



Project Name : Former Shrublands Nursery, Roundstone Lane, Angmering

Job No : 21-254

Note Title : Drainage Maintenance and Management Plan

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## **1.0 INTRODUCTION**

1.1.1 Odyssey has been commissioned by Sigma Homes to undertake a surface water and foul water drainage strategy in respect of the development located at Platinum Way, Angmering.

1.1.2 This technical note provides a Drainage Maintenance and Management plan to support the proposed surface water drainage strategy.

1.1.3 The surface water network includes sustainable drainage system (SuDS) element such as infiltration blankets / trench soakaways, permeable road system and is designed to cater for a 1 in 100-year return storm (1% annual probability) plus a climate change allowance of 45%. 10% Urban creep has been allowed for roofs within the design catchments.

## **2.0 MAINTENANCE AND MANAGEMENT PLAN**

### **2.1 General**

2.1.1 This section outlines the proposed maintenance and management regimes of the drainage systems as part of the proposed development.

2.1.2 The proposed drainage features on site comprise a combination of:



## DRAINAGE MAINTENANCE AND MANAGEMENT PLAN

- permeable paving,
- traditional piped sewer networks, manholes and silt traps,
- drainage channels,
- infiltration blankets / trench soakaways,
- dry detention basin – acting as emergency and spare volume for overflow from the infiltration blanket located within public open space,
- water butts.

2.1.3 Drainage features serving single dwelling only will be the responsibility of an individual householder. Drainage features of any shared surface water drainage system will be the responsibility of and be maintained long term by the appointed Management Company in accordance with the drainage suppliers' requirements / recommendations.

2.1.4 The surface water drainage networks will remain private and be maintained by the Management Company.

2.1.5 This section of the report sets out the maintenance and management of the drainage system throughout its lifetime.

2.1.6 The actions outlined in this plan are common to all types of drainage, and are the minimum standard of maintenance and inspection however, the management company and individual householders (where appropriate) may find it beneficial to vary the maintenance regularity, and to include extra tasks such as

- To record the measurements of sediment levels;
- To make a photographic record of problem areas;
- To identify and clear areas where refuse is a problem;

2.1.7 The following text has been divided into sections which correspond to each relevant drainage type detailing:

- Description of feature
- Maintenance activities and frequency
- Inspection and frequency



## **2.2 Permeable Paving**

2.2.1 Permeable paving has been proposed on this site to drain the surface water falling on the roads and driveways. The block pavements on the surface of the road are of a type which allows surface water to infiltrate through the small gaps and into the sub-base below. This avoids the need for gullies. The thickness of the sub-base has been sized to attenuate the surface water run off for a 1 in 100 year plus 45% event. The system will be ultimately lined with a permeable geotextile, this will allow the surface water to infiltrate into the ground below.

2.2.2 Schedule for maintenance and inspection is shown in **Table 2.1**.



## DRAINAGE MAINTENANCE AND MANAGEMENT PLAN

**Table 2.1: Permeable Paving Maintenance Activities & Frequency**

| Maintenance Category   | Maintenance Activity           | Comments                                                                                                                                                                                                           | Frequency                                                                                                                                                                                                                                     |
|------------------------|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Routine Maintenance    | Sweeping                       | Regular removal of silt and other sediments to maintain infiltration capacity.                                                                                                                                     | Minimum of 3 surface sweepings per year                                                                                                                                                                                                       |
|                        | Brushing and Vacuuming         | Brush and suction cleaner (either lorry-mounted or small precinct sweeper)<br>Care should be taken to adjust vacuum equipment to ensure jointing material is not removed.<br>Any lost material should be replaced. | 1. End of winter (April)<br>- to collect winter debris<br>2. Mid-summer (July/August)<br>- to collect dust, flower and grass-type deposits.<br>3. After autumn leaf fall (November)<br><br>Or as required based on site specific observations |
| Infrequent Maintenance | Landscaping trimming           | Stabilise and mow adjacent areas.                                                                                                                                                                                  | As required                                                                                                                                                                                                                                   |
|                        | Weeding                        | Removal of weeds from permeable pavement structure.                                                                                                                                                                | As required                                                                                                                                                                                                                                   |
| Corrective Maintenance | Landscape Remediation          | Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50mm of the level of the paving.                                                                           | As required                                                                                                                                                                                                                                   |
|                        | Rutting and Damage Remediation | Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users.                                                                  | As required                                                                                                                                                                                                                                   |
|                        | Structural Remediation         | Rehabilitation of surface and upper sub-structure<br><br>Rehabilitation of inter-connection pipe links and/or diffuser units                                                                                       | Every 10 to 15 years or as required (if infiltration performance is reduced because of significant clogging or CCTV reports structural damage to diffusers or pipes)                                                                          |
| Monitoring             | Initial Inspection             | Initial Inspection                                                                                                                                                                                                 | Monthly for 3 months after installation                                                                                                                                                                                                       |
|                        | Operation Inspection           | Inspect for evidence of poor operation and/or weed growth. If required, take remedial action.                                                                                                                      | 3-monthly and 48 hours after large storms                                                                                                                                                                                                     |
|                        | Clogging Inspection            | Inspect silt accumulation rates and establish appropriate brushing frequencies.                                                                                                                                    | Annually                                                                                                                                                                                                                                      |



### **2.3      *Piped Sewer Networks, Manholes and Silt Traps***

2.3.1      Drainage systems comprising of pipe runs, manholes and gullies are a more conventional method of draining surface water run-off from impermeable areas.

2.3.2      Surface water falling on impermeable areas such as roofs drain to gutters and downpipes or at surface level to gullies which convey the water below ground to the main drainage network. Manholes are also provided on the main drainage system at regular intervals, changes in sewer direction, gradient or pipe diameter. This type of drainage system can be accessed from the gullies or manholes for routine inspection and maintenance.

2.3.3      Gullies are to be 'trapped' such that on collecting and conveying surface water they trap sediment and prevent any unpleasant odours returning from the sewers.

2.3.4      Schedule for maintenance and inspection of pipe systems, gullies, manholes and silt traps is shown in **Table 2.2**.

**Table 2.2: Pipe Systems, Manholes and Silt Traps Maintenance Activities & Frequency**

| Maintenance Category   | Maintenance Activity                                                                            | Comments                                                                                                                                                                                                           | Frequency                                                                       |
|------------------------|-------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| Routine Maintenance    | Litter and debris removal                                                                       | Debris removal which may cause risks to performance.                                                                                                                                                               | Monthly                                                                         |
|                        | Checking of blockages, cleaning of gutters, drainage channels and silt traps (where applicable) | Silt traps found to be non-functioning/blocked on annual inspection will be noted and cleared at 6 monthly intervals. Recurring blockages should be investigated.<br><br>Cleaning of gutters and drainage channels | Annually (or as required)<br><br>Annually (or as required based on inspections) |
|                        | Correct Operation                                                                               | Check for blockages, inspect and identify any areas that are not operating correctly. If required, take corrective action and maintenance.                                                                         | Monthly for 3 months after installation and then 6 monthly                      |
| Infrequent Maintenance | Clear blockages                                                                                 | Cleaning/jetting                                                                                                                                                                                                   | As required                                                                     |
|                        | Desilting of silt traps                                                                         | Remove sediment and debris from silt traps                                                                                                                                                                         | As required                                                                     |
| Corrective Maintenance | Repair                                                                                          | Repair/rehabilitation of system components                                                                                                                                                                         | As required                                                                     |
| Monitoring             | Initial Inspection                                                                              | Initial Inspection                                                                                                                                                                                                 | Monthly for 3 months after installation                                         |
|                        | Operation Inspection                                                                            | Inspect for evidence of poor operation. Check silt traps for prolonged surcharge. If required, take corrective action and maintenance.                                                                             | 3-monthly and 48 hours after large storms for silt traps checks                 |
|                        | Clogging Inspection                                                                             | Inspect silt accumulation rates and establish appropriate cleaning frequencies.                                                                                                                                    | Monthly in the first year and then as required                                  |
|                        | Inspection Chambers, Silt traps                                                                 | Monitor inspection chambers and silt traps.                                                                                                                                                                        | Annually or as required                                                         |



## **2.4 Drainage Channels**

2.4.1 There are drainage channels used across the site. These are used to capture surface water run-off where appropriate.

2.4.2 It is imperative that any drainage channels are properly maintained to ensure that rain water flow within them is not impeded.

2.4.3 When and where necessary drainage channel maintenance activities will be undertaken in accordance with **Table 2.2**.

2.4.4 The design of drainage channels is based on a full-bore condition however no flooding is allowed. Should rainwater start to escape from the channel via the top grating it will be necessary to investigate the issue and necessary corrective maintenance will be undertaken accordingly.

2.4.5 Access into drainage channel is easily facilitated by lifting channel grating thus allowing internal inspection and maintenance action as necessary.

## **2.5 Infiltration Blankets / Trench Soakaways**

2.5.1 Infiltration blankets / trench soakaways are proposed on this site to drain surface water falling directly onto the roofs.

2.5.2 Surface water flow to the blankets will be via linear drains, a piped network and silt trap inspection chambers. All manholes immediately upstream of the infiltration blankets / soakaways will incorporate a silt trap / sump. The above system will offer treatment of surface water prior to entering the infiltration blanket / soakaway.

2.5.3 All pipework up to the inlet into the blanket / soakaway will be maintained in accordance with **Table 2.2**.

2.5.4 Infiltration blankets / trench soakaways will incorporate perforated distributor pipe that will allow for an internal inspection / survey. These distributor pipes will be accessed via dedicated inspection chambers and will allow CCTV inspection and de-silting (via jetting) should it be necessary.

2.5.5 The inspection frequency will be the same as the 'Routine Maintenance' category and 'Checking for blockages' activity in **Table 2.2**.



## 2.6 Dry Detention Basin and Overflow Gullies

2.6.1 Dry detention basin located within public open space is designed as an infiltration blanket emergency overflow. It comprises of a shallow, vegetated open area slightly sunken in relation to the adjacent roads / access.

2.6.2 Schedule for maintenance and inspection of basin is shown in **Table 2.3**.

**Table 2.3: Dry Detention Basin and Overflow Gullies Maintenance Activities & Frequency**

| Maintenance Category   | Maintenance Activity                                                                                      | Comments                                                                                                                                                                                                                                                                                                                                                    | Frequency                                       |
|------------------------|-----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|
| Routine Maintenance    | Litter and debris removal, inspection of overflow gullies arrangement for blockages and clear if required | Litter & debris to be removed prior to any grass cutting activity to minimise risk of shredding litter. Particular attention should be paid to overflow gullies arrangement                                                                                                                                                                                 | Monthly.                                        |
|                        | Grass cutting:                                                                                            | All cuttings to be removed from basin component.                                                                                                                                                                                                                                                                                                            | Monthly (during growing season) or as required. |
|                        | Manage other vegetation and remove nuisance plants.                                                       | Weeding should be conducted by hand or use non-toxic and biodegradable weed killer. Invasive species should be removed in accordance with best practice.                                                                                                                                                                                                    | Monthly (at implementation) then as required.   |
|                        | Tidy all dead growth before start of growing season.                                                      |                                                                                                                                                                                                                                                                                                                                                             | Annually.                                       |
|                        | Re-seed or replant areas of poor vegetation growth.                                                       |                                                                                                                                                                                                                                                                                                                                                             | As required.                                    |
| Infrequent Maintenance | Repair erosion or other damage.                                                                           |                                                                                                                                                                                                                                                                                                                                                             | As required.                                    |
| Corrective Maintenance | Repair / rehabilitation of overflow gullies arrangement                                                   | Should overflow gully become fully silted-up then the granular fill material and geotextile liner is to be removed from the gully. New geotextile liner to be placed in the gully and the granular material to be washed if feasible (and thus to be re-used) or replaced with clean one and placed over the geotextile liner up to the gully grating level | As required.                                    |



## **2.7 Water Butts**

2.7.1 The water butts shall be maintained by the individual property owners or management company (as applicable).

2.7.2 Responsible party shall be responsible for ensuring that each water butt remains in good working order, including regular inspection cleaning, removal of accumulated sediment and debris, checking for leaks, and ensuring that inlets, outlets, overflows, and taps remain unobstructed and operational (as per water butt manufacturer recommendation or **Table 2.2** in the absence of the former).

2.7.3 Any damaged or defective components shall be repaired or replaced promptly to maintain the intended level of performance.



### 3.0 MAINTENANCE RESPONSIBILITIES

3.1.1 A pre-handover inspection will be required prior to the commencement of any maintenance periods.

3.1.2 The residents of each dwelling would be responsible for all elements of drainage which would fall within the extent of land conveyed to them through each individual plot purchase. This would include all chambers, rodding eyes, drainage channels and pipework as necessary. The responsibilities would include the required maintenance activities, as well as the replacement and repair of components as required.

3.1.3 A private management company would be responsible for all elements of any shared drainage system. The remit of the private management company would include the regular and satisfactory maintenance of the components listed above, as well as the “end of life” replacement as required by the manufacturer’s guidance. The private management company would be required to identify a suitable storage or disposal location for all green and organic waste. The private management company would also be required to prepare an action plan for dealing with accidental spills of pollutants, as well as task specific Risk Assessments and Method Statements associated with the relevant maintenance activity.

3.1.4 Private management company must have access rights to all areas (even private) where the maintenance of a shared drainage system would be necessary.

3.1.5 The maintenance regimes set out in this document are subject to review at periods deemed suitable by the appointed management company and their internal processes and procedures may be amended to suit.

3.1.6 Should repairs to the drainage system be needed it is expected that upon completion any drainage system reinstatement works will provide the same construction and functioning standards as per the approved drainage designs (please refer to **Appendix A** for approved designs).

3.1.7 It would be necessary for the maintenance company to prepare a bespoke maintenance record sheet, however as a guide a CIRIA’s C753 SuDS Manual example is shown in **Appendix B**.

3.1.8 If the appointed private management company is no longer able to fulfil its duties, then the responsibility will remain with the residents to form and / or appoint a new management company to undertake the maintenance of the shared drainage system.



#### **4.0 ACCIDENTAL SPILLAGES OF POLLUTANTS**

4.1.1 If the spill cannot be safely contained or if the spill is causing a threat to life, evacuate the area and call emergency services from a safe location.

4.1.2 If it is safe to do so an action for dealing with accidental spillages should follow the stop-contain-notify-clean up procedures. These procedures must only be followed if the nature of the spillage and associated hazard is known and understood.

4.1.3 'Stop' – If appropriate stop activity immediately and stop the leak or eliminate the source of the spill.

4.1.4 'Contain' – Spills involving hazardous materials should first be contained to prevent spread of the material to other areas. Use pollution control equipment (e.g. spill kits, drip trays, etc) to contain the spill. Check the spill has not reached any drains or water bodies.

4.1.5 'Notify' – Once the spill has been contained notify emergency contact, either nominated management company or emergency services by calling 999.

4.1.6 'Clean up' – Attempt to soak up the spill using absorbent material (or by suction tank or similar if appropriate). Wherever possible the material should be rendered safe by treating with appropriate chemicals. Treated material should be absorbed onto inert carrier material to allow the material to be cleared up and removed to a safe place for disposal or further treatment as appropriate. Any areas of affected permeable block paving surfacing should be appropriately cleaned and re-laid on a new bedding material. In case of a heavy pollution of the sub-base it might be necessary to replace the sub-base as appropriate.



## **5.0 FINANCIAL MANAGEMENT AND MAINTENANCE COSTS**

5.1.1 The management company will collect funds through estate charges (monthly, annually or as appropriate) from all residents to cover costs for the ongoing maintenance.

5.1.2 Within the estates charges a contingency pot / sinking fund will accumulate monies which will cover costs for unforeseen maintenance / repairs and the future replacement of any major components at the end of the manufacturers' recommended design life.

## **Appendix A**

### **Approved Drawings**

## **Appendix B**

### **CIRIA C753 SuDS Manual Maintenance Record Pro-forma Example**

**TABLE B.25 SuDS maintenance inspection checklist**

| General information                                 |  |  |  |                                                                                            |  |  |  |  |
|-----------------------------------------------------|--|--|--|--------------------------------------------------------------------------------------------|--|--|--|--|
| Site ID                                             |  |  |  |                                                                                            |  |  |  |  |
| Site location and co-ordinates (GIS if appropriate) |  |  |  |                                                                                            |  |  |  |  |
| Elements forming the SuDS scheme                    |  |  |  | Approved drawing reference(s)                                                              |  |  |  |  |
| Inspection frequency                                |  |  |  | Approved specification reference                                                           |  |  |  |  |
| Type of development                                 |  |  |  | Specific purpose of any parts of the scheme (eg biodiversity, wildlife and visual aspects) |  |  |  |  |

  

| Inspection date                                                                                                                                                                                                                                                                                                                                                                                          |         |     |                 |                |         |     |                 |                |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----|-----------------|----------------|---------|-----|-----------------|----------------|
|                                                                                                                                                                                                                                                                                                                                                                                                          | Details | Y/N | Action required | Date completed | Details | Y/N | Action required | Date Completed |
| General inspection items                                                                                                                                                                                                                                                                                                                                                                                 |         |     |                 |                |         |     |                 |                |
| Is there any evidence of erosion, channelling, ponding (where not desirable) or other poor hydraulic performance?                                                                                                                                                                                                                                                                                        |         |     |                 |                |         |     |                 |                |
| Is there any evidence of accidental spillages, oils, poor water quality, odours or nuisance insects?                                                                                                                                                                                                                                                                                                     |         |     |                 |                |         |     |                 |                |
| Have any health and safety risks been identified to either the public or maintenance operatives?                                                                                                                                                                                                                                                                                                         |         |     |                 |                |         |     |                 |                |
| Is there any deterioration in the surface of permeable or porous surfaces (eg rutting, spreading of blocks or signs of ponding water)?                                                                                                                                                                                                                                                                   |         |     |                 |                |         |     |                 |                |
| Silt/sediment accumulation                                                                                                                                                                                                                                                                                                                                                                               |         |     |                 |                |         |     |                 |                |
| Is there any sediment accumulation at inlets (or other defined accumulation zones such as the surface of filter drains or infiltration basins and within proprietary devices)?<br>If yes, state depth (mm) and extent.<br>Is removal required?<br>If yes, state waste disposal requirements and confirm that all waste management requirements have been complied with (consult environmental regulator) |         |     |                 |                |         |     |                 |                |

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**TABLE B.25** SuDS maintenance inspection checklist

| Inspection date                                                                                                                                                        |         |     |                 |                |         |     |                 |                |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----|-----------------|----------------|---------|-----|-----------------|----------------|
|                                                                                                                                                                        | Details | Y/N | Action required | Date completed | Details | Y/N | Action required | Date Completed |
| Is surface clogging visible (potentially problematic where water has to soak into the underlying construction or ground (eg underdrained swale or infiltration basin)? |         |     |                 |                |         |     |                 |                |
| Does permeable or porous surfacing require sweeping to remove silt?                                                                                                    |         |     |                 |                |         |     |                 |                |
| System blockages and litter build-up                                                                                                                                   |         |     |                 |                |         |     |                 |                |
| Is there evidence of litter accumulation in the system?<br>If yes, is this a blockage risk?                                                                            |         |     |                 |                |         |     |                 |                |
| Is there any evidence of any other clogging or blockage of outlets or drainage paths?                                                                                  |         |     |                 |                |         |     |                 |                |
| Vegetation                                                                                                                                                             |         |     |                 |                |         |     |                 |                |
| Is the vegetation condition satisfactory (density, weed growth, coverage etc)? (Check against approved planting regime.)                                               |         |     |                 |                |         |     |                 |                |
| Does any part of the system require weeding, pruning or mowing? (Check against maintenance frequency stated in approved design.)                                       |         |     |                 |                |         |     |                 |                |
| Is there any evidence of invasive species becoming established?<br>If yes, state action required                                                                       |         |     |                 |                |         |     |                 |                |
| Infrastructure                                                                                                                                                         |         |     |                 |                |         |     |                 |                |
| Are any check dams or weirs in good condition?                                                                                                                         |         |     |                 |                |         |     |                 |                |
| Is there evidence of any accidental damage to the system (eg wheel ruts?)                                                                                              |         |     |                 |                |         |     |                 |                |
| Is there any evidence of cross connections or other unauthorised inflows?                                                                                              |         |     |                 |                |         |     |                 |                |
| Is there any evidence of tampering with the flow controls?                                                                                                             |         |     |                 |                |         |     |                 |                |

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**TABLE B.25 SuDS maintenance inspection checklist**

| Inspection date                                                                                                                                                                            |         |     |                 |                |         |     |                 |                |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----|-----------------|----------------|---------|-----|-----------------|----------------|
|                                                                                                                                                                                            | Details | Y/N | Action required | Date completed | Details | Y/N | Action required | Date Completed |
| Are there any other matters that could affect the performance of the system in relation to the design objectives for hydraulic, water quality, biodiversity and visual aspects? (Specify.) |         |     |                 |                |         |     |                 |                |
| Other observations                                                                                                                                                                         |         |     |                 |                |         |     |                 |                |
| Information appended (eg photos)                                                                                                                                                           |         |     |                 |                |         |     |                 |                |
| Suitability of current maintenance regime                                                                                                                                                  |         |     |                 |                |         |     |                 |                |
| Continue as current<br>Increase maintenance<br>Decrease maintenance                                                                                                                        |         |     |                 |                |         |     |                 |                |
| Next inspection                                                                                                                                                                            |         |     |                 |                |         |     |                 |                |
| Proposed date for next inspection                                                                                                                                                          |         |     |                 |                |         |     |                 |                |