

Residential Development at  
Kilcarbery, Clondalkin, South Dublin

Ronan Mac Diarmada & Associates

Landscape Architects & Consultants



**GREEN INFRASTRUCTURE PLAN**

Client: South Dublin County Council

December 2023

---

Ronan MacDiarmada + Associates Ltd.

Landscape Architects and Consultants  
Newcastle, Co. Dublin

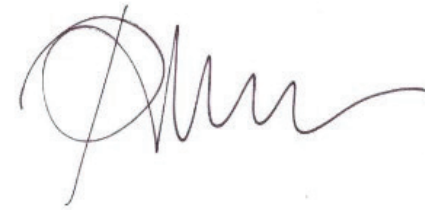
## Introduction

Chapter 4 of the South Dublin County Council Development Plan 2022-2028 identifies 5 key Green Infrastructure Themes.

**Policy GI1: Objective 4: 'To require development to incorporate GI as an integral part of the design and layout concept for all development in the County including but not restricted to residential, commercial and mixed use through the explicit identification of GI as part of a landscape plan, identifying environmental assets and including proposals which protect, manage and enhance GI resources providing links to local and countrywide GI networks' The Landscape Strategy addresses the five main themes identified in this Plan, namely:**

- Biodiversity,
- Sustainable Water Management,
- Climate Resilience,
- Recreation and Amenity (Human Health and Wellbeing),
- Landscape, Natural, Cultural and Built Heritage.

We wish to confirm that careful consideration has also been afforded to 'Chapter 4- Green Infrastructure' in the preparation of this Landscape Strategy Plan. A response to Green Infrastructure Objectives which are of relevance to this proposal are subsequently addressed in the Green Infrastructure Plan.



---

Ronan MacDiarmada.



---

## Response to Main Themes addressed in Policy GI1: Objective 4

### **Biodiversity**

The site is currently a monoculture of farmland grass, providing little biodiversity. The existing hedgerow on site is of moderate ecological value. The landscape plan proposes additional tree planting across the site that will offset the loss of the existing trees and increase the tree number of trees on site greatly.

Rain gardens will support the associated environment around the residential development and new native hedgerow planting will enhance corridors for flora and fauna.

### **Sustainable Water Management**

Bioretention raingardens and detention basins are depressed areas of ground that collect rainfall from hardsurfaces which may then percolate into the soil, reducing runoff and pollutants. Planting within these areas also enhance surface water runoff quality as the plants slow down water flow, allowing suspended particles to filter and settle out of suspension. The rain gardens will be connected to the surface water network so that any excess flows can be directed to the mains rather than overspilling to open spaces on the site.

It is proposed to introduce permeable paving on parking bays around the development. The goal of permeable paving is to control stormwater at the source to reduce runoff. In addition to reducing surface runoff, permeable paving has the dual benefit of improving water quality by trapping suspended solids and filtering pollutants in the substrata layers.

### **Climate Resilience**

Empahsis has been placed on incorporating native species to support and encourage the biodiversity across the site and locality. Additional planting will strengthen and increase green networks through the site.

Attention to sustainable design practices such as the use of permeable paving and SUDS elements work in conjunction with new and existing planting across the site to enhance the environment. These practices work to create a landscape plan that has focus on sustainability and climate resilience.

### **Recreation and Amenity (Human Health and Wellbeing)**

The landscape plan provides connections to the large existing areas of open space that surround the proposed development. Between the existing housing estate and the proposed site, there are public open area spaces that provide great social amenity.

These areas are thoughtfully designed to create an enjoyable communal experience, with clear Landscape Architecture principles guiding our design approach, and ecological principles guiding our planting approach. Pockets of planted areas shall provide a haven for local flora and fauna and create areas of amenity for Oldcourt Residents.

### **Landscape, Natural, Cultural and Built Heritage**

The proposed development has been designed to be integrated sensitively into a high quality landscaped environment consisting of residential communities and urban design. This will add to the green infrastructure of the local area and shall feed into the existing hedgerows and trees surrounding the proposal.

# CONTENTS

## 1. EXECUTIVE SUMMARY

SITE LOCATION .....	5
KEY HIGHLIGHTS .....	6
OPEN SPACE HIERARCHY .....	7
GREEN INFRASTRUCTURE STRATEGY .....	8

## 1. SITE CONTEXT

SITE LOCATION .....	9
GREEN INFRASTRUCTURE PLAN .....	10

## 2. GREEN INFRASTRUCTURE

LANDSCAPE MASTERPLAN .....	11
GREEN INFRASTRUCTURE PLAN .....	12
GI METHODOLOGY .....	13
CONNECTIVITY - PEDESTRIAN ROUTES .....	14
OPEN SPACE SUDS .....	15
FLOW ROUTE ANALYSIS .....	16
ATTENUATION AREAS .....	17
ARBORICULTURAL IMPACT - REMOVAL .....	18
ARBORICULTURAL IMPACT .....	19
PROPOSED STREET & OPEN SPACE TREES .....	20
PROPOSED SHRUBS PLANTING .....	21
PROPOSED BUFFER DEFENSIVE PLANTING .....	22

PROPOSED PLANTING - HEDGEROWS .....	23
PROPOSED AQUATIC SWALE PLANTING .....	24
SUDS - SWALES .....	25
PROPOSED TREE PIT PLANTING .....	26
PERMEABLE PAVING .....	27
SUDS - BIORETENTION RAINGARDEN .....	28

## 3. DETAIL DESIGN

SOFT LANDSCAPE DETAILS .....	29
DRAINAGE - SUDS .....	30



# 1. EXECUTIVE SUMMARY




## Key Highlights

- Green space within 50m of every home.
- Support an increase in species and new habitats in around the new development
- Provide a variety of open areas with a range of habitats and amenity spaces to meet the need of both nature and people(residents)
- Be equipped to cope with the effects of climate change and weather events, this includes the integration of Suds into the landscape design, detention basins and tree pits.
- The landscape design be developed to fit into the landscape setting and the surrounding countryside.

The site has been visited to review the landscape inventory on site and determine the existing green infrastructure on site and in the surrounding area. Colleagues on the design team have been consulted notably the ecologist and arborist for their views and suggested proposals. These have been incorporated into the Landscape Design.

- The Arborist and Ecologist have both visited the site.



-  Public Open Space - Linear park, public realm, congregation areas, informal play spaces and recreation
-  Communal Open Space - seating space, visual amenity, sensory planting
-  Proposed Tree Planting



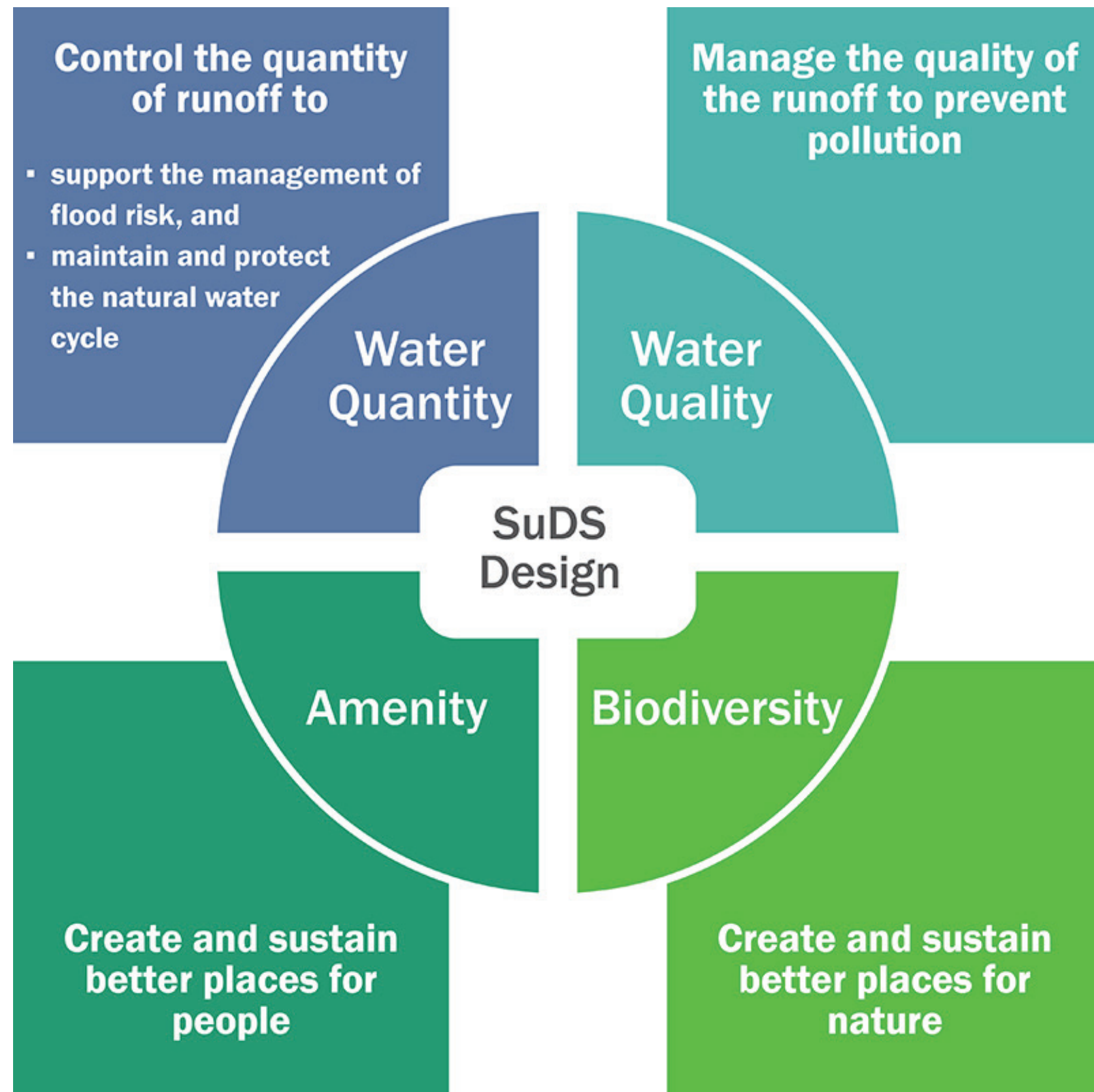


## Green Infrastructure Strategy

The use of nature-based solutions, alongside traditional drainage, in our roads and streets is particularly important with the multiple benefits that it provides, such as:

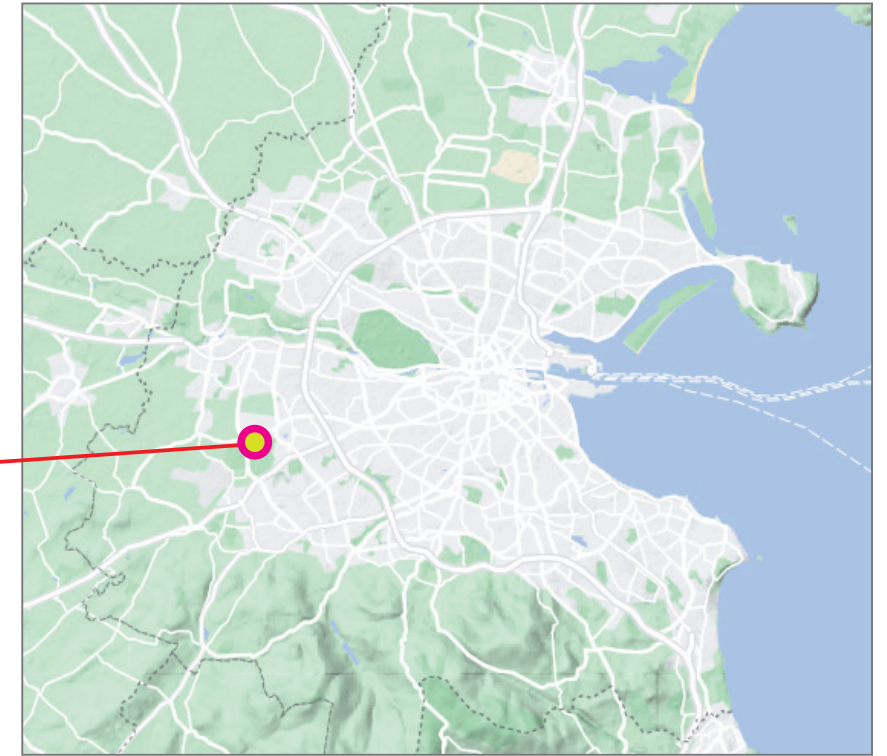
- Improving water quality in our receiving water bodies thus benefiting human, marine and aquatic health,
- Protecting groundwater recharge,
- Improved road safety through landscape interventions,
- Creating a high-quality public realm,
- Reduced flood risk, water channel erosion and overflows in our drainage and sewer systems,
- Creating more sustainable and climate adaptive urban neighbourhoods,
- Increased biodiversity,
- Provision of shade and reducing the “heat island” effect,
- Reduction of noise pollution,
- Improved air quality,
- Enhanced visual amenity
- Lessening the negative impacts of urban development on the natural environment,
- Potential for lowering capital and operating costs associated with development.

-Advice Note 5 Road and Street Drainage using Nature Based Solutions- Design Manual for Urban Roads and Streets DMURS Manual 2023



# . SITE CONTEXT

## Site Location



 Subject Lands





The site is adjacent to a primary Green Infrastructure Link on a wider context. This link serves as a wildlife corridor from the Grand Canal Corridor in Central Dublin, to the River Liffey. The smaller scale Green Infrastructure Network Strategy for Kicarbery has been designed to facilitate this wider context wildlife network.

**Key**

- County Boundary
- River/ Stream/ Canal
- Core Area
- Primary GI Corridor
- Secondary GI Link

**Primary GI Corridor**

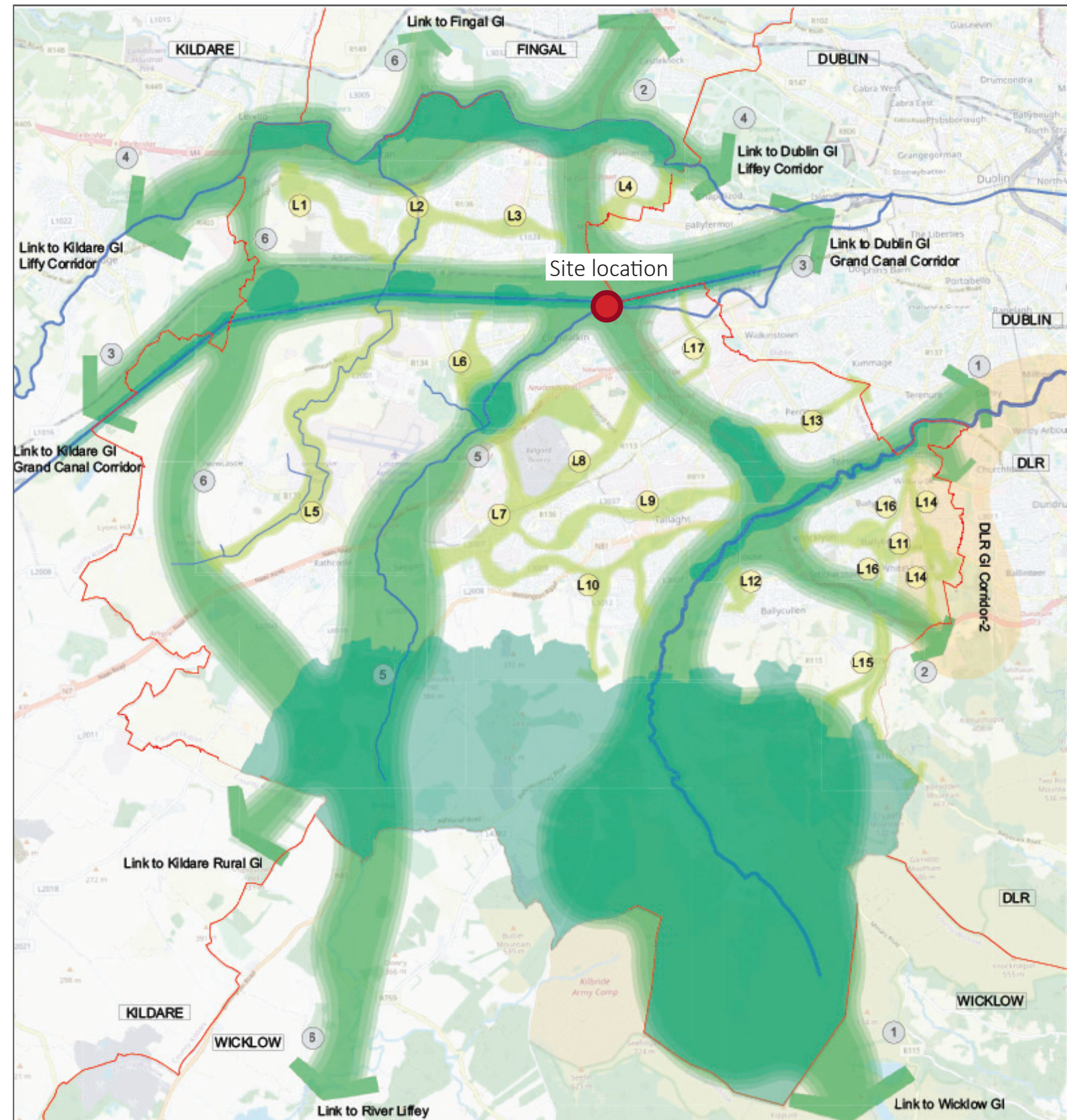
- 1 Dodder River Corridor
- 2 M50 Corridor
- 3 Grand Canal Corridor
- 4 Liffey Valley Corridor
- 5 Camac River Corridor
- 6 Rural Fringe Corridor

**Secondary GI Link**

- L1 Adamstown Link
- L2 Griffeen-Grand Canal Link
- L3 Griffeen-M50 Link
- L4 M50-Liffey Cross Link
- L5 Griffeen River Link
- L6 Grand Canal-Corkagh Link
- L7 Citywest-Saggart Link
- L8 Tallaght-Rural Link

**Secondary GI Link**

- L9 Tallaght-Urban Link
- L10 Tallaght-Dublin Mountains Link
- L11 M50-DLR Crosslink
- L12 Ballycullen Stream-Dodder Link
- L13 River Poddle Link
- L14 Whitechurch Stream Link
- L15 Owendoher River/Glendoo Brook Link
- L16 Owendoher River Link
- L17 Ballymount-Grand Canal Link





### 3. GREEN INFRASTRUCTURE

### Landscape Masterplan



**Proposed Landscape Design - Methodology**  
We have provided a comprehensive landscape design combining all elements, roads, and green spaces into one total. A combination of all elements, amenity, suDS, and connectivity to create a unique environment.

These areas combine to create a robust Green infrastructure which offers betterment in terms of biodiversity enhancement & public amenity.

The open spaces will provide for habitat to enhance site wide biodiversity.

**Drainage - Natural SUDS Measures**  
Proposals have been developed to inform the strategic drainage network across the development. The SUDs provision comprises of a large detention basins, bioretention raingardens, tree pits, permeable paving, and swale borders with supplementary trees.





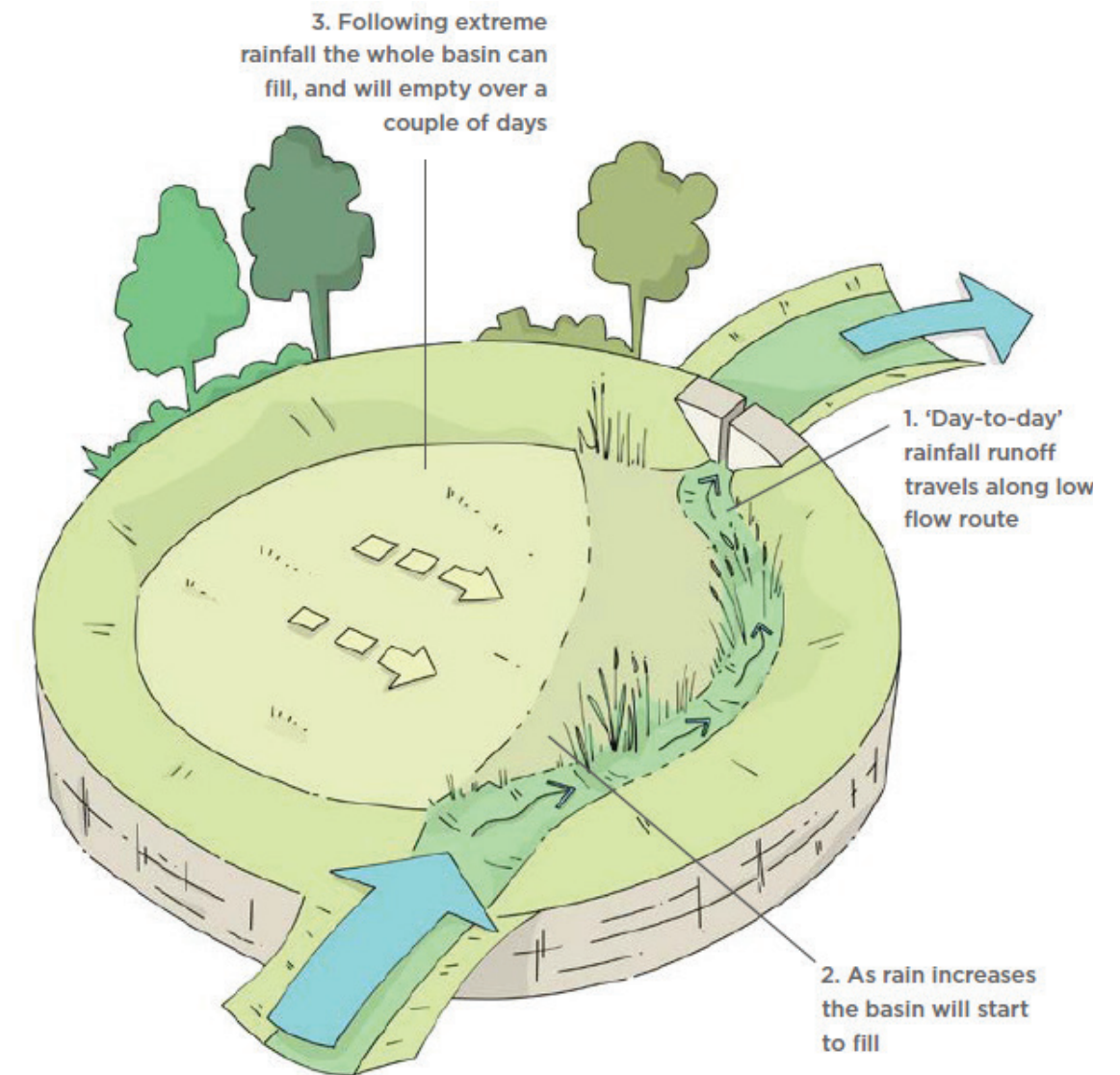






 SuDS in Public Open Space

The following graphic demonstrates how levels within a basin can be adapted to ensure that most of the basin is available for play during the majority of rainfall events. As further surface runoff is stored water will encroach gradually up the slope, until the full storage capacity of the basin is utilised.







— — — — —> Flow Route

The site layout optimises the following SuDS measures to mimic and support the existing flow route and .

- Raingardens
- Tree pits
- Permeable paving
- Swales
- Infiltration trenches
- Bioretention areas
- Infiltration/detention basins

Existing flow route analysis



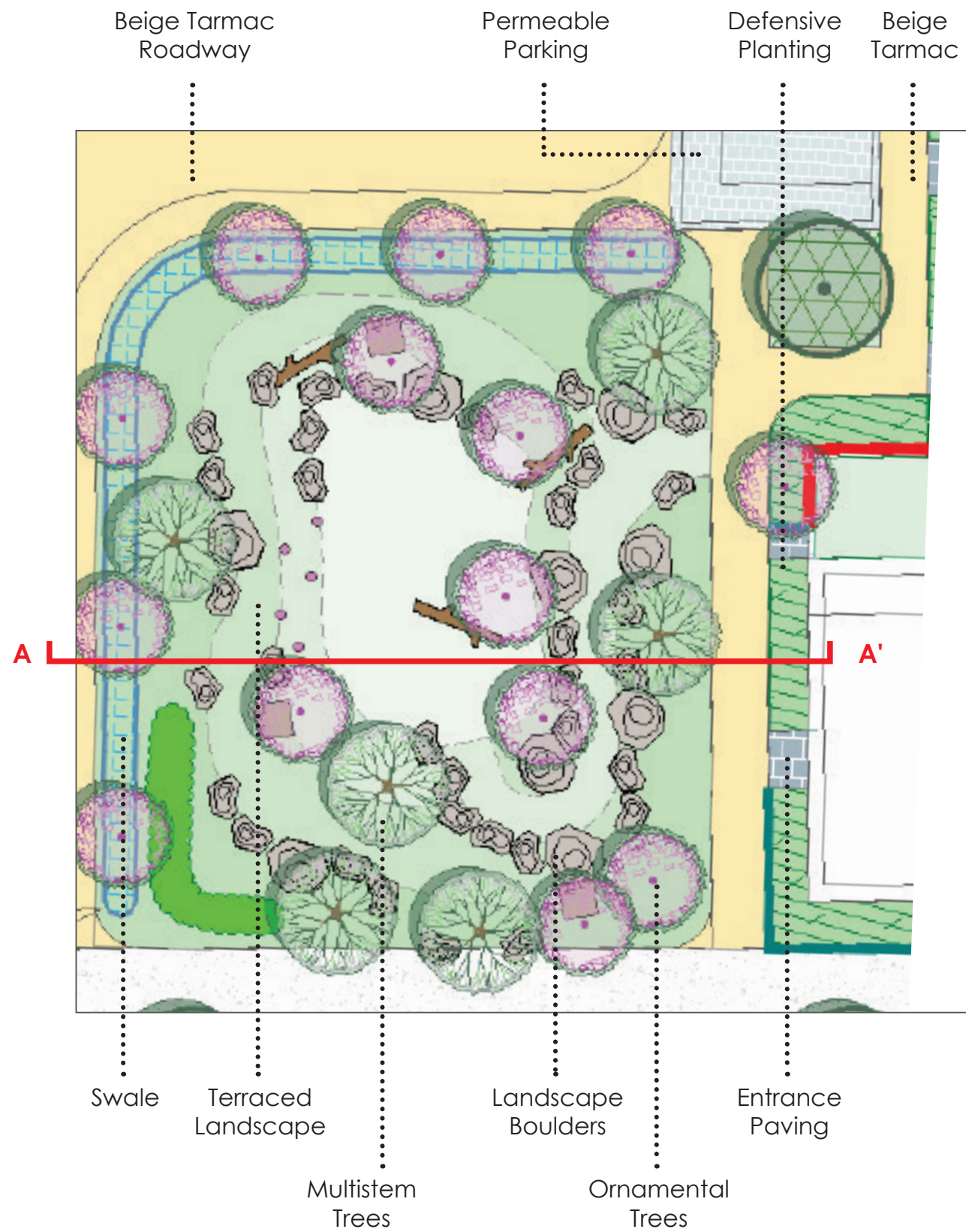
— — — — —> Flow Route

.....> SuDS flow route

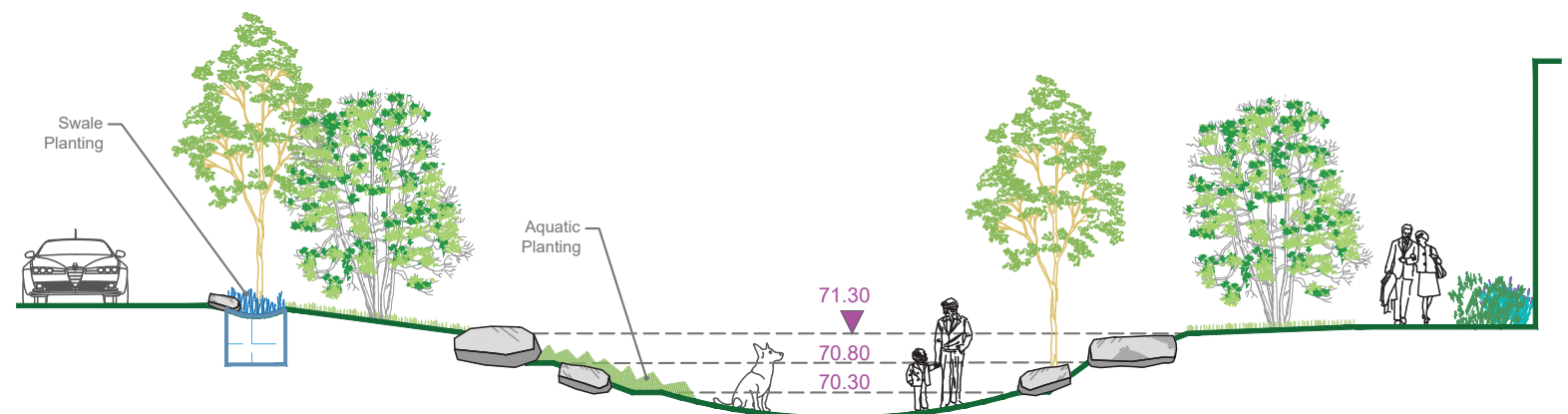
Flow route analysis



## Attenuation Areas



Section AA'





## Arboricultural Impact - Removal



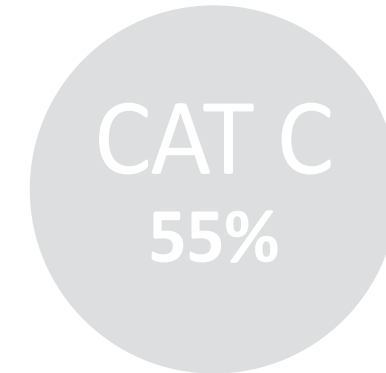
### EXISTING

**11no.** (9no. within redline boundary)

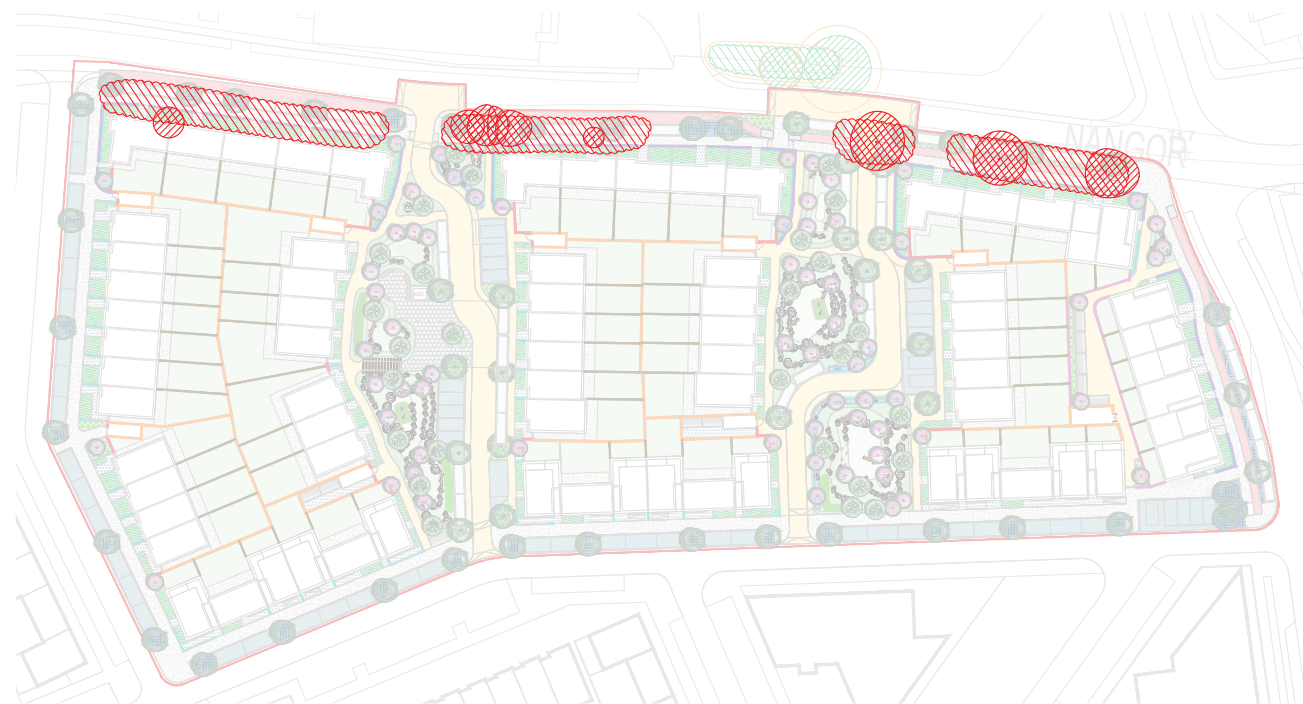
A total of 11 trees were identified and assessed and 4 hedgerows.

The condition of trees is generally moderate to poor.

The percentage of trees refers to trees within the red line only.



*% of the total number of the existing trees*



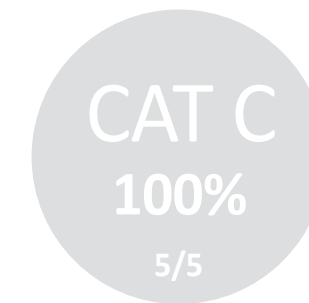
### REMOVAL

**9no.**

100% of the 9no. trees will be removed at the site, many of which have been highlighted for removal due to poor condition.

A further 4 hedgerows have been identified for removal.

To offset any loss of hedgerows, it is proposed to retain the topsoil containing the local indigenous seed mix which will be used in the open spaces. If possible some of the existing hedge will be reused in the proposed hedgerows on the new development.



*% of the total in category*



### RETAINED TREES

**2no.** (0no. within redline boundary)

0% of the existing trees within the redline will be retained at the site



### PROPOSED TREES

**150no.**

A total of 150 trees are proposed at the site, far in excess of what is on site at present.

#### Front Garden 12-14cm

*Amelanchier lamarckii*

#### Multistemmed Trees 12-14cm

*Prunus avium* 'Plena'

*Malus* 'John Downie'^

*Betula utilis* var. *jaquemontii*

#### Street Trees / Front Garden 14-16cm

*Tilia tomentosa* 'Brabant'

*Pyrus calleryana* 'Chanticleer'

*Carpinus betulus* 'Fastigiata'

*Sorbus aucuparia*

*Tilia cordata* 'Greenspire'

#### Open Space 14-16cm / 20-25cm

*Betula pendula*

*Pinus sylvestris*

*Alnus glutinosa*

*Quercus robur* 'Koster'

*Quercus robur*

*Aesculus hippocastanum*

*Fagus sylvatica*

*Prunus avium*





Quercus robur 'Koster'



Fagus sylvatica



Betula jacquemontii  
multi stem



Malus domestica



Note: Planting shown throughout rationale are mature and are not indicative of size that shall be planted first.



Prunus avium



Betula pendula



Amelanchier lamerkii



Prunus domestica



## Proposed Shrubs Planting



Persicaria affine



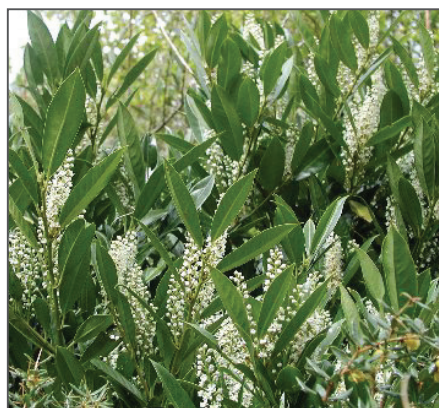
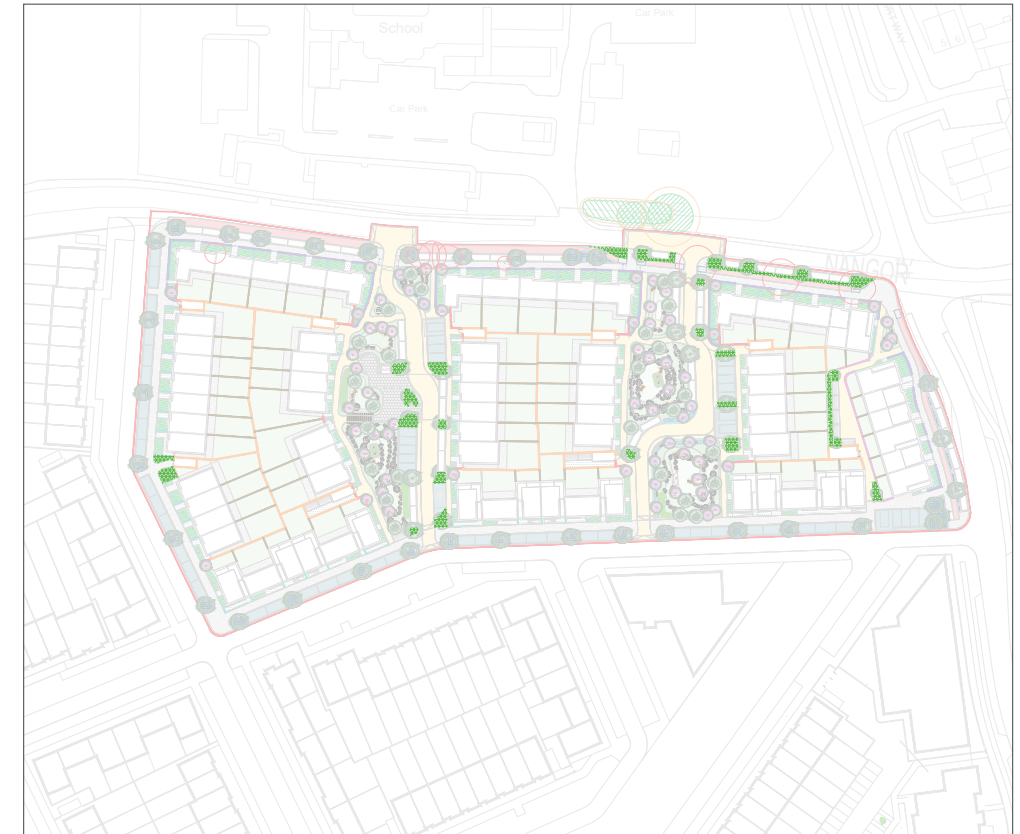
Bergenia cordifolia



Libertia grandiflora



Aucuba japonica



Prunus 'Otto luyken'



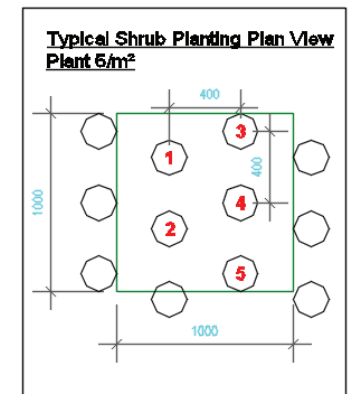
Lavandula angustifolia



Hypericum hidcote



Astelia 'Silver Spear'



Agapanthus 'Blue Giant'



Kniphofia 'Royal standard'



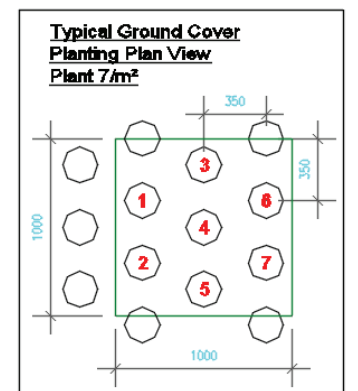
Nerine bowdenii



Sedum spectabile



Miscanthus sinensis





## Proposed Buffer Defensive Planting



— Defensive Planting

Defensive space is provided between private patios, apartments and public open space across the scheme. These are planted with low shrub planting, large shrubs and small trees. Similarly the same treatment is used within the communal courtyard between private patios, apartments and communal open space.





## Proposed Planting - Hedgerows

### H2 - Structural Hedgerow

- Private Space Hedgerow
- Noise Barrier
- Single Row
- 100cm. height 500 c/c



*Prunus lusitanica*

### H1 - Native Hedgerow

Native Hedgerows functionally create habitat links throughout the site which would be beneficial for commuting and foraging for animal species, leading to the compensation of the removal of the hedge along the northern boundary.

- Double Row
- 40-60cm. height 500 c/c



*Rosa canina*



*Crataegus monogyna*



*Prunus spinosa*



*Ilex aquifolium*



*Viburnum opulus*



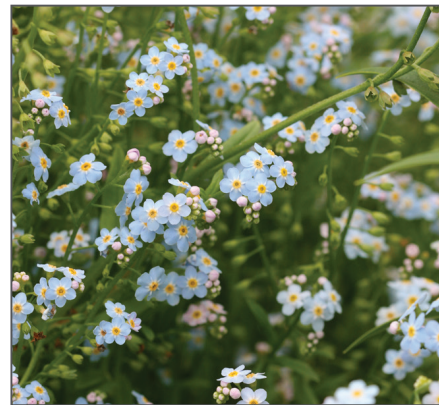
## Proposed Aquatic Swale Planting



Yellow Flag iris (*Iris pseudacorus*)



Water plantain (*Alisma plantago-aquatica*)



Water forget-me-not (*Myosotis scorpiodes*)



Marsh marigold (*Caltha palustris*)



Ragged robin (*Lychnis flos-cuculi*)



Brooklime (*Veronica becabunga*)



Bogbeam (*Menyanthes trifoliata*)

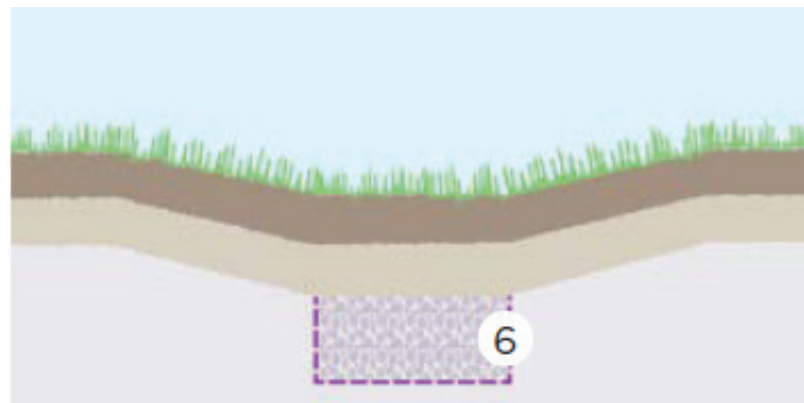
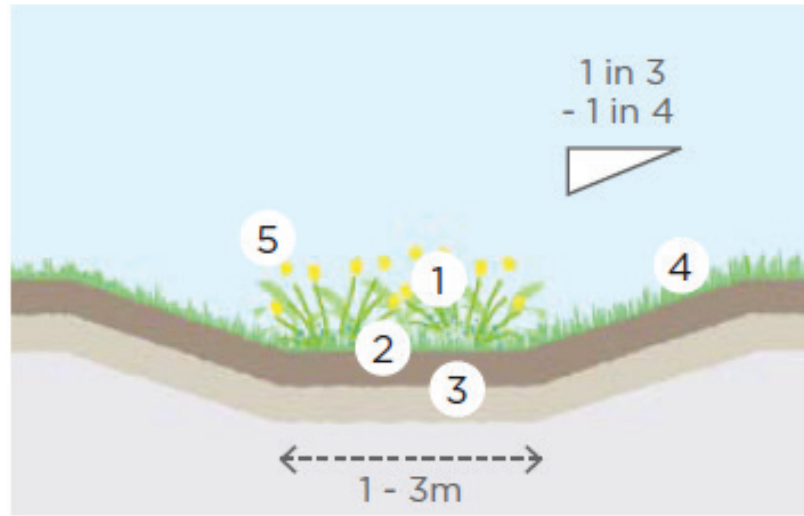


Note: The Wildflower Meadow will need to be cut once in Autumn (Late August/Early September) with a tractor and mower. Leave the mowings for a few days to allow seed to drop to the ground. Then it should be baled and bales removed.



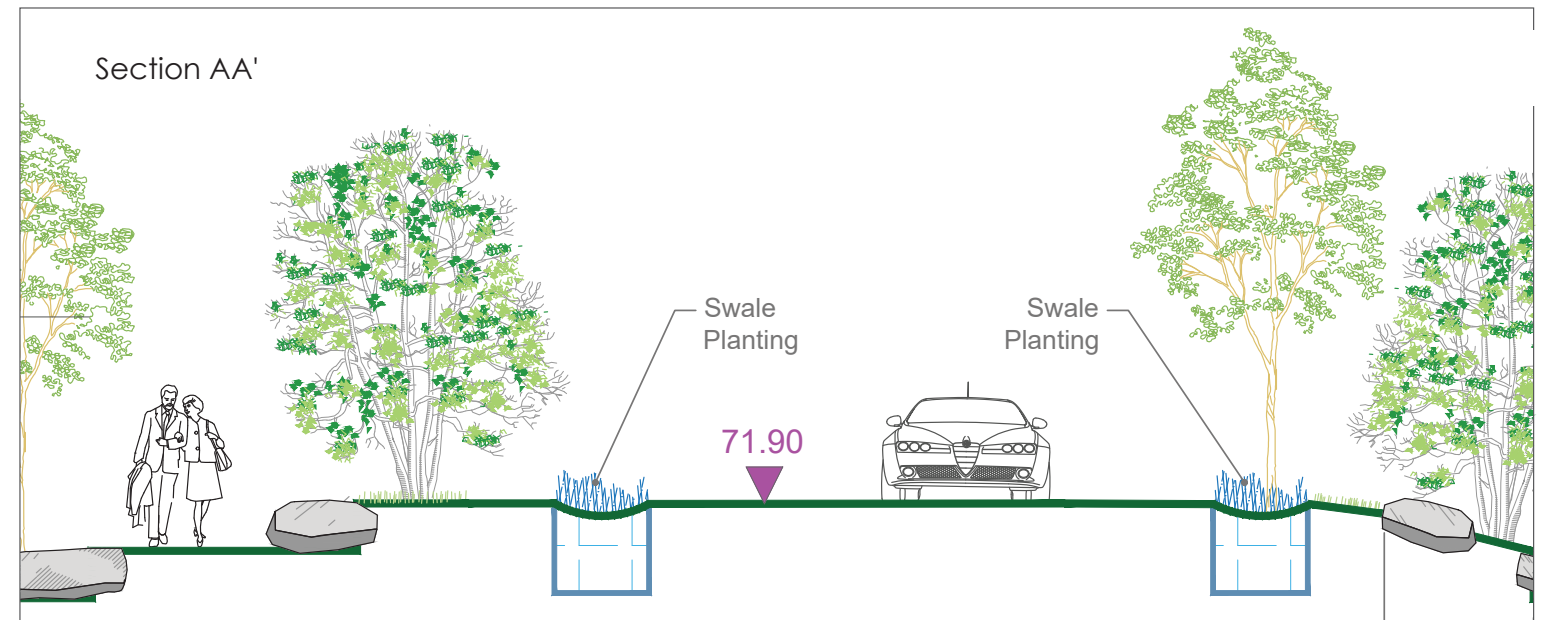
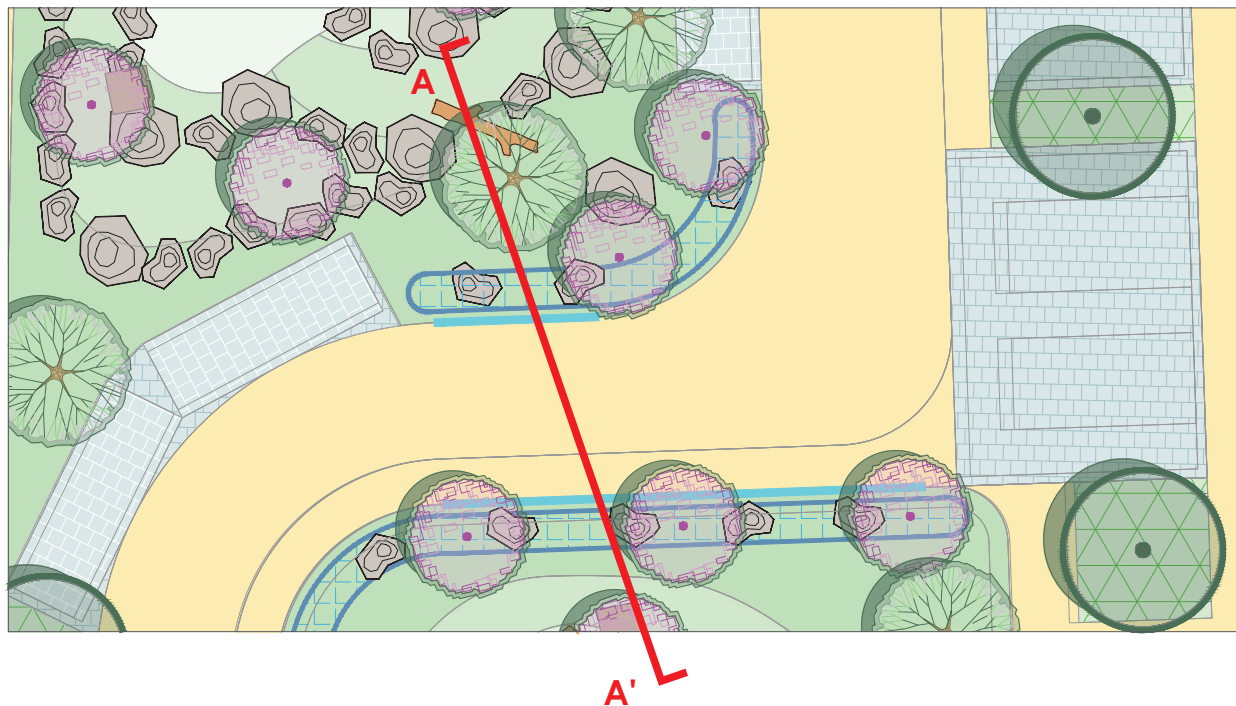
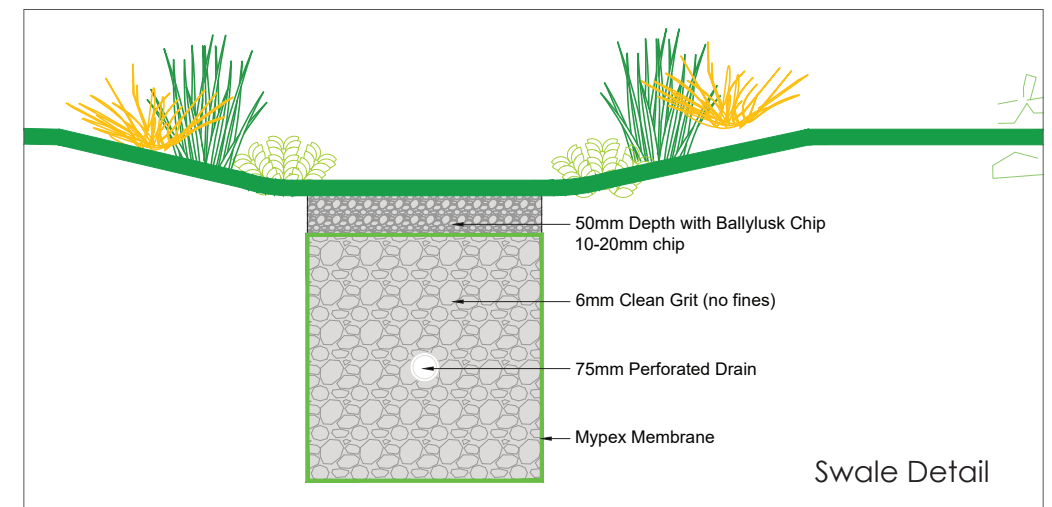


## SUDs - Swales



Swales are shallow, flat bottomed vegetated channels which can collect, treat, convey and store runoff.

1. The basic profile is a 1 in 3 or 1 in 4 side slopes to a flat base falling at no more than 1 in 50 to prevent erosion. Checkdams or terraced swales can be used to mitigate risk of erosion where 1 in 50 falls cannot be achieved.
2. Base width less than 1m wide will increase the risk of erosion and ditch forming, conversely, base width wider than 3m a meandering channel can develop.
3. 150mm clean topsoil over subsoil. Ripping or light harrowing will improve establishment of the swale by providing a key for the topsoil, encourage deep rooting and assist infiltration.
4. Where swale vegetation is kept less than 100mm, the shoulders at the top of the swale can be 'scalped' leaving bare soil. The shoulders should therefore be rounded to prevent this happening.
5. Swale can be vegetated with more biodiverse plants to attract pollinators etc.
6. Swale can be under-drained using a filter drain to create a dry swale.

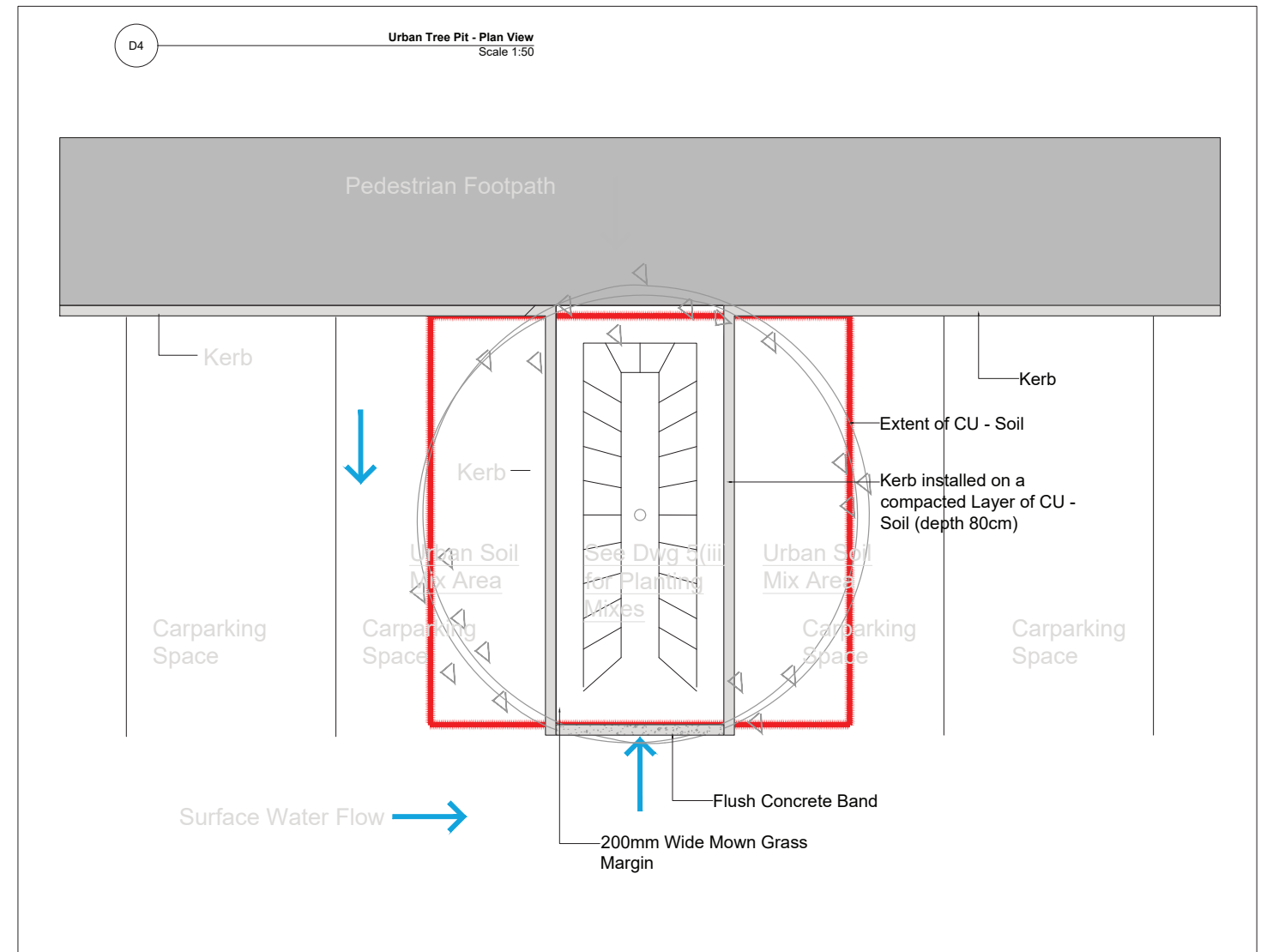
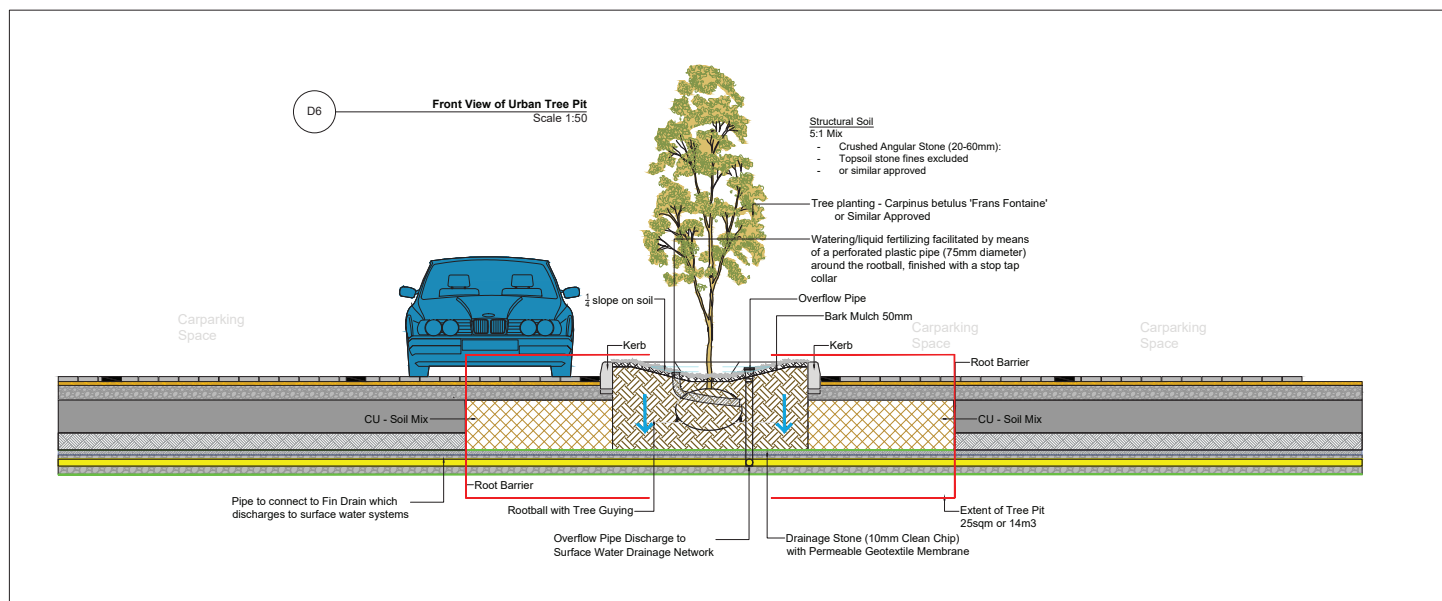
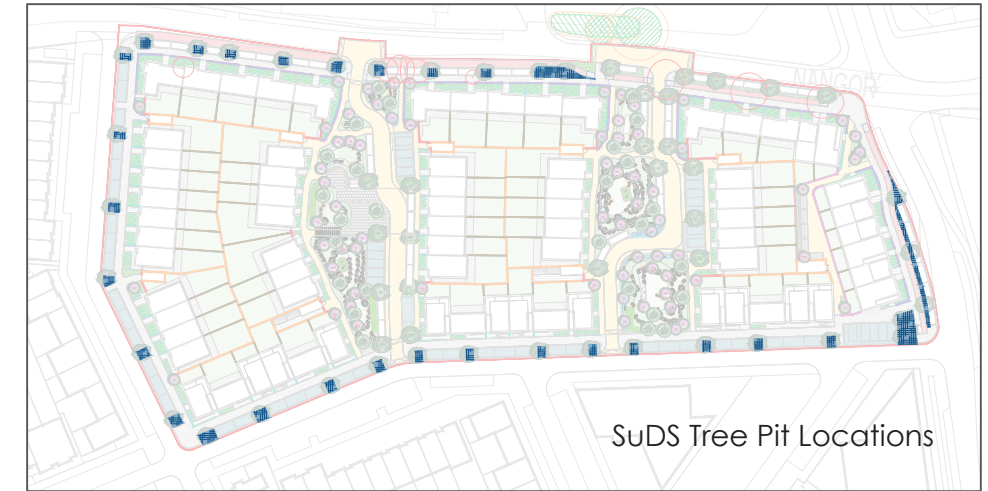
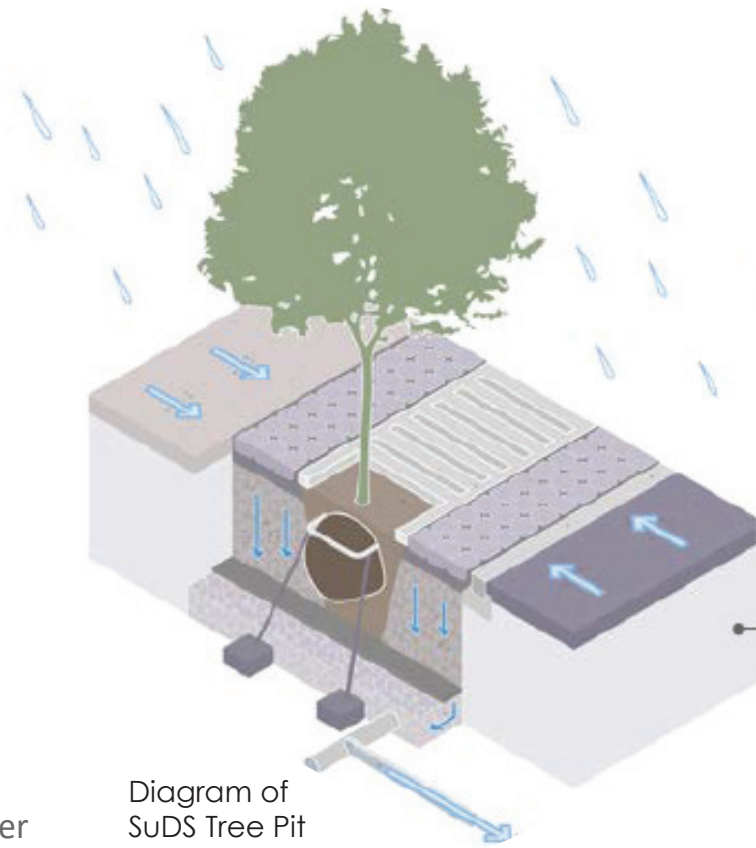




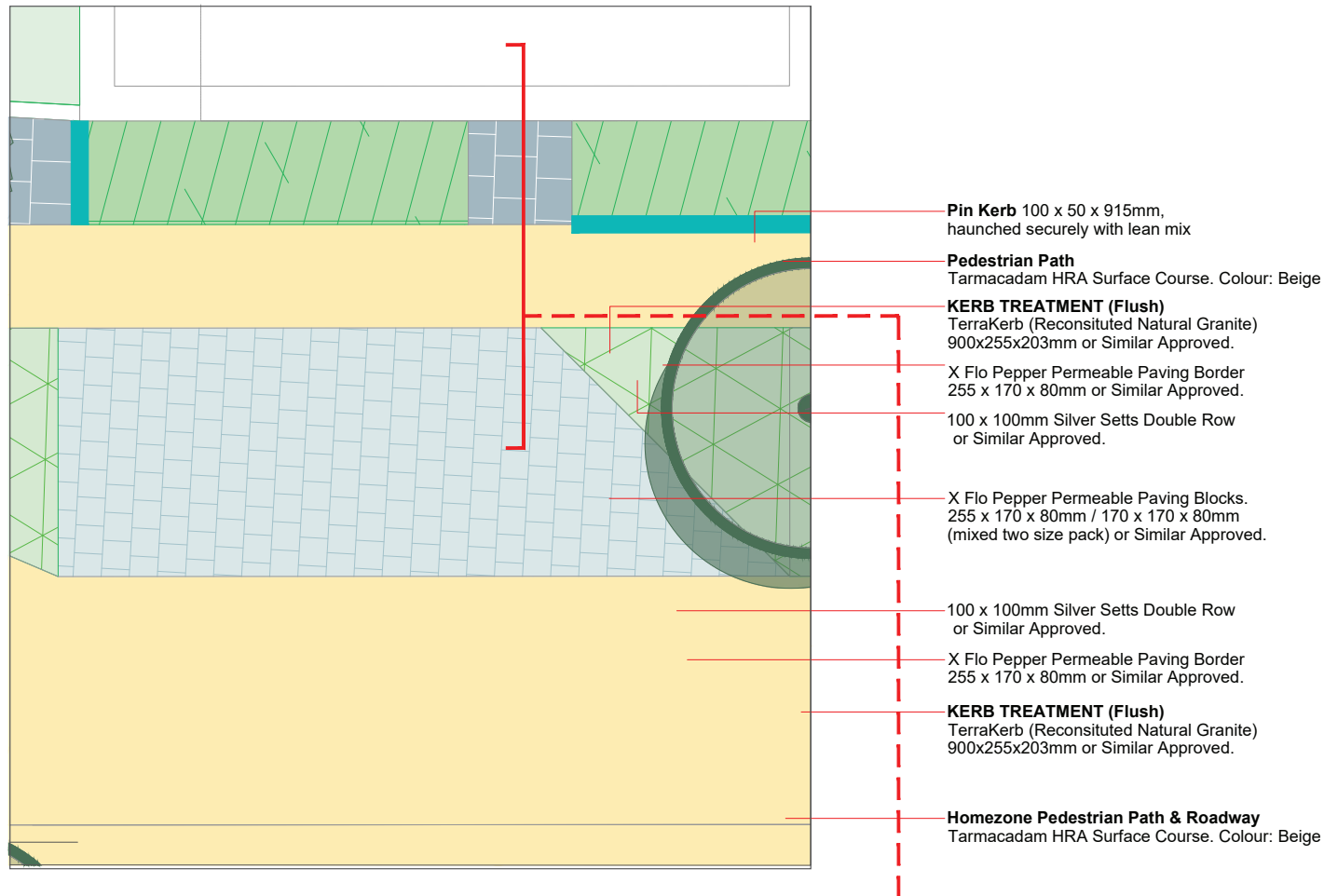
## Proposed Tree Pit Planting



Helleborus  
Astible  
Carex pendula  
Iris siberica  
Kniphofia Red Hot Poker



## Permeable Paving



Permeable surfaces direct rainfall straight into a SuDS structure for cleaning and storage or infiltration into the ground. Utilising:

1. pervious surface to allow water through the pavement surface
2. an open-graded sub-base layer that provides structural strength to the pavement with about 30% by volume available for water storage. The subbase designed structurally and hydraulically.
3. to avoid silt washing off adjacent landscape areas and leading to localised surface clogging., the following measures have been considered:

- sloping adjacent landscape areas away,
- using paved or turfed surfaces to adjacent areas,
- proposing soil in adjacent planting beds at min. 50mm below the top of kerb with dense ground cover to bind the soil.

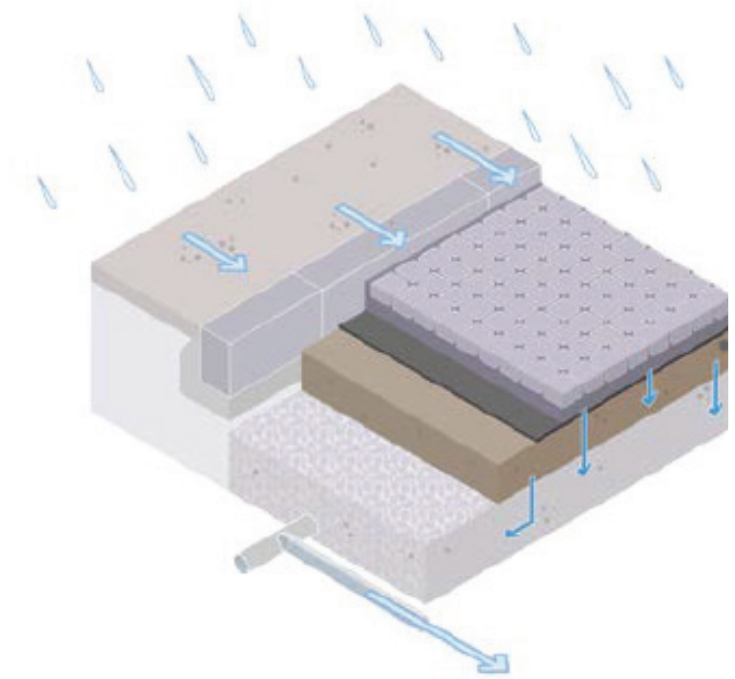
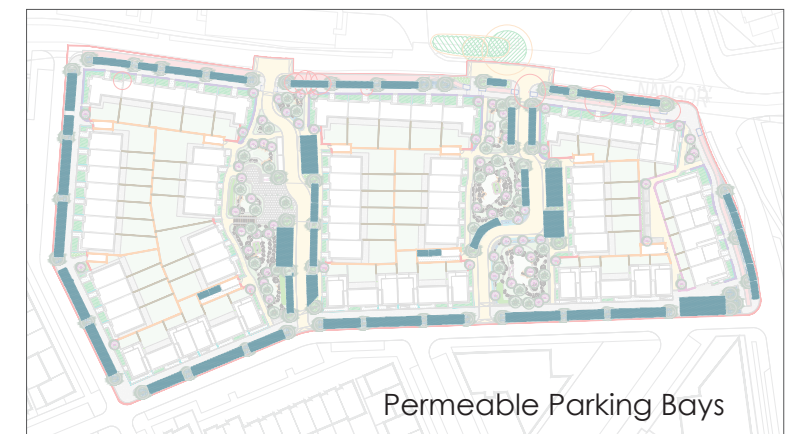
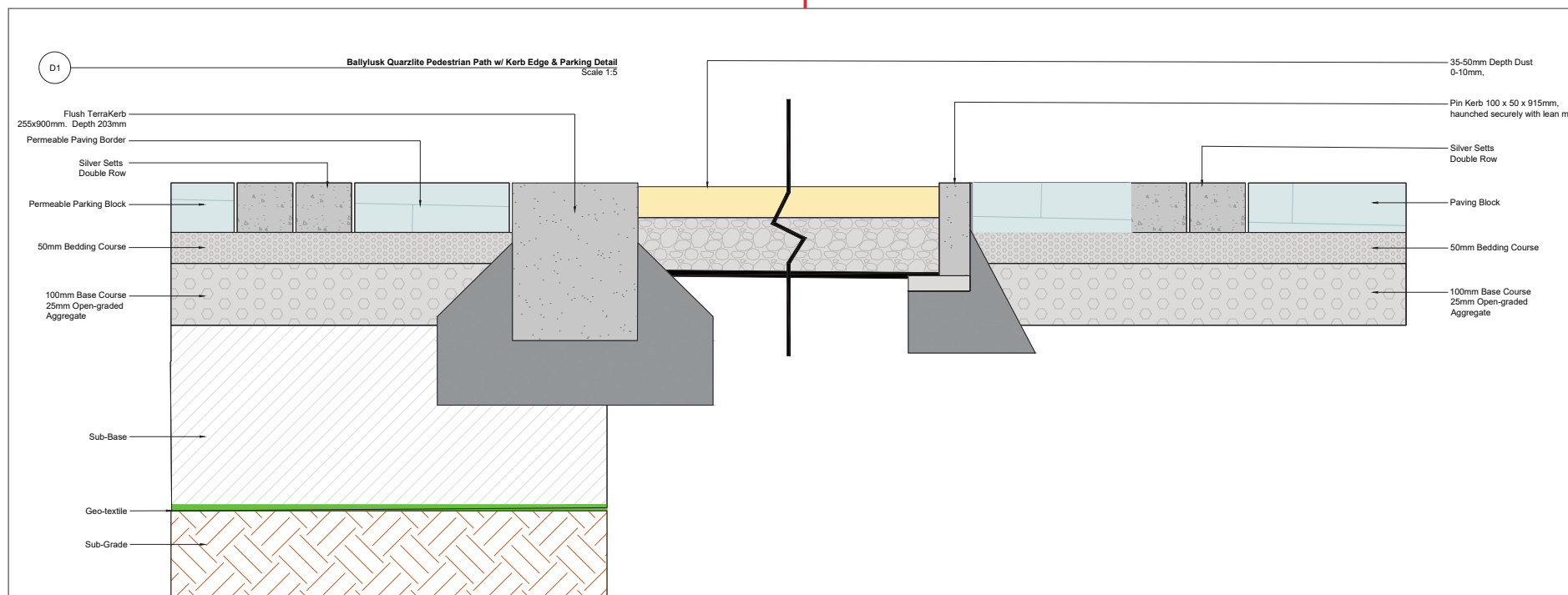


Diagram of Permeable Paving in parking bays



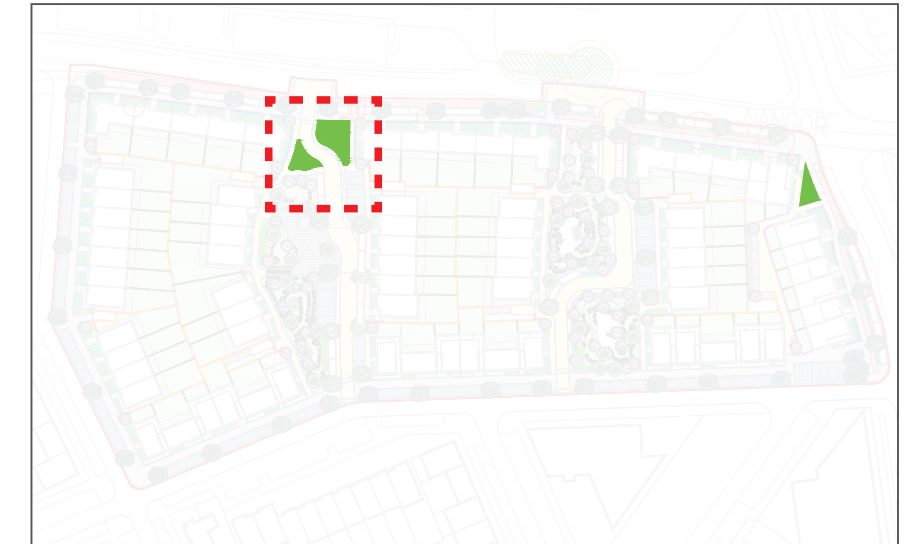
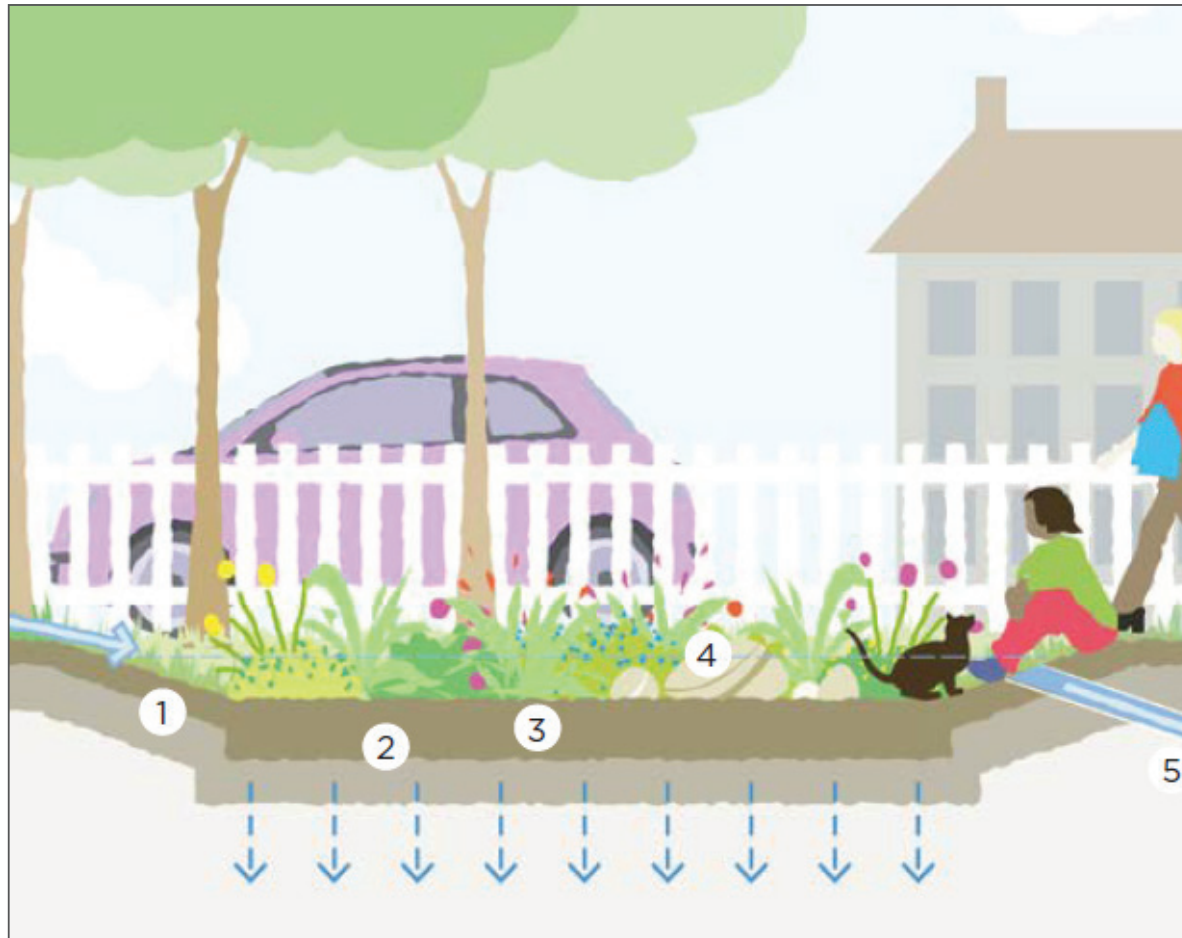


## SUDs - Bioretention Raingarden

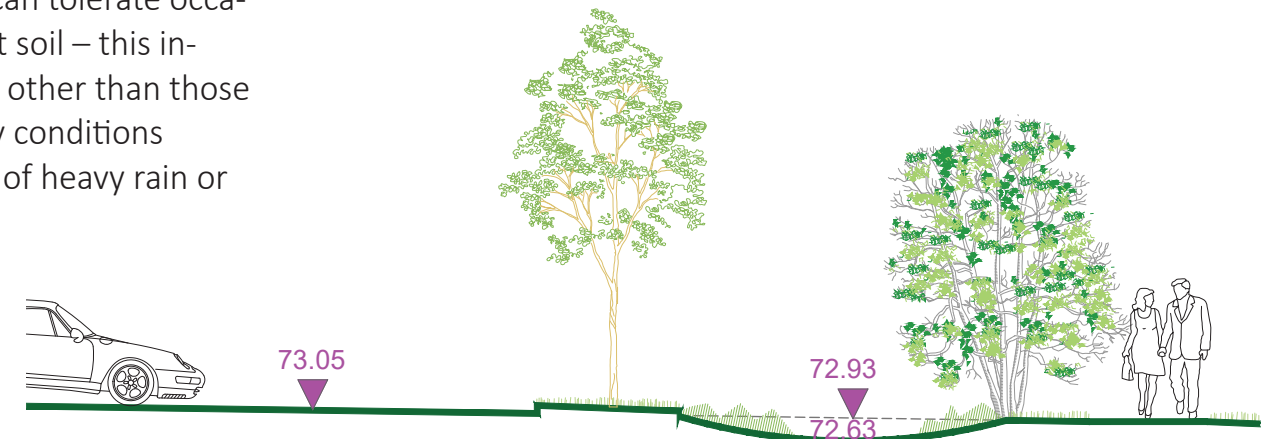
Raingardens are designed to collect and manage reasonably clean water from roofs and low pollution risk drives and pathways. They are generally installed where community or private maintenance is available to upkeep these attractive features.

Key aspects of raingarden design include:

1. gentle side slopes with water collected at the surface
2. a free-draining soil, sometimes with an underdrain to avoid permanent wetness
3. a minimum of 450mm improved topsoil with up to 20% coarse compost
4. garden plants that can tolerate occasional submersion and wet soil – this includes most garden plants other than those particularly adapted to dry conditions
5. an overflow in case of heavy rain or impeded drainage.



Rain Gardens



Section AA'

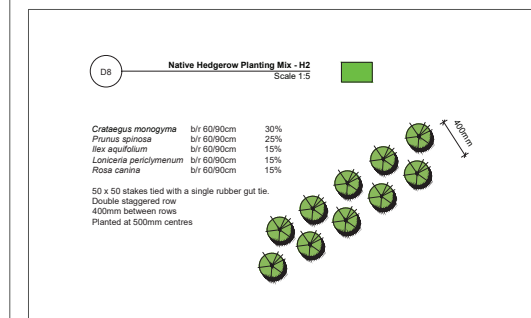
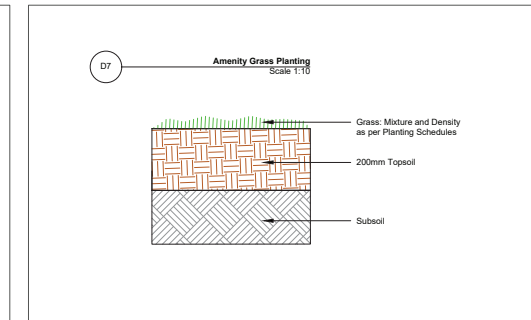
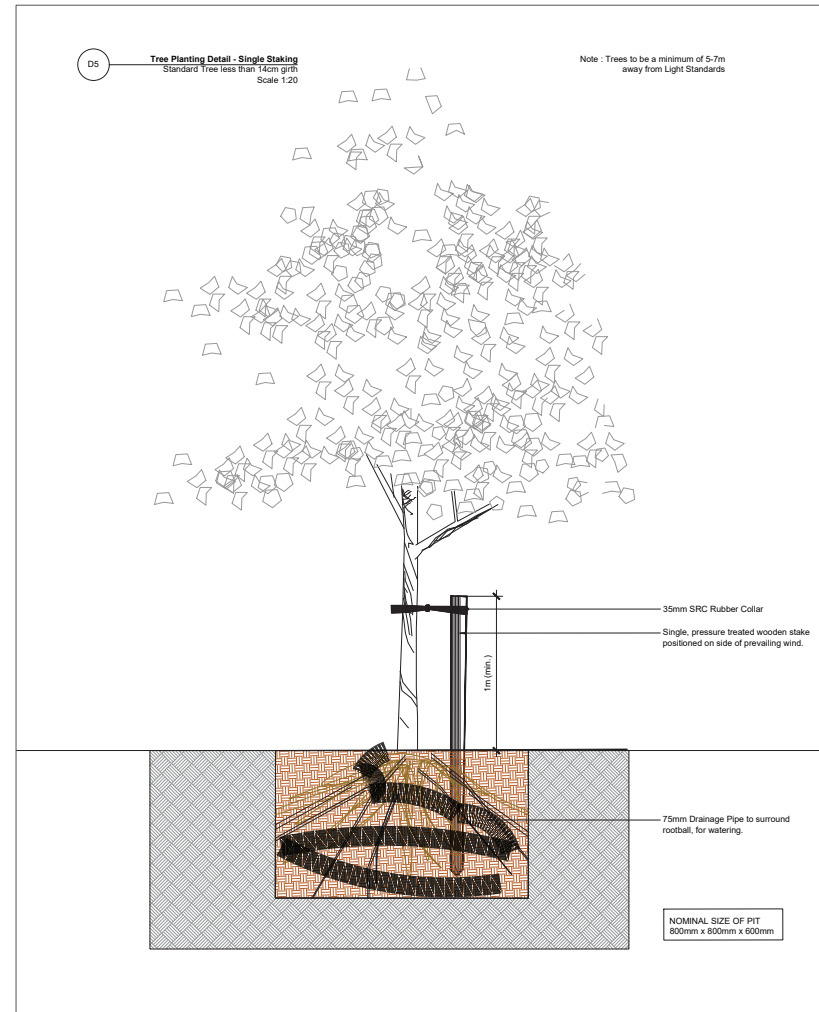
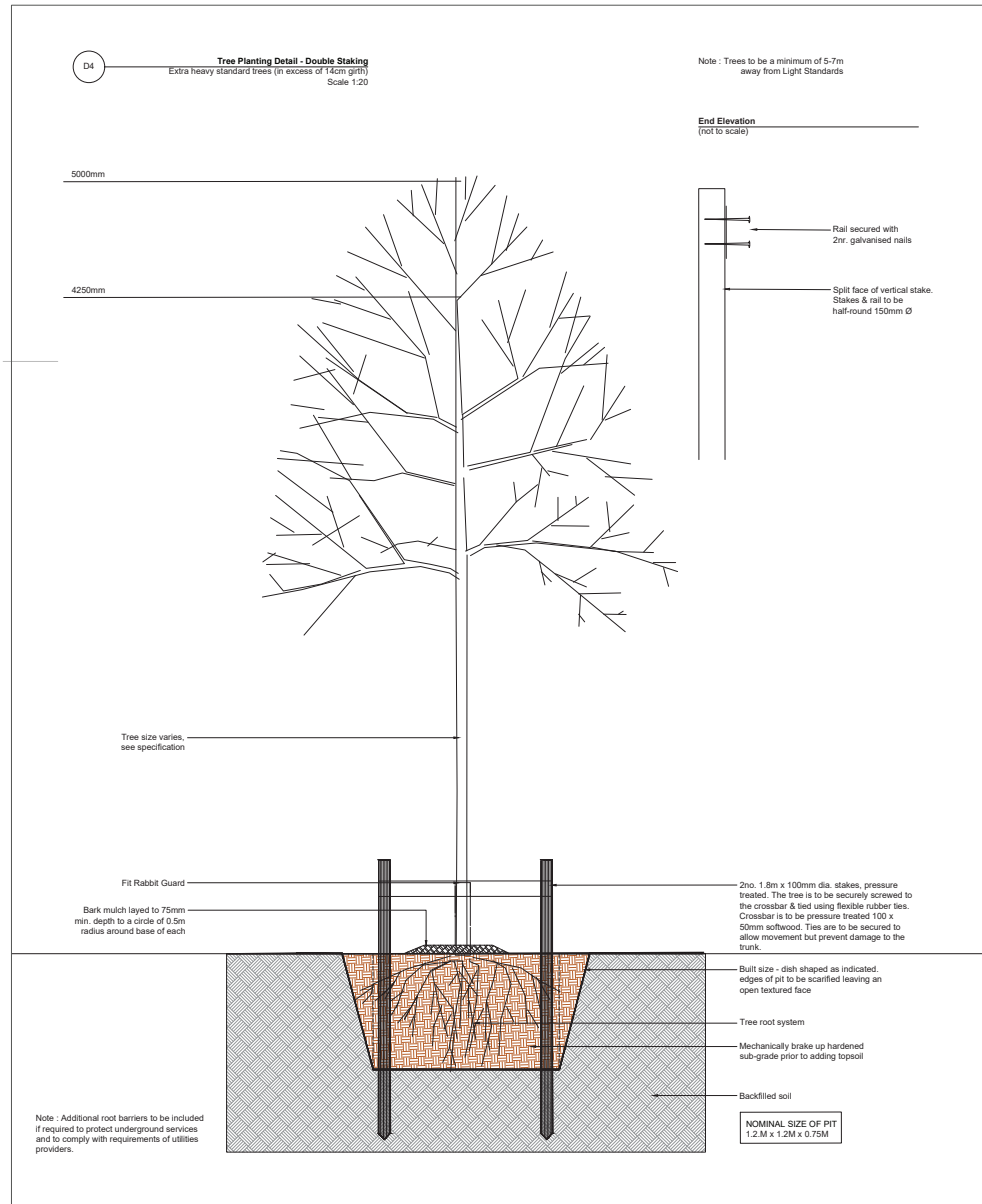
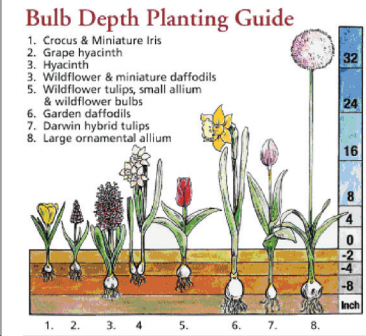
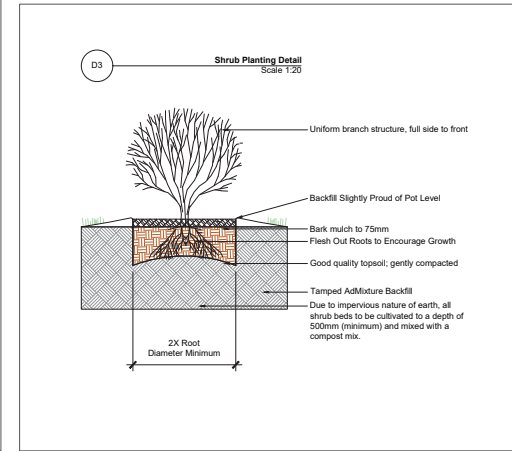
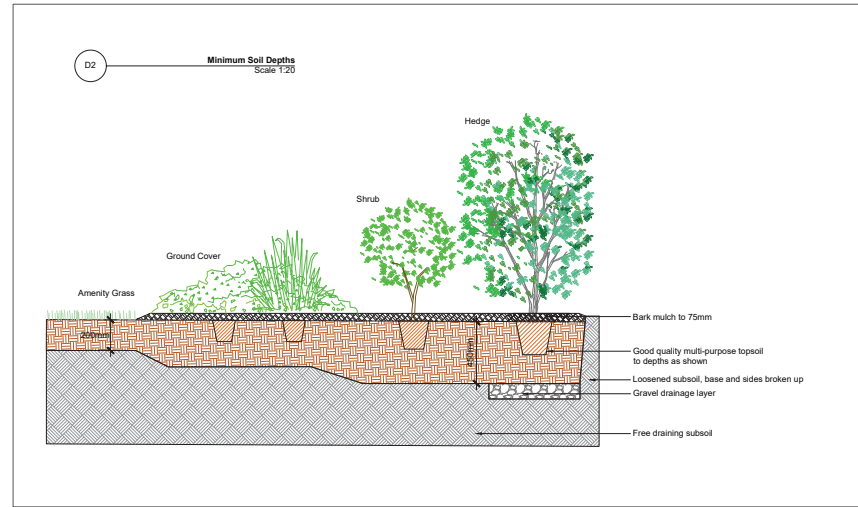
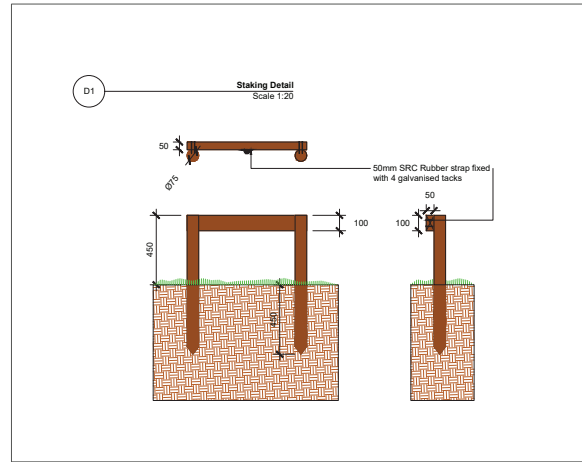


Diagram of Bioretention Raingarden



# 4. DETAIL DESIGN





## Soft Landscape Details

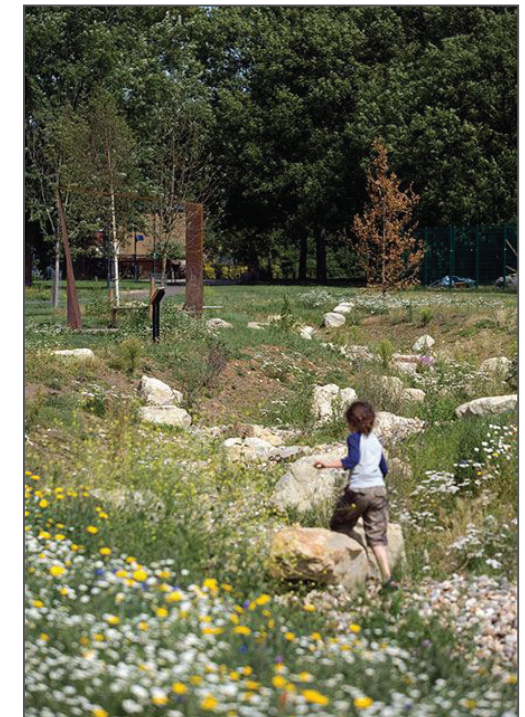




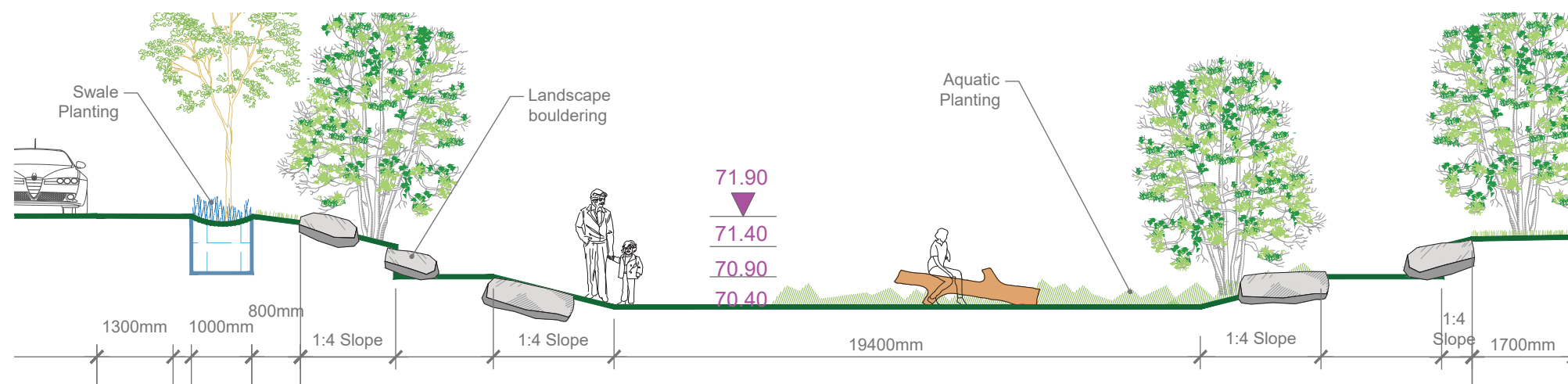


The SUDs areas provide an additional habitat to the site with different plant species. The fauna that inhabits these areas shall also increase the diversity across the site.

-  Attenuation Basins
-  Rain Gardens
-  Tree Pit Locations
-  Swales



Dry basins incorporating nature based play



Attenuation Areas



## Green Links

We have provided a comprehensive landscape design combining all GI elements; Biodiversity, Sustainable Water Management, Climate Resilience, Recreation & Amenity (Human Health & Wellbeing) and Landscape, Natural, Cultural & Built Heritage to create a unique environment.

These elements combine to create a robust Green Infrastructure which builds upon the site's existing natural assets and offers increased value in terms of biodiversity enhancement & public amenity.

-  - Large wetland habitats
-  - Green Corridors
-  - Retained existing hedgerows in the neighboring development
-  - Site Boundary
-  - Primary Green Links
-  - New Green Links



South of the proposed development site there is a residential development that has retained existing hedgerows throughout the site. These hedgerows will form part of the primary green links to the site that are an important element of the wider green infrastructure network.

The development seeks to enhance hedgerows, trees and wetland environments with new native tree planting, hedgerow planting and wetland species in the rain gardens. Proposed new habitat areas include the raingardens, native hedgerow and meadow grassland. This diverse mosaic of habitats will bring both biodiversity and public amenity benefits to the wider area.



### Tree Pit Details:

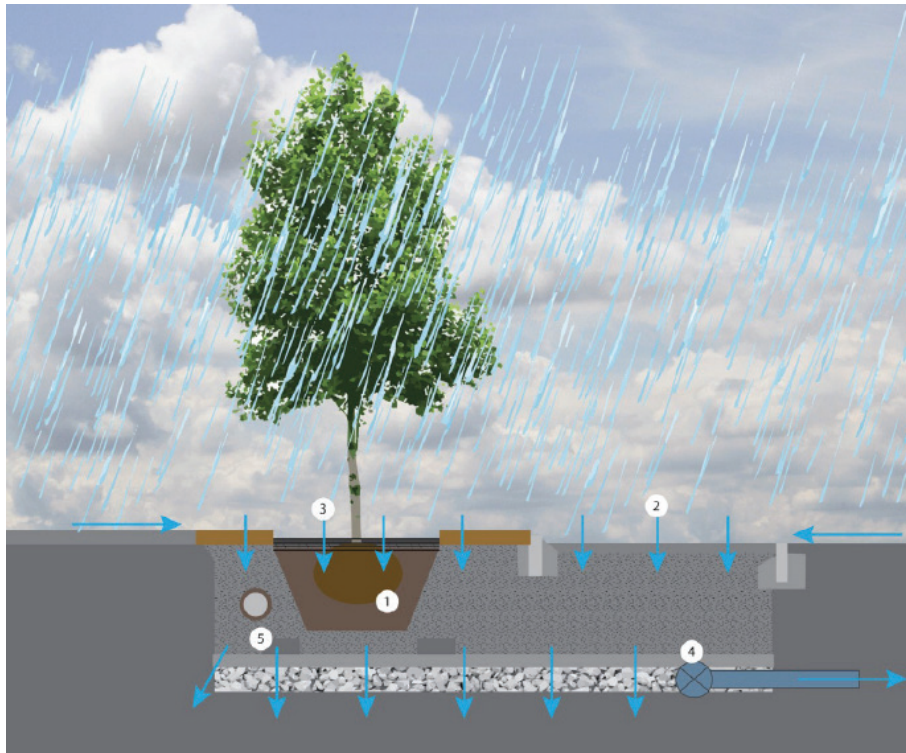


Fig 1.26 DMURS Guidance Note 5 - Tree Pit Section

### Rain Garden Details:

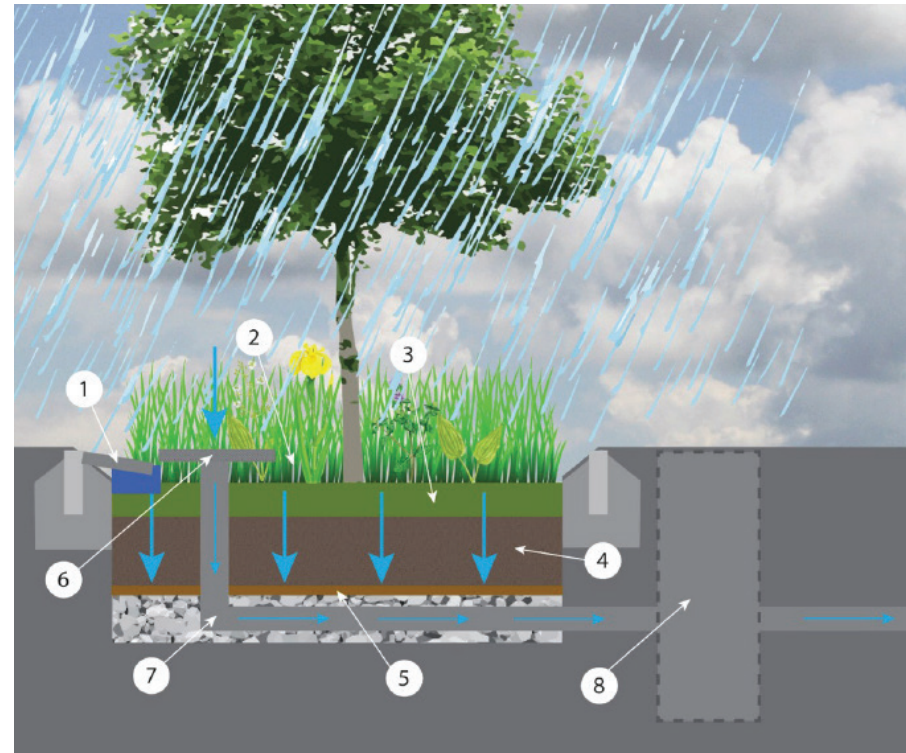


Fig 1.25 DMURS Guidance Note 5 - Rain Garden Section

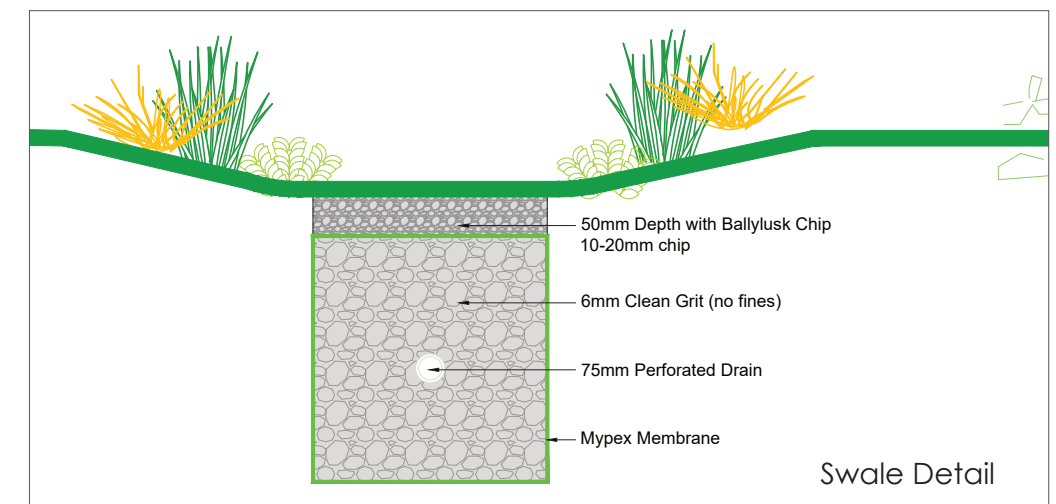
### Swale:



Fig 1.27 DMURS Swale example

- 1.** Trees require a growing medium of between 10 - 30m<sup>3</sup> depending on tree species. A few trees can be placed in a trench to enhance the growing medium volume available to each tree.
- 2.** Silt removal, via swales, raingardens' or other mechanisms must be designed within the tree pit design to allow runoff from roads into the tree pit. Ensure sufficient freeboard is provided to avoid clogging by silt, litter etc.
- 3.** Positioning and specification of trees to be in accordance with Design Manual for Urban Roads and Streets.
- 4.** A drain down pipe must be provided. This ensures no waterlogging of roots or build up of road salt within the tree pit.
- 5.** Service trenches can be designed through the tree pit for services such as water, gas and drainage systems. (in agreement with the Local Authority). Electrical supply or telecoms with a joint box located within the tree pit feature is not recommended. Liaise with Uisce Éireann to identify how best to reduce surface water ingress into combined sewers.

The above details are taken from Road and Street Drainage Using Nature Based Solutions - Design Manual for Urban Roads and Streets (DMURS Manual 2023). These details should be used as principle reference for all rain garden and tree pits across the site.





## Arboricultural Impact - Removal



### EXISTING HEDGEROWS



### HEDGEROWS TO BE REMOVED

It is proposed to take 20 cuttings from the existing hedgerow, to pot them and keep them off-site until the planting phase of the development.

A portion of the hedgerow shall be selected, cut back and lifted with its root system intact, this is to be planted in the open space.

The vegetation at the base of the hedge shall be lifted as 8 sods 1.5m X 600mm and positioned on the open space to retain the existing seed mix.

The topsoil from around the hedge shall be retained on site. The topsoil is to be spread over the open space areas to retain the existing seed/vegetation mix.

Minimum Required GI score: 0.5

Development Site Area m <sup>2</sup>	20417			
Surface Type (see tab for detailed descriptions)	Factor	Proposed Surface Area m <sup>2</sup>	Factor Values	
Short Lawn	0.3	3876	1162.8	
Tall Lawn (wild, not mown)	0.5	6191	3095.5	
Permeable Paving	0.3	2456	736.8	
<b>Vegetation</b>				
Vegetation-Shrub below 3m	0.4	4410	1764	
Vegetation-Shrub / Hedgerow above 3m	0.5	334	167	
Vegetation-Pollinator friendly perennial planting	0.5	4410	2205	
Vegetation-Preserved hedgerow	1.2	0	0	
<b>Trees</b>				
New trees	0.6 (no. of trees x 8m <sup>2</sup> )	1200	720	
Preserved trees	1.2 (no. of trees x 10m <sup>2</sup> )	0	0	
<b>Landscape Features</b>				
SuDS intervention (rain garden, bioswale)	0.6	2696	1617.6	
Green Roofs- Intensive green roof (substrate is 1 metre or greater)	0.7	0	0	
Green Roofs - Extensive green roof (less than 1 metre in depth)	0.6	0	0	
Green wall	0.4	0	0	
Retained Open Water	2	0	0	
New open water	1.5	0	0	
<b>Total Equivalent Surface Area of Greening Factors</b>		<b>25573</b>	<b>11468.7</b>	<b>Final GI score</b>
			<b>0.561723074</b>	<b>Result</b>

## MULTIDISCIPLINARY DESIGN TEAM



**Ronan Mac Diarmada & Associates**  
Landscape Architects & Consultants

Tootenhill Cottages, Rathcoole, Co. Dublin, D24 XA02  
TEL 01 4124476  
EMAIL [info@rmda.ie](mailto:info@rmda.ie)  
WEB [www.rmda.ie](http://www.rmda.ie)

**bkdarchitects**  
BURKE-KENNEDY DOYLE

**DBFL**  
DBFL CONSULTING ENGINEERS

**OCSC**  
O'CONNOR · SUTTON · CRONIN  
MULTIDISCIPLINARY CONSULTING ENGINEERS