DOCUMENT TITLE

SuDS REPORT
FOR
2 no. NEW HOUSES
AT
LYNBROOK, WHITECHURCH ROAD,
RATHFARNHAM

CLIENT
BRIAN DUNNE

PROJECT NO. 5558

REVISION	DATE
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1. INTRODUCTION

This report has been prepared for a planning application for two detached houses at Lynbrook, Whitechurch Road, Rathfarnham, Dublin 16.

2. SITE LOCATION AND DESCRIPTION OF PROJECT

The proposed development will consist of two detached two detached houses within the curtilage of 'Lynbrook', an existing two-storey family home dating from the 1970s/1980's.

The proposal is for the construction of two detached two-storey dwellings with parking areas to the east which front onto the stream and separate rear gardens. The site and the existing house are bounded to the north and east by the the Whitechurch stream which rises in Tibradden, south of Rathfarnham, and joins the Dodder a few kilometers north. To the west is a ridge line set with mature trees and the existing house lies to the south.

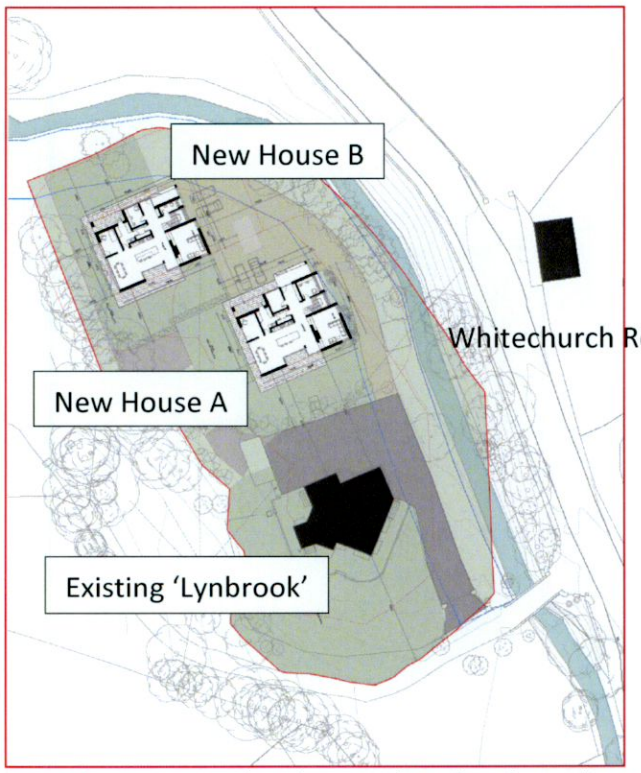

Fig 3.1 showing proposed site layout with curtilage denoted in red.

This report addresses the principles of SuDS, determining the most appropriate SuDS options suitable for the proposed development and assessing the impact on the public drainage network of the proposed development.

3.1 References

The following documents have been reviewed and provide the basis for recommendation of the most applicable SuDS measures for the project as proposed:

- SDCC Water and Drainage Considerations
- Dublin City Development Plan :SW Drainage and Sustainable Urban Drainage Systems
- CIRIA Report C753 The SuDS Manual-V6
- Greater Dublin Region Code of Practice for Drainage Works

3.2 Definition

The function and purpose behind SuDS (sustainable drainage systems) is to employ diverse and bespoke water drainage solutions which maximise the opportunities and benefits of water management and reduce the traditional reliance on traditional surface water drainage systems.

There are four main categories of benefits that can be achieved by SuDS: **water quantity, water quality, amenity** and **biodiversity**. These are the four pillars which underpin the design of all SuDS systems.

3.3 SuDS Systems Overview

There are a diverse range of different SuDS drainage systems developed for different applications which adhere to the core principles outlined above but they can all be grouped under the following categories:

Rainwater harvesting systems - components that capture rainwater and facilitate its use within the building or local environment.

Previous surfacing systems structural surfaces that allow water to penetrate (thus reducing the proportion of run off) but is conveyed to the drainage system, e.g. green roofs, pervious paving. Many of these systems also include some surface storage and treatment.

Infiltration systems - components that facilitate the infiltration of water into the ground. These often include temporary storage zones to accommodate run off volumes before slow release to the soil.

Conveyance systems - components that convey flows to downstream storage systems. Where possible, these systems also provide flow and volume control and treatment, eg swales.

Storage systems - components that control the flows and, or possible, volumes of run off being discharged from the site, by storing water and releasing it slowly (attenuation). These systems may also provide further treatment of the run off, e.g. ponds, wetlands and detention basins.

Treatment systems - components that remove or facilitate the degradation of contaminants present in the run off.

3.4. System Options

The following table details all principal SuDS conforming designs recognisable as separate systems. It is usual practice that drainage designers employ one or more of these components in the design of an overall site-specific SuDS system.

Types of SuDS components	
Component type	**Description**
Rainwater harvesting systems	Rainwater is collected from the roof of a building or from other paved surfaces in an over-ground or underground tank for use on site. Depending on its intended use, the system may include treatment elements. The system should include specific storage provision if it is to be used to manage runoff to a design standard.
Green roofs	A planted soil layer is constructed on the roof of a building to create a living surface. Water is stored in the soil layer and absorbed by vegetation. Blue roofs store water at roof level, without the use of vegetation.
Infiltration systems	These systems collect and store runoff allowing it to infiltrate into the ground. Overlying vegetation and underlying unsaturated soils can offer protection to groundwater from pollution risks.
Proprietary treatment systems	These subsurface and surface structures are designed to provide treatment of water through the removal of contaminants.
Filter strips	Runoff from an impermeable area is allowed to flow across a grassed or otherwise densely planted area to promote sedimentation and filtration.
Filter drains	Runoff is temporarily stored below the surface in a shallow trench filled with stone/gravel, providing attenuation, conveyance and treatment (via filtration).
Swales	A vegetated channel is used to convey and treat runoff (via filtration). These can be "wet", where water is designed to remain permanently at the base of the swale, or "dry" where water is only present in the channel after rainfall events. It can be lined, or unlined to allow infiltration.
Bioretention systems	A shallow landscaped depression allows runoff to pond temporarily on the surface, before filtering through vegetation and underlying soils prior to collection or infiltration. In its simplest form it is often referred to as a rain garden. Engineered soils (gravel and sand layers) and enhanced vegetation can be used to improve treatment performance.
Trees	Trees can be planted within a range of infiltration SuDS components to improve their performance, as root growth and decomposition increase soil infiltration capacity. Alternatively they can be used as standalone features within soil-filled tree pits, tree planters or structural soils, collecting and storing runoff and providing treatment (via filtration and phytoremediation).
Pervious pavements	Runoff is allowed to soak through structural paving. This can be paving blocks with gaps between solid blocks, or porous paving where water filters through the block itself. Water can be stored in the sub-base and potentially allowed to infiltrate into the ground.
Attenuation storage tanks	Large, below-ground voided spaces can be used to temporarily store runoff before infiltration, controlled release or use. The storage structure is often constructed using geocellular or other modular storage systems, concrete tanks or oversized pipes.
Detention basins	During a rainfall event, runoff drains to a landscaped depression with an outlet that restricts flows, so that the basin fills and provides attenuation. Generally, basins are dry, except during and immediately following the rainfall event. If vegetated, runoff will be treated as it is conveyed and filtered across the base of the basin.
Ponds and wetlands	Features with a permanent pool of water can be used to provide both attenuation and treatment of runoff, where outflows are controlled and water levels are allowed to increase following rainfall. They can support emergent and submerged vegetation along their shoreline and in shallow, marshy zones, which enhances treatment processes and biodiversity.

Table 4.4 : SuDS systems.

3.5. Appropriate Site-Specific Systems

We have reviewed the proposed structure, location and curtilage and are of the opinion that the following component types are those best suited to addressing the SuDS design requirements: **infiltration, pervious (permeable) pavements and rainwater harvesting** and it is proposed to incorporate these three elements in the drainage design. Please refer to drawing **5558-MCE-00-XX-DR-C-0003_Proposed Surface Water Layout** attached as an appendix to illustrate proposed surface water drainage details.

3.5.1 Infiltration

Soakaways refer to excavations that are filled with a void forming material that allows the temporary storage of water before it soaks into the ground. Modern small soakaways are nowadays constructed using geocellular units wrapped in geotextile. It is proposed to use these units in this development, as outlined in the initial application, employing a silt trap catchpit pre-treatment chamber as per following schematic:

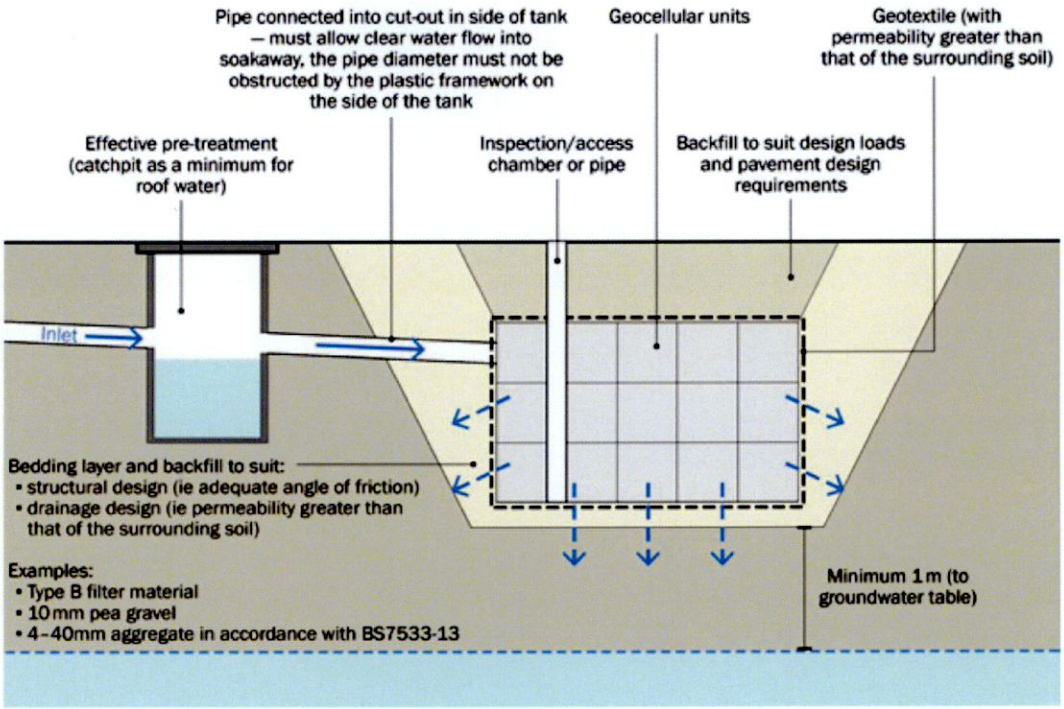

Fig 4.5.1: Typical soakaway details including a pre-treatment system .

The soakaway designs remain the same as those conducted by Traynor Environmental Ltd as part of the original, planning application.

3.5.2 Pervious Pavements

Pervious pavements provide a pavement suitable for pedestrian and/or vehicular traffic, while at the same time allowing rainwater to infiltrate through the surface and into the underlying structural layers. Some typical examples are shown in the figure below.

Permeable pavement drainage has been shown to have decreased concentrations of a range of surface water pollutants when compared to impermeable surface drainage, including heavy metals, oil and grease, sediment etc. It is proposed in this application to use concrete paving blocks set in a layer of bedding sand. The sand will act as catchment for first flush contaminants but in addition to this it is proposed to install a geotextile layer above the subgrade material as a secondary barrier. Please refer to the middle section of the indicative figure below.

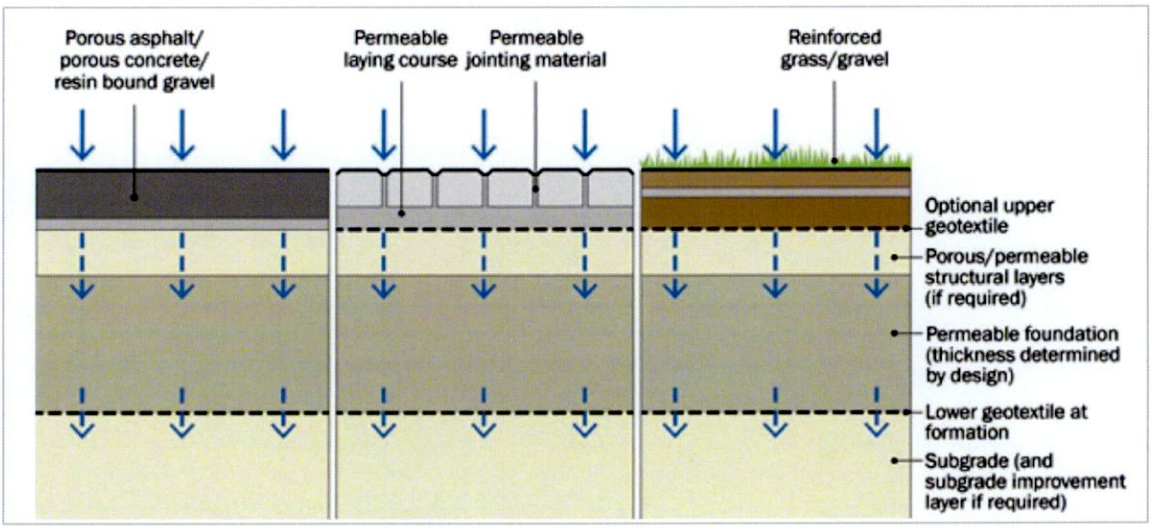

Fig 3.4.2: Typical pervious/permeable pavement buildup details.

The permeable paving design has been conducted by Traynor Environmental Ltd and is included in this response under separate cover. It is proposed to use Tobermore Hydropave paving.

3.5.3 Rainwater Harvesting

Rainwater harvesting refers to the retention and storage of rainwater for non-potable applications. It is proposed to fit a 200l water butt to one of the down pipes to the rear of each house for use in gardening applications.

Fig 3.4.3: Typical water butt with downpipe diverter and inline filter..

4.0 SUMMARY

We have reviewed all options and have arrived at the reasonable determination that the use of **soakaways, permeable paving** and **water harvesting** systems are the most appropriate combination of SuDS-compatible systems to meet the requirements of the project. The soakaways, designed by Traynor Environmental Ltd are sized to meet volume requirements generated by a 60min storm, and dimensioned to remain above the water table. The permeable paving specified for the driveways will utilise both sand bedding and geotextile membrane to contain any potential hydrocarbon contaminants .

TABLE OF ATTACHED DRAWINGS

5558-MCE-00-XX-DR-C-0003_Proposed Surface Water Layout