



Hampshire
County Council

FINAL

BARNCROFT INFANT SCHOOL REDEVELOPMENT

DRAINAGE STATEMENT

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Job No: R.J502775



Certificate No. FS 21845



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1. INTRODUCTION

1.1. Executive Summary

Foul water connection approval has been gained from Southern Water for 39 units.

Surface water connection approval has been gained from Southern Water and the Environment Agency for a discharge rate of 48.9 l/s.

A total below ground storage volume for surface water of 46m³ is required to attenuate flows to the 30 year return period storm, Southern Water need to be consulted further about adopting the oversized pipes. A further 65.8m³ of above ground storage is required to attenuate flows to the 100 year +30% for climate change return period storm.

There is a net reduction in foul flow and therefore capacity of the existing Southern Water sewer is not an issue for this redevelopment.

1.2. Background

During the production of this report and the associated consultation with the Environment Agency and Southern Water the number of houses proposed for the development has decreased from 39 to 36. The calculations within this report relate to 39 units and hence the approvals obtained can safely be applied to a 36 unit development.

HCC Property Services are seeking to redevelop Barncroft Infant School and a piece of land to the south west of Barncroft Junior School, to be known as in this report as 'Surplus Land', into a 36 unit housing development. Please refer to drawing 'Infant School Site + Surplus Land Off of Park Lane', this can be found in appendix J of this report.

Engineering Consultancy have been instructed to carry out this feasibility study and initial design work in order to gain consent from Southern Water and the Environment Agency for surface water & foul water discharge from the proposed residential development.

Barncroft Junior School & Infant School are adjacent to each other and discharge their foul water via a private foul sewer into the Southern Water foul sewer in Barncroft Way. The surface water for the Junior School discharges via the Infant School's surface water drainage system into the Southern Water surface water sewer in Hooks Row. The Surplus Land is a parcel of land on the opposite side of the Junior School to the Infant School, this requires connecting to the foul sewer in Barncroft Way via a pumping station due to constraints with the Southern Water foul sewers in Park Lane. The Junior School has already agreed to having a rising main laid across its field.

Drawing R.J502775.03/001 in Appendix A shows the Surplus Land Site and the Infant School site highlighted in green with the Junior school hatched in red.

Barncroft Junior School will be refurbished in 2011 into a primary school. Southern Water and the Environment Agency have been reviewing the proposed developments for both the schools and the Surplus Land site which is why all flows have been considered. This has allowed Hampshire County Council to offset the foul flow increase of the Junior School with that of the Infant school. Surface water flow rates have been kept separate.

2. DRAINAGE

2.1. Introduction

The following summaries provide a brief and concise overview of the existing foul and surface water drainage systems serving Barncroft Infant school. The proposed foul and surface water drainage systems and the consents received from Southern Water and the Environment Agency are included, along with calculations and drawings.

2.2. Surface Water - Existing

Barncroft Infant School currently discharges surface water to the 750mm diameter Southern Water storm water sewer which runs east along the southern boundary of the school. This discharges some 200m east of the school into the Hermitage stream. The school has three un-attenuated points of connection to this sewer which are via one manhole and two saddle connections. There is also an existing connection from the Infant School site that is currently redundant. These are shown on drawing R.J502775.03/001 'Existing Infant School Drainage Scheme & Storm Runoff Rates' to be found in Appendix A of this report.

The total impermeable area of the infant school, including roof tops and all external hard standing areas comes to 4710m². For the purpose of modelling, the site has been divided into two areas 'A left hand side' 1781m² and 'B right hand side' 2929m² respectively. These discharge to two connections points on the existing surface water sewer. The left and right points of connection are shown on the drawing on the drawing in Appendix A.

Drawing R.J502775.03/005 'Existing Infant School Surface Water Flow Survey' in Appendix B provides information on the areas connected to the Southern Water surface water sewer.

Modelling the two areas using MicroDrainage the whole Infant School site currently develops:

1:2 Year Design Storm	48.9 l/s
1:30 Year Design Storm	86.3 l/s
1:100 Year Design Storm	101.1 l/s

The calculations are in Appendix C with the break down of the left and right side of the school shown in the table in drawing R.J502775.03/001 of Appendix A.

2.3. Foul Water – Existing

The infant school is served by an existing private 225mm diameter foul sewer which is shared with Barncroft Junior school; it connects to the Southern Water foul sewer in Barncroft Way.

Using BE EN 12056: 2000 Gravity Drainage Systems Inside Buildings which calculates flow based on drainage fixtures the foul flow for the infant school is 6.0 l/s.

The existing foul flow calculation is included in Appendix D.

2.4. Surface Water – Proposed

Drawing R.J502775.03/006 in appendix E shows the preliminary drainage design based on the original site proposals showing 39 housing units. This drawing shows using two of the three current surface water points of connection from the infant school as well as making use of the existing unused connection. A future design could use all four. The proposed connection for the Surplus Land site to the south west is also shown.

Having consulted with Southern Water it has been agreed that the allowable discharge rate to Southern Water's storm sewer from the new development will be that of the 2 year return period storm from the existing impermeable area of the infant school.

Therefore, any developments on the infant school land and the land to the south west of Barncroft junior school will need to limit their combined surface water discharge rate to the existing 48.9 l/s. Detailed proposals for the attenuation and storage required to limit discharge to the public sewer need to be submitted to Southern Water for approval once a development proposal is finalised. A copy of our proposal to discharge the Southern Water sewer is included in Appendix F as well as the approval letter from Southern Water to our proposal.

The current intention is to attenuate flows for up to the 30 year return period in adopted oversize storm sewers. For storms greater, up to 100 year (+30%), the flows will have to be attenuated in appropriately designed external areas such as car parking or by using bunds where necessary to retain the water. Levels will need designing so that surface water flows away from any buildings so as not to pose a flood risk. The volumes to be stored in oversize pipes and above ground are shown in Table 1.

The Environment Agency have been consulted and their approval gained for this flow rate as it offers a significant improvement in the existing non attenuated situation. A copy of our proposal to the Environment Agency and their response is in Appendix G.

A previous report by Gifford in May 2008 determined that there was additional capacity available in the Southern Water surface water sewer. In the event that the two parcels of land are developed separately then it is advised that an additional capacity check is undertaken to determine if there is additional capacity available. It may be possible to utilise the 48.9l/s for the infant school housing site. The site to the south west could make use of additional capacity should it exist at the time of development.

The storage requirements shown below have been calculated by splitting the 48.9 l/s across both sites. Drawing R.J502775.03/006 in Appendix H shows the preliminary drainage design.

Table 1: Attenuation requirements based on 48.9 l/s overall discharge for the combined housing sites in m³ based on different storm frequencies.

30 year / m ³ in pipes	100 year +30% / m ³	100 year 30% Above ground storage / m ³
46 m³	111.8 m ³	65.8m³

Further detail and calculations are provided in Appendix H. Please refer to drawing R.J502775.03/006 in Appendix E for the preliminary drainage design.

Surface water storage for 30 year return period:

The 30 year return period requires 46m^3 of storage, supporting calculations are in Appendix H. Using box culverts with the internal dimensions of 1.375m wide by 0.5m high and a cross sectional area of 0.654m^2 , the 30 year return period storage can be achieved for the Infants school site with lengths of 32m for the storm drainage attenuation to the top of the site, 12m for the middle section, 20m for the bottom section. The Surplus Land site to the south west requires 9m of the same storm drainage attenuation. The preliminary design is shown in Appendix E. There is scope under the current proposed site layouts to achieve this. Southern Water does adopt oversized pipes and it is recommended to liaise with them during the design stage to discuss the proposal and flow control devices.

Surface water storage for 100 year +30% return period:

The 100 year +30% return period storm requires 111.8m^3 of storage, supporting calculations are in Appendix H. With the 30 year storm being stored below ground 65.8m^3 of above ground storage is required. It is recommended that areas of the two development sites of 329m^2 are appropriately designed with respect to their levels to retain flood water on site to the depth of 200mm within the landscaped areas.

2.5. Foul Water – Proposed

Based on 'Sewers for Adoption 6th Ed' the proposed housing development will generate 1.8 l/s. The infant school discharges 6.0 l/s which means there is a decrease of 4.2 l/s. The proposed junior school redevelopment will increase the foul flow from 6.6 l/s to 7.0 l/s. The proposal to Southern Water is to cover the increase in flow by using the excess from the infant school. Southern Water's Network Development team have been consulted on this and they have approved these flow rates. Proposed foul flow calculations, HCC correspondence and Southern Water approval is in Appendix I.

To make this permitted connection, the Surplus Land to the south west of the junior school will require a pump station to serve the 5 houses. The rising main will have to cross the playing field of the junior school to connect into the main housing sites drainage system which discharges into Barncroft Way.

2.6. Conclusions

Foul water connection approval has been gained from Southern Water for 39 units.

Surface water connection approval has been gained from Southern Water and the Environment Agency for a discharge rate of 48.9 l/s.

A total below ground storage volume for surface water of 46m^3 is required to attenuate flows to the 30 year return period storm, Southern Water need to be consulted further about adopting the oversized pipes. A further 65.8m^3 of above ground storage is required to attenuate flows to the 100 year +30% for climate change return period storm.

There is a net reduction in foul flow and therefore capacity of the existing Southern Water sewer is not an issue for this redevelopment.

Southern Water and the Environment Agency will need consulting further with regards to any detailed designs.

3. APPENDICES