Drawing 0150-P03. There follows a summary of the various SuDS components and measures adopted by the Applicant for the proposed development.

Technique	Considered	Adopted	Auditor's Comments
<b>A: SOURCE CONTROL</b>			
Green roofs	✓	Yes	Extensive green roofs adopted for the flat-roof apartment blocks.
Bioretention	✓	Yes	Bioretention features are included in the proposals in the form of raingardens to the front and rear of buildings and adjacent to parking bays.
Rainwater Harvesting	✓	No	A rainwater harvesting system is mentioned in the report but no details are included with the drawing proposals.
Permeable paving	✓	No	Block pavers are proposed for the parking bays. The parking bays are described as permeable paving in the report but no details have been provided on the drawings.
Other Permeable surfaces	✓	Yes	Resin-bound gravel has been adopted for the path to the north of Block D. Areas of soft landscaping are provided within the development.
Water Butts	Not known	No	Water butts are not included in the proposals.
<b>B: CONVEYANCE CHANNELS</b>			
Swales	✓	Yes	An inlet and outlet swale to the attenuation pond is included in the proposals (by others), which forms part of the Cherrywood Strategic Development (SDZ) Storm Water Infrastructure,
Channels & rills	Not known	No	Not considered/included.
<b>C: FILTRATION</b>			
Filter drain	Not known	No	Not considered/included.
Filter strip	Not known	No	Not considered/included.
Bioretention areas	✓	Yes	Rain gardens are proposed to buildings and adjacent to parking bays.
Petrol interceptor	✓	Yes	A bypass separator is proposed for runoff from car park/roadway areas..
<b>D: INFILTRATION</b>			
Soakaways	Not known	No	Not considered/included.
Infiltration trenches	Not known	No	Not considered/included.
Infiltration basins	Not known	No	Not considered/included.
Permeable paving	✓	No	Block pavers are proposed for the parking bays. The parking bays are described as permeable paving in the report but no details have been provided on the drawings.
Tree pits & bioretention	✓	No	Bioretention areas have a geotextile membrane liner – it is unclear whether this membrane shall allow for any potential infiltration.
<b>E: Retention &amp; Detention</b>			
Detention basins	Not known	No	Not considered/included.
Retention ponds	✓	Yes	An attenuation pond is included in the proposals (by others), which forms part of the Cherrywood Strategic Development (SDZ) Storm Water Infrastructure,

Technique	Considered	Adopted	Auditor's Comments
Storage systems	✓	Yes	Underground geocellular type detention structure is proposed in non-trafficked area.
<b>F: Wetlands</b>			
Wetlands	Not known	No	Not considered/included.
<b>G: Inlets, Outlets &amp; Controls</b>			
Inlets, outlets & controls	✓	Yes	Dropped kerbs and trapped gullies are adopted for the bioretention systems
Vortex Control systems	✓	Yes	Used to control discharge rate from detention system.

Supporting information regarding the SuDS proposals are provided in Punch's Engineering Planning Report. The report includes the following aspects of the design:

1. Calculations for the derivation of QBar using the Cherrywood SDZ specific objective "PI 8" nominates that discharge from developments is to be limited to a discharge rate of 1l/s/Ha.
2. SuDS attenuation design, which has been modelled using Causeway's *Flow+* design software. The modelling has been carried out for 5-year, 30-year and 100-year return periods, and includes allowances of 20% for climate change and 10% for urban creep.
3. Brief descriptions of the proposed SUDS features including Green Roofs, Permeable Pavements, Bioretention, Attenuation tank and Petrol Interceptor, .
4. Interception and treatment storage calculation statement.
5. Operation and maintenance of SuDS proposals.
6. Treatment of exceedance flows and flow path.



## 5.0 AUDITOR'S COMMENTS & RECOMMENDATIONS

We confirm that we have examined all documentation issued to us by Punch Consulting Engineers. This examination has been carried out with the sole purpose of reviewing the proposed sustainable drainage systems design components and measures adopted for the development and to make recommendations for further review or modifications for the proposed system. We have not carried out a check of any of the detailed proposals or calculations provided as these are the designer's sole responsibility.

The designer's proposed stormwater solution incorporates a number of SuDS measures, and these are summarised in Section 4.0 above. The auditor's comments/recommendations on the design are listed below. The designer's response to the comments/recommendations raised are provided on the stormwater audit feedback form enclosed in Appendix A of this report.

Item No.	Auditor Comment/Recommendation
5.1	<p><i>Comment:</i> Infiltration-type SuDS measures are not included in the proposals. There is no reference in the report to the nature of the subsoils on site and their potential suitability for infiltration-type SuDS measures. There is no reference to any site-specific geotechnical site investigation having been carried out as part of the site appraisal.</p> <p><i>Recommendation:</i> A site-specific geotechnical site investigation including infiltration testing and ground water monitoring is recommended to establish whether the development is suitable for SuDS measures that would promote on-site infiltration of surface water.</p>
5.2	<p><i>Comment:</i> Bioretention in the form of rain gardens is proposed to the front and rear of the individual buildings and adjacent to parking bays. Typical section details have been provided for the proposed rain gardens, including rainwater downpipe and dropped kerbs. The rain garden includes a "geotextile membrane" liner, which suggests that infiltration will not be permitted. The rain garden detail includes a low-level collector pipe, but no details are provided as to how these individual collector pipes are connected to the main surface water conveyance system and detention system.</p> <p><i>Recommendation:</i> Details of the geotextile liner sheet are to be confirmed including clarification whether infiltration is possible/promoted. Additional details for the rain gardens should be provided to show how excess surface water is conveyed to the detention system.</p>
5.3	<p><i>Comment:</i> The adoption of permeable paving for parking bays is described in Section 2.3.3 of the report. However, no details have been provided on the drawings for permeable paving as having been adopted, and, if so, whether these pavements are designed for infiltration or exfiltration.</p> <p><i>Recommendation:</i> Confirmation and rationale is required whether permeable paving has been considered/adopted for the parking bays and other non-trafficked areas. If so, confirmation of the permeable paving details is to be included on the drawings. If adopted, consideration should also be given to the use of permeable geotextile liner to the permeable paving system to encourage natural infiltration where possible, subject to site-specific information regarding subsoil and groundwater characteristics.</p>

Item No.	Auditor Comment/Recommendation
5.4	<p><i>Comment:</i></p> <p>The adoption of a rainwater harvesting system is mentioned in Section 2.3.1 of the report. However, no details/specification are provided on the drawings as to whether a rainwater harvesting system (for the apartment blocks) and/or water butts (for the terraced house units) have been considered/adopted.</p> <p><i>Recommendation:</i></p> <p>Confirmation and rationale is required as to whether rainwater harvesting and/or water butts has been considered/adopted for the development.</p>
5.5	<p><i>Comment:</i></p> <p>An underground detention system is proposed for the development to cater for excess runoff. Alternative above-ground detention systems may be feasible which would promote greater amenity and biodiversity within the development, and encourage infiltration of detained water to the subsoils (if feasible).</p> <p><i>Recommendation:</i></p> <p>Confirmation and rationale is required for the selection of an underground detention basin type system in preference to an above-ground detention system.</p>
5.6	<p><i>Comment:</i></p> <p>The calculations for the underground storage system do not appear to include time of emptying.</p> <p><i>Recommendation:</i></p> <p>Please indicate time of emptying for the storage system, to confirm time of emptying to half full is less than 24 hours, as is recommended.</p>
5.7	<p><i>Comment:</i></p> <p>The report does not include any analysis of the effectiveness of the chosen SuDS components to achieve water quality criteria.</p> <p><i>Recommendation:</i></p> <p>It is recommended that an assessment is provided as to the effectiveness of the proposed SuDS management train in terms of water quality, eg using the “simple index approach” as set out in Chapter 26 of CIRIA C753 The SuDS Manual.</p>
5.8	<p><i>Comment:</i></p> <p>There is no commentary in the report as to whether a utility clash check has been undertaken.</p> <p><i>Recommendation:</i></p> <p>As set out by DLRCC, the Applicant should undertake a utilities clash check to ensure all utilities’ vertical and horizontal separation distances can be provided throughout the scheme. The Applicant should demonstrate this with cross-sections at critical locations such as junctions, site thresholds and connection points to public utilities. Minimum separation distances must be in accordance with applicable Codes of Practice.</p>
5.9	<p><i>Comment:</i></p> <p>It is noted that the extent of green roof proposed does not comply with DLRCC’s Green Roof Policy, i.e. the percentage of extensive green roof proposed (for non-exempt buildings) is less than the minimum 70% coverage required. The Applicant is seeking an exemption on the basis that alternative nature-based SuDS are proposed in lieu of green roofs.</p>

Item No.	Auditor Comment/Recommendation
	<p><i>Recommendation:</i> The Applicant shall confirm with DLRCC whether the proposal for treatment by alternative bioretention is acceptable to DLRCC.</p>
5.10	<p><i>Comment:</i> There is an opportunity to incorporate other SuDS features within the development, particularly with regard to enhanced water features (rills, open conveyance channels, etc.) for the conveyance of water from the building RWPs' to the bioretention areas that would improve the amenity aspects of the drainage system.</p> <p><i>Recommendation:</i> The Applicant is encouraged to consider introducing above-ground water conveyance features into the SuDS proposals.</p>

Signed:



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Andrew Dixon

**DOWNES ASSOCIATES**

12<sup>th</sup> April 2024

**APPENDIX A  
COMPLETED STORMWATER AUDIT FEEDBACK FORM**

## STORM WATER AUDIT FEEDBACK FORM

Development: Residential Development at Lehaunstown Land, Cherrywood

Audit Stage: 1 Date Audit Completed: 11/04/24 Our Ref : 24018

Comment Item in Audit Report	Comment Accepted (Yes/No)	Recommended Measure Accepted (Yes/No)	Alternative Measures (described) [or reason comment not accepted]	Alternative Measures Accepted by Auditors (Yes/No)
5.1	Y	Y		Y Punch to provide further information on site investigation.
5.2	Y	N	Geotextile membrane at base of bioretention to be identified as impermeable to avoid undermining of nearby buildings and roads. Full detail for membrane not to be provided at planning application stage. Overflow detail comment agreed.	Y Punch to update drawings to show overflow connections from bioretention areas.
5.3	Y	Y		Y Punch to provide further information on site investigation and permeable paving details proposals.
5.4	Y	Y		Y Punch to provide further information on rainwater harvesting/water butt proposals.

## STORM WATER AUDIT FEEDBACK FORM

Comment Item in Audit Report	Comment Accepted (Yes/No)	Recommended Measure Accepted (Yes/No)	Alternative Measures (described) [or reason comment not accepted]	Alternative Measures Accepted by Auditors (Yes/No)
5.5	Y	Y		Y Punch to provide rationale for selection of underground detention system.
5.6	Y	Y		Y Punch to provide time-of-emptying calculation.
5.7	N	N	An assessment of the treatment capability of the SUDS measures in relation to the first 15mm of runoff has been provided in compliance with the DLRCC Development Plan 2022-2028 assessment requirements, and formulae provided in the UK SUDS Manual.  This assessment is summarised in section 2.3.8 of the report (Interception / treatment calculation).	Y
5.8	N	N	Considering the planning application type, this assessment is proposed at detailed design stage.  In principle, all drainage is proposed inroads, and all watermains and M+E services are proposed in footpaths.  Adjustments to planning design are not expected.	Y

**STORM WATER AUDIT FEEDBACK FORM**

Comment Item in Audit Report	Comment Accepted (Yes/No)	Recommended Measure Accepted (Yes/No)	Alternative Measures (described) [or reason comment not accepted]	Alternative Measures Accepted by Auditors (Yes/No)
5.9	Y	Y		Y DLRCC to review/approve green roof policy exemption
5.10	N	N	The entire site is treated by SUDS measures – bioretention and green roofs. There is no apparent benefit to using different types of treatments.	Y

Signed:

  
\_\_\_\_\_

**Design Team Project Manager**

Date: 6/4/2024

Please complete and return to the auditor

Auditor Signed Off:

  
\_\_\_\_\_

17.04.24