



**BELLWAY HOMES LTD (WESSEX) & THE  
BORROW FOUNDATION LTD  
PADNELL GRANGE  
WATERLOOVILLE**

**SUSTAINABLE DRAINAGE SYSTEMS -  
MANAGEMENT AND MAINTENANCE  
PLAN**

**JANUARY 2019**



**the journey is the reward**

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PLAN**

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|                      |                     |
|----------------------|---------------------|
| <b>Project Code:</b> | <b>A/BHPADNELL</b>  |
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**Bellway Homes Ltd (Wessex) & The Borrow Foundation Ltd**  
**Padnell Grange**  
**Waterlooville**  
**Sustainable Drainage Systems - Management and Maintenance Plan**

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# 1 Introduction

- 1.1 Mayer Brown Ltd have been commissioned by Bellway Homes Ltd & The Borrow Foundation Ltd to provide a SuDS Management and Maintenance Plan in support of a planning application for a proposed residential development located on at Padnell Grange, Waterloooville.
- 1.2 The proposed surface water drainage network (refer to Appendix A) utilises Sustainable Drainage techniques (SuDS) including permeable paving and a filter trench. The management and maintenance of these features is of paramount importance to ensure their effectiveness over the lifetime of the development.
- 1.3 The proposed surface water drainage features will not be adopted by any public body and will remain in private ownership. There will be a designated site maintenance team employed which should enable tight control over the operation and maintenance of the drainage/SuDS systems as proposed in this report.
- 1.4 This Owner's Manual is for advising the required maintenance activities for the sustainable drainage network. This report has been prepared with reference to CIRIA document C753 – The SuDS Manual and provides current best practice guidance on Sustainable Drainage Systems (SuDS) to facilitate their effective implementation within developments.

## 2 Management and Maintenance of SuDS Features

### Introduction

- 2.1 Unlike conventional drainage systems, SuDS features should be visible and their function should be easily understood by those responsible for maintenance. When problems occur, they are generally obvious and can be remedied simply, using standard landscaping practice. If systems are properly monitored and maintained, any deterioration in performance can often be managed out.
- 2.2 There are three categories of maintenance activities:
- **Regular Maintenance** (*including inspections and monitoring*) – Consists of basic tasks done on a frequent and predictable schedule, including vegetation management, litter and debris removal, and inspections.
  - **Occasional Maintenance** – Comprises tasks that are likely to be required periodically, but on a much less frequent and predictable basis than the routine tasks (e.g. sediment removal).
  - **Remedial Maintenance** – Comprises intermittent tasks that may be required to rectify faults associated with the system.

### Health and Safety

- 2.3 All those responsible for maintenance should take appropriate health and safety precautions of all activities (including lone working, if relevant) and risk assessments should always be undertaken.

## Attenuation Tank

- 2.4 The attenuation tank on site is primarily for the conveyance and attenuation of surface water. However, it also provides a level of treatment.
- 2.5 Regular inspection and maintenance is important for the effective operation of attenuation tanks as designed. These are described below in **Table 2.1**.

| Maintenance Schedule | Required Action                                                                                                             | Recommended Frequency                                                  |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|
| Regular Maintenance  | Inspect and identify any areas that are not operating correctly. If required, take remedial action.                         | Monthly for 3 months, then annually                                    |
|                      | Debris removal from catchment surface (where may cause risk to performance).                                                | Monthly.                                                               |
|                      | Remove sediment from pre-treatment structures.                                                                              | Annually, or as required.                                              |
| Remedial Actions     | Repair/rehabilitation of inlets, outlets, overflows and vents.                                                              | As required.                                                           |
| Monitoring           | Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed. | Annually and after large storms.                                       |
|                      | Survey inside of tank for sediment build-up and remove if necessary.                                                        | Annually until evidence this is too regular, every 5 years thereafter. |

**Table 2.1: Attenuation Tank Maintenance Requirements**

## Filter Trench

- 2.6 A filter trench is a linear drain which comprises a ditch with permeable material inside for the filtration of surface water. Filter trenches can reduce pollutant levels in the surface run-off by filtering out fine sediments.
- 2.7 Regular inspection and maintenance is important for the effective operation of the Filter Trench as designed, these are described below in Table 2.3:

| Maintenance Schedule   | Required Action                                                                                                                                     | Recommended Frequency                                                              |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| Regular Maintenance    | Litter and debris removal from trench surface, access chambers and pre-treatment devices.                                                           | Monthly or as required.                                                            |
|                        | Inspect filter drain surface, inlet/outlet pipework and control systems for blockages, clogging, standing water and structural damage.              | Monthly.                                                                           |
|                        | Inspect pre-treatment systems, inlets and perforated pipework for silt accumulation, and establish appropriate silt removal frequencies.            | Six monthly                                                                        |
|                        | Remove sediment from pre-treatment devices.                                                                                                         | Six monthly or as required.                                                        |
|                        | Removal and washing of exposed stones on the trench surface.                                                                                        | Annually (bi-annual in the first year) or when the silt is evident on the surface. |
|                        | Trimming of any roots that may be causing blockages.                                                                                                | Annual (semi-annual for the first year).                                           |
|                        | Remove weeds on the trench surface.                                                                                                                 | Monthly at start, then as required.                                                |
| Occasional Maintenance | Remove or control tree roots where they are encroaching the sides of the filter drain, using recommended methods (e.g. HJUG, 2007 or BS 3998:2010). | As required.                                                                       |
|                        | At locations with high pollution loads, remove surface geotextile and replace, and wash or remove overlying filter medium.                          | Five yearly or as required.                                                        |
|                        | Clear perforated pipework of any blockages.                                                                                                         | As required.                                                                       |
|                        | Remove tree roots or trees that grow close to the trench.                                                                                           | As required.                                                                       |
|                        | Remove surface geotextile and replace, and wash or replace filter media.                                                                            | Five yearly.                                                                       |

**Table 2.2: Filter Trench Maintenance Requirements**

## Pond

- 2.8 Ponds can be used for the attenuation of surface water however, they also provided a level of water treatment.
- 2.9 Regular inspection and maintenance is important for the effective operation of the ponds as designed, these are described below in table 2.4:

| Maintenance Schedule   | Required Action                                                                                                                                                                                                                 | Recommended Frequency                                            |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|
| Regular Maintenance    | Remove litter and debris.                                                                                                                                                                                                       | Monthly or as required.                                          |
|                        | Cut grass – public areas.                                                                                                                                                                                                       | Monthly (during growing season), or as required.                 |
|                        | Cut meadow grass                                                                                                                                                                                                                | Half yearly (spring).                                            |
|                        | Inspect marginal and bankside vegetation and remove nuisance plants (for first 3 years).                                                                                                                                        | Monthly at start, then as required.                              |
|                        | Inspect inlets, outlets, banksides, structures, pipework etc for evidence of blockage and/or physical damage.                                                                                                                   | Monthly.                                                         |
|                        | Inspect water body for signs of poor water quality.                                                                                                                                                                             | Monthly (May-October).                                           |
|                        | Inspect silt accumulation rates in any fore-bay and in main body of the pond and establish appropriate removal frequencies; undertake contamination once some build-up has occurred, to inform management and disposal options. | Half yearly.                                                     |
|                        | Check any penstocks and other mechanical devices.                                                                                                                                                                               | Annually.                                                        |
|                        | Hand cut submerged and emergent aquatic plants (at minimum of 0.1m above pond base; include max 25% a pond surface).                                                                                                            | Annually.                                                        |
|                        | Remove 25% of bank vegetation from water's edge to a minimum of 1m above water level.                                                                                                                                           | Annually.                                                        |
|                        | Tidy all dead growth (scrub clearance) before start of growing season (Note: tree maintenance is usually part of overall landscape management contract).                                                                        | Annually.                                                        |
|                        | Remove sediment from any fore-bay.                                                                                                                                                                                              | Every 1-5years.                                                  |
|                        | Remove sediment and planting from one quadrant of the main body of ponds without sediment fore-bays.                                                                                                                            | Every 5 years, or as required.                                   |
| Occasional Maintenance | Remove sediment from the main body of big ponds when volume is reduced by 20%.                                                                                                                                                  | With effective pre-treatment, this will only be required rarely. |
| Remedial Actions       | Repair erosion or other damage.                                                                                                                                                                                                 | As required.                                                     |
|                        | Replant where necessary.                                                                                                                                                                                                        | As required.                                                     |
|                        | Aerate pond when signs of eutrophication are detected.                                                                                                                                                                          | As required.                                                     |
|                        | Realign rip-rap or repair other damage.                                                                                                                                                                                         | As required.                                                     |
|                        | Repair/rehabilitate inlets, outlets and overflows.                                                                                                                                                                              | As required.                                                     |

**Table 2.3: Pond Maintenance Requirements**

## 3 Maintenance Activities

### Regular Maintenance Activities

#### Inspections and Reporting

- 3.1 Inspections can generally be carried out at monthly site visits and should be subsumed into regular maintenance requirements. During the first year of operation, inspections should ideally be carried out after every significant storm event to ensure proper functioning, but in practice this may be difficult or impractical to arrange.
- 3.2 Typical routine inspection questions that will indicate when occasional or remedial maintenance activities are required, and/or when water quality requires investigation include:
- Are inlets or outlets blocked?
  - Is there evidence of poor water quality? (e.g. algae, oils, milky froth, odour, unusual colourings.)
  - Is there evidence of sediment build up?
  - Is there evidence of ponding above an infiltration surface?
  - Is there evidence of structural damage that requires repair?
  - Are there areas of erosion or channelling over vegetated surfaces?

#### Litter/Debris Removal

- 3.3 This is an integral part of SuDS maintenance and reduces the risks of inlet and outlet blockages, retains amenity value and minimises pollution risks.

#### Weed/Invasive plant control

- 3.4 Weeds are generally defined as vegetation types that are unwanted in a particular area. For SuDS, weeds are often alien or invasive species, which do not enhance the technical performance or aesthetic value of the system, or non-native species and the spread of which is undesirable.
- 3.5 In some places, weeding has to be done by hand to prevent the destruction of surrounding vegetation (hand weeding should generally be required only during the first year, i.e. during plant establishment). However, over grassed surfaces, mowing can be an effective management measure. The use of herbicides and pesticides should be prohibited since they cause water quality deterioration. The use of fertilisers should also be limited or prohibited to minimise nutrient loadings which are damaging to water bodies.

### Shrub Management

- 3.6 Shrubs tend to be densely planted and are likely to require weeding at the base, especially during the first year to ensure that they get enough water. Shrubs should be selected so they can grow to their maximum natural height without pruning.

### **Irregular Maintenance Activities**

#### Sediment Removal

- 3.7 To ensure long-term effectiveness, the sediment that accumulates in SuDS should be removed periodically.
- 3.8 Sediment accumulation will typically be rapid for the entire construction period (including time required for the building, turfing and landscaping of all upstream development plots). Once a catchment is completely developed and all vegetation is well-established, sediment mobility and accumulation is likely to drop significantly.

### **Remedial Maintenance**

#### Structure rehabilitation/repair

- 3.9 There will come a time with most SuDS techniques when a major overhaul of the system is required to remove clogged filters, geotextiles, gravel etc. This will typically be between 10 and 25 years, depending on the technique and factors such as the type of catchment and sediment load.
- 3.10 Major overhaul is most likely to be required on techniques that rely on filtration through soils or aggregates, such as sand filters and infiltration devices. Other SuDS techniques are unlikely to need major overhaul if routine maintenance is undertaken as required.

## **APPENDIX A: Proposed Drainage Strategy Drawing**

