Drainage Assessment

Proposed Development at Countesswells, Areas N2 & N13

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Issue 01

FAIRHURST

CONTROL SHEET

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REPORT TITLE: Drainage Assessment

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Contents

Drainage Assessment 1
Appendix A - Drawings 5
Appendix B – Simple Index Approach 6
Appendix C – Calculations 9
Appendix D – Approval Letters 11
Appendix E – SUDS Function Document 12

Drainage Assessment

This drainage assessment has been prepared to support the Areas N2 and N13 Planning application for the proposed new community at Countesswells, in accordance with the guidance given in the following documents:-

- Water Assessment & Drainage Assessment Guide – A guide for Scotland, produced by SEPA on behalf of the Sustainable Urban Drainage Scottish Working Party (SUDSWP)
- Planning Advice Note (PAN) 61: Planning and Sustainable Urban Drainage Systems, issued by the Scottish Executive Development Department, July 2001.
- The CIRIA SUDS Manual – C753.
- Sewers for Scotland, Fourth Edition, October 2018, published by Scottish Water & WRc plc.
- SUDS for Roads.

The Development Proposal

Barratt Homes propose to develop an area of the new Countesswells community, by Countesswells Development Ltd, which totals 165 hectare greenfield area to the west of Aberdeen. This drainage assessment document is pertinent only to Areas N2 and N13 of the Countesswells development and should be read in conjunction with the Drainage Assessment prepared for the Phase 1A Infrastructure on behalf of the Countesswells Consortium.

Areas N2 and N13 comprises of 185 residential properties, which consists a mix of detached/semi-detached and terraced properties. The development is located at grid reference NJ 87259 05404

Refer to drawing 134783/2200 for details of the site layout and drainage proposals.

Existing Drainage

There are no public sewers on, or adjacent to, the site at present, however there are detailed proposals for new foul and surface water sewer infrastructure along with SUDS features to be installed as part of the infrastructure works for Phase 1 of this development.

Any existing drainage encountered during the development will be reinstated or re-routed as necessary.

Foul Drainage

New foul gravity sewers will be provided to serve the development and will be located within the new roads and areas of open ground where necessary. Sewers will be designed and installed in accordance with 'Sewers for Scotland, Fourth Edition, October 2018', published by Scottish Water & WRc plc.

Each plot will discharge to the new sewer via a single disconnecting or a communal disconnecting chamber if serving more than one property. Disconnecting chambers will be located either within the plots own curtilage, or areas of communal ground.

The new gravity foul sewers for Areas N2 and N13 will connect into the proposed foul sewer infrastructure which is to be provided for the Phase 1 infrastructure works. These foul sewers gravitate in a southern direction to a waste water pumping station located to the very south of the Countesswells development. These foul flows will be pumped to the existing Scottish Water sewer network in Countesswells Road.

Scottish Water has confirmed that the foul flows from the whole of Phase 1 of the Countesswells development can be discharged to the existing drainage network.

Surface Water Drainage

Using the simple index approach referred to in the SUDS manual (CIRIA Report C753), developments of this nature show a low level of pollution hazard. Therefore the surface water run-off has to be dealt with accordingly.

Internal Roads/Housing/Car Park

The simple index approach states that SUDS should be provided to ensure that a total pollution mitigation index equals or exceeds the pollution hazard index.

Referring to Table 1 (Appendix B), this development is shown to have pollution hazard indices (worst case scenario) of**:**

- TSS: 0.5
- Metals: 0.4
- Hydrocarbons: 0.4

In order to provide the necessary mitigation, Table 2 (Appendix B) should be referred to. Based on the land use and by looking at the mitigation indices it is proposed that treatment should be provided in the form of a two stage extended detention basin. For the purpose of the simple index approach, this should be modelled as a swale upstream of a detention basin. This gives overall mitigation indices of:

- TSS: 0.5 + (0.5 x 0.5) = 0.75
- Metals: 0.6 + (0.5 x 0.5) = 0.85
- Hydrocarbons: 0.6 + (0.5 x 0.6) = 0.90

Overall, it can be seen that the mitigation indices provided by the two stage detention basin outweigh the pollution hazard indices of the land use type. Therefore, the proposed SUDS measures are deemed adequate. See Appendix E for details of the two stage basin functionality.

Conveyance

New surface water sewers will be provided to service the development and will be located within the new roads and areas of open ground where necessary. Sewers will be designed and installed in accordance with 'Sewers for Scotland, Fourth Edition, October 2018', published by Scottish Water & WRc plc.

Run-off from the access road and internal housing roads will drain direct to the new sewers via traditional trapped gullies

Run-off from individual plots will also drain direct to the new sewers. Each plot will discharge to the new sewer via a single disconnecting or a communal disconnecting chamber if serving more than one property. Disconnecting chambers will be located either within the plots own curtilage, or areas of communal ground.

Run-off generated from plot driveways will be picked up via trapped yard gullies and/or channel drains before connecting to the private plot drainage upstream of the surface water disconnection chamber. Where the driveway slopes towards an adopted surface, a channel drain will be located at the interface between the plot boundary and carriageway.

Run-off from parking bays will be picked up via traditional trapped gullies and/or channel drains before connecting direct into the new surface water sewer. Parking bays which slope away from the road will have a gully/gullies suitably located at the rear of the bays. Any private parking bays which slope towards an adopted carriageway will have a channel drain installed towards the front of the bay.

Hydraulic Control

In accordance with the Drainage Assessment guide, the rate and volume of surface water run-off from the post development situation should not exceed the surface water run-off from the existing greenfield site.

As Areas N2 and N13 are included within a larger catchment based on the existing topography of the site, the discharge from the proposed two stage detention basin will not exceed the greenfield run-off from the catchment.

This equates to a total surface water discharge of 121.72 l/s for the proposed 16.10ha catchment area, during the 30 year plus climate change rainfall event.

Attenuation volumes will be provided within the two-stage detention basin in order to contain the run-off volumes generated by the critical 30 year, plus climate change, rainfall return event. The two-stage detention basin will also contain the run-off volumes generated by critical rainfall events up to and including the 200 years plus climate change rainfall return event. The attenuated discharge from the two-stage detention basin will not exceed the agreed greenfield rate to the existing watercourse. Refer to Appendix C for details of calculations.

Site levels will be set in order to prevent water entering buildings or restricting access for emergency vehicles.

As part of the detailed drainage design for each of the development areas, sensitivity tests to assess flood risk from the drainage system will be carried out for rainfall events up to and including the 200 year, plus climate change event. Site levels will be set in order to prevent water entering buildings or restricting access for emergency vehicles.

Maintenance

- Scottish Water will adopt and maintain the new foul and surface water sewers. The developer will own the drainage system until it is adopted. The developer will also remain responsible for maintenance of the drainage system until Scottish Water issue a Completion Certificate for the drainage system, at which time they will assume responsibility for maintenance of the elements they are to adopt.
- Road gullies will be adopted and maintained by Aberdeen City Council as part of the roads adoption.
- The adoption and maintenance of the two stage detention basin that will serve the development will be discussed and agreed with Scottish Water and Aberdeen City Council at the time of detailed design.
- The adoption of the drainage system will be the subject of a Section 7 Agreement.

Construction Phase SUDS

In order to protect the existing water environment and prevent run-off and sediment impacting on watercourses, including the River Dee, a method statement, detailing how surface water arising during construction is to be dealt with, will be prepared by the contractor for approval prior to commencement of works on site.

During the development of the site a surface water management strategy will be prepared for each individual construction phase. This strategy will be submitted to the Planning Authority for their approval prior to the commencement of works.

The surface water management strategy will be based on the Contractor's Method Statement and will incorporate the following measures to prevent the surface water run-off from the construction works discharging direct to the watercourses.

- Localised interception of surface water run-off. Temporary ditches or channels around the area of works would provide this. Check dams or silt traps can be provided to encourage the settlement of silt.
- Surface water settlement and filtration. Temporary settlement ponds will be formed and water intercepted at the construction area will be directed to these where it will be retained to allow silt suspended in the run-off to settle. A high level outlet will be formed from the settlement pond to allow treated run-off to discharge to the watercourse. Additional protection could be provided by placing straw bales in the high level outlet so that all flows pass through these before entering the watercourse.
- Protection of permanent drainage system. Surface water run-off from construction areas will, where practicable, will not be drained to the permanent drainage system. This will prevent silt and other construction debris from building up in the system. Where the use of the permanent system cannot be avoided then the system will need to be thoroughly cleaned on the completion of the construction phase.

Appendix A - Drawings

- 134783/2200 Drainage Strategy Layout
- 134783/2205 Drainage Strategy Adoption Plan
- 112614/2003 West Link Road Drainage Layout Sheet 3 of 3
- 112614/2052 Layout of Basin 06

Do not scale from this drawing.

SAFETY HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARD/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING RISKS AND INFORMATION.

RISKS LISTED HERE ARE NOT EXHAUSTIVE. REFER TO DESIGN ASSESSMENT FORM NO.

CONSTRUCTION
NO SIGNIFICANT RESIDUAL HAZARDS WERE IDENTIFIED THAT A COMPETENT CONTRACTOR WOULD NOT BE AWARE OF.

DEMOLITION
NOT APPLICABLE.

FOR INFORMATION RELATING TO USE, CLEANING AND MAINTENANCE SEE THE HEALTH AND SAFETY FILE

IT IS ASSUMED THAT ALL WORKS WILL BE CARRIED OUT BY A COMPETENT CONTRACTOR WORKING, WHERE APPROPRIATE, TO AN APPROVED METHOD STATEMENT.

NOTES

1. THE COPYRIGHT OF THIS DRAWING SUBSISTS WITH FAIRHURST.
2. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS & ENGINEERS DRAWINGS AND SPECIFICATIONS.
3. THE CONTRACTOR IS RESPONSIBLE FOR CHECKING THE LINE AND LEVEL OF EXISTING SERVICES PRIOR TO WORKS COMMENCING. ANY DISCREPANCIES FROM DESIGN INFORMATION MUST BE REPORTED BACK TO THE ENGINEER IMMEDIATELY FOR ACTION.
4. THIS DRAWING SHOULD ONLY BE USED FOR CONSTRUCTION PURPOSES WHEN THE ISSUE STATUS IS "CONSTRUCTION".
5. THE CONTRACTOR WILL BE RESPONSIBLE FOR ALL COSTS INVOLVED IN CHANGES OR MODIFICATIONS REQUESTED AND APPROVED, TO SUIT HIS PREFERRED WORKING METHOD.
6. LARGE SCALE DETAILS TAKE PRECEDENCE OVER SMALL SCALE DETAILS.
7. DO NOT SCALE.
8. IF IN DOUBT, ASK.

LEGEND

- EXISTING SURFACE WATER SEWER
- EXISTING FOUL SEWER
- PROPOSED SURFACE WATER SEWER
- PROPOSED FOUL SEWER
- PROPOSED DISCONNECTION CHAMBERS
- PROPOSED ROAD DRAIN
- PROPOSED PRIVATE ROAD DRAIN
- PROPOSED PIPE CULVERT

Rev.	Date	Description	Drawn	Checked	Approved

This is the plan / drawing / specification referred to in the application

Signed .....

Dated .....

For Fairhurst

Client:

BARRATT HOMES

Project Title:

PROPOSED DEVELOPMENT AT AREA N2 COUNTESSWELLS

Drawing Title:

DRAINAGE STRATEGY LAYOUT

FAIRHURST

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Scale at A0:	Status:	
1:500	For Information	
Drawn:	Checked:	Approved:
CW	MC	DA
Date:	Date:	Date:
30/03/21	30/03/21	30/03/21

Drawing No.: 134783/2200

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