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ASSOCIATES**

Briarwood SEN School, Bristol

## General Arrangement Sketchbook

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Flood and Coastal Resilience Innovation Programme

Part of the Resilience Innovation Fund

### Overall General Arrangement

Briarwood Special School is situated off Briar Way in Fishponds, Bristol. The school sits within a predominantly residential area with a number of businesses and industrial units to the west. A sports field sits adjacent to the southern boundary of the site.

A review of national surface water flood risk mapping found to be high, with the risk indicated across the majority of the school grounds.

Following a site visit and discussion with the school, a number of areas of the site were identified where there have been surface water drainage has been an issues.

The overall general arrangement plan to the right shows the proposed interventions to minimise the impact of surface water flooding issues on the school.

These interventions can be broken down into five key areas:

- 1 Central Raingarden
- 2 Eastern Raingardens
- 3 Rainplanters
- 4 Southern Swale and Basin
- 5 Permeable Paving Areas

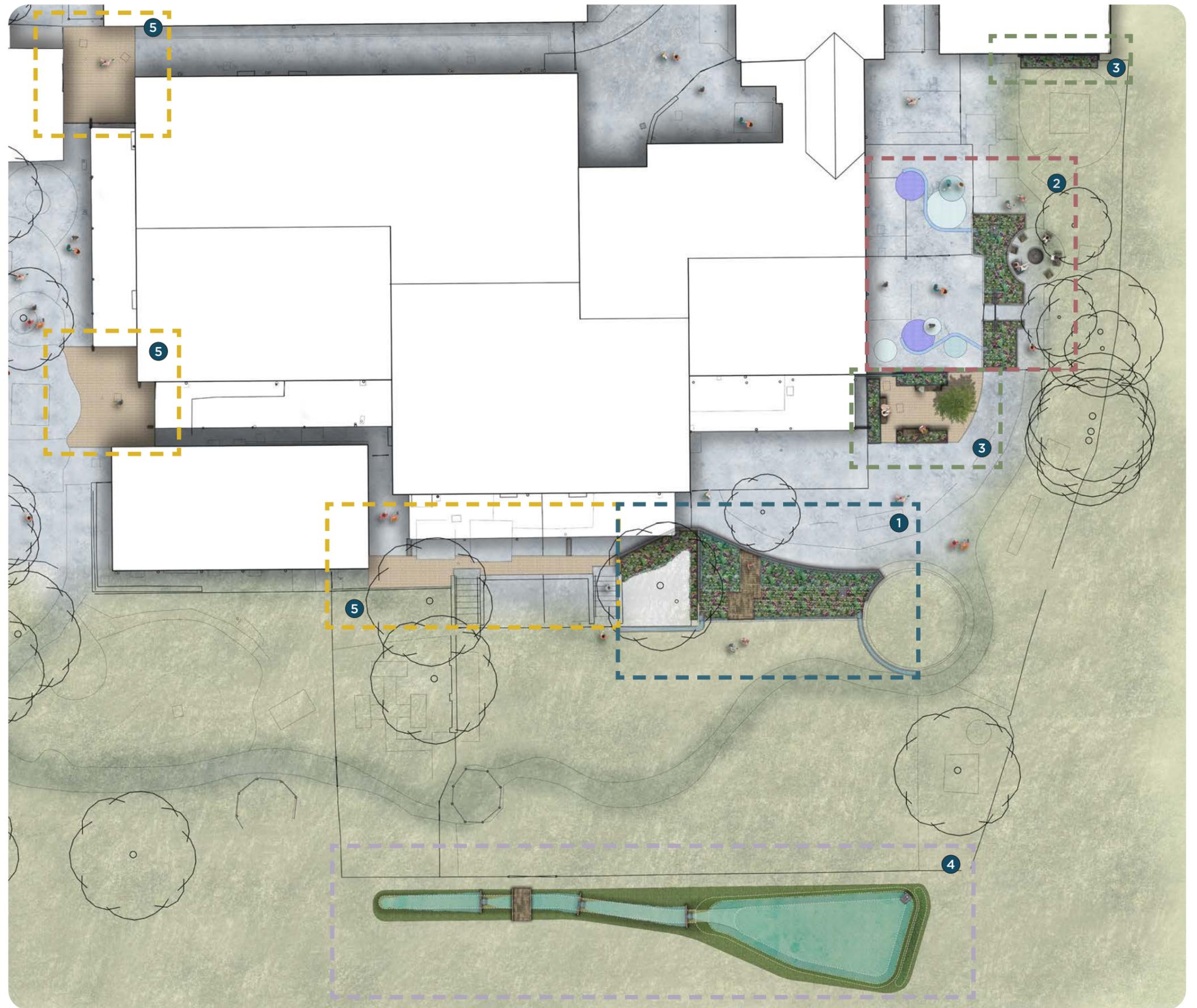


Figure 1: Overall general arrangement plan

### Central Raingarden

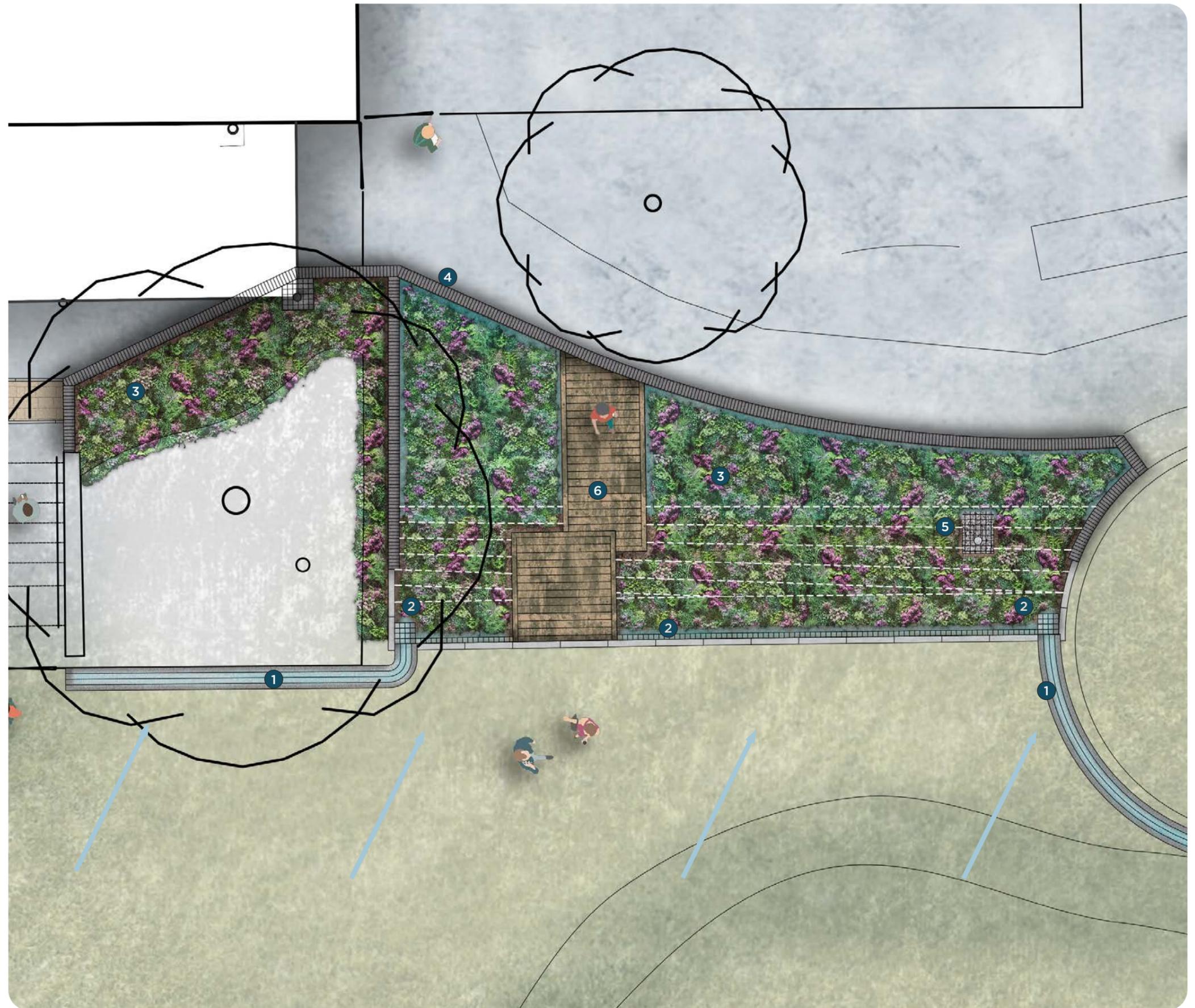
Central raingarden created to intercept surface water flows from asphalt playground. This will minimise the amount of surface water, soils and debris being deposited at the bottom of the slope.

**Design features:**

- 1 Surface channel intercepts flows and convey them into raingarden.
- 2 Erosion pad and apron to dissipate surface water flows and catch debris.
- 3 Mixed shrub and perennial planting to enhance biodiversity and amenity.
- 4 New brick wall increases soil depth for raingarden water storage volume, also stops flows from running down slope.
- 5 Flow control removes excess water from the raingarden.
- 6 Raise decking allows children to immerse themselves in the raingarden safely.



**Photo 1:** View east, drainage issues evident along boundary. Surface water run off from asphalt playground flows into this space.



**Figure 2:** Central raingarden

### Eastern Raingardens

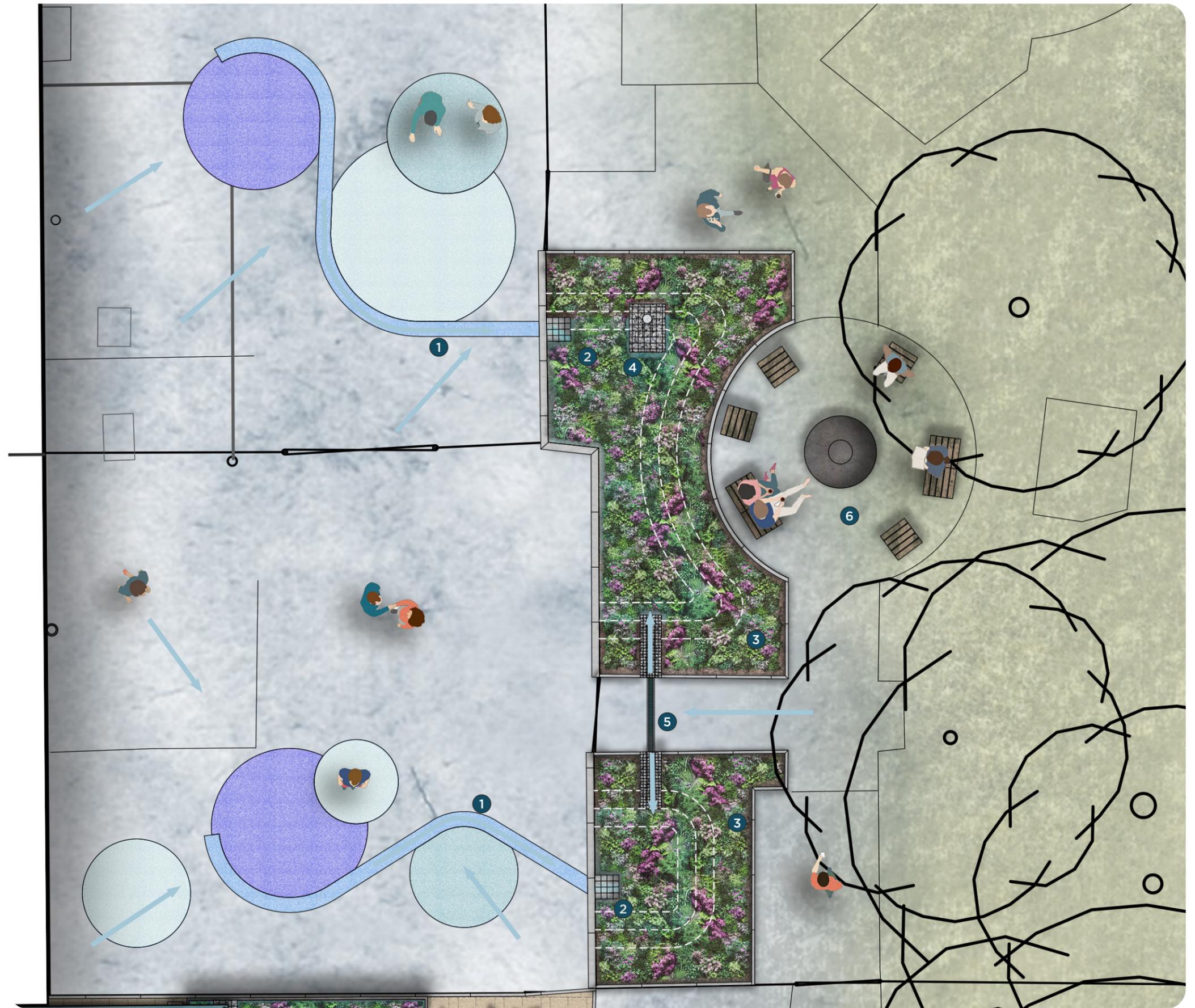
The eastern raingardens have been proposed to intercept surface water flows from areas of surrounding impermeable asphalt. Drainage gulleys at this location are small can become easily blocked, which can lead to flooding.

**Design features:**

- 1 Permeable asphalt channel intercepts flows and convey them into raingarden.
- 2 Erosion pad to dissipate surface water flows and catch debris.
- 3 Mixed shrub and perennial planting to enhance biodiversity and amenity.
- 4 Flow control removes excess water from the raingarden.
- 5 ACO drain catches flows and channels them directly into raingarden.
- 6 New seating area with fire pit.



**Photo 2:** View north, large areas of impermeable surfacing draining into small gully.



**Figure 3:** Eastern raingardens

### Rainplanters

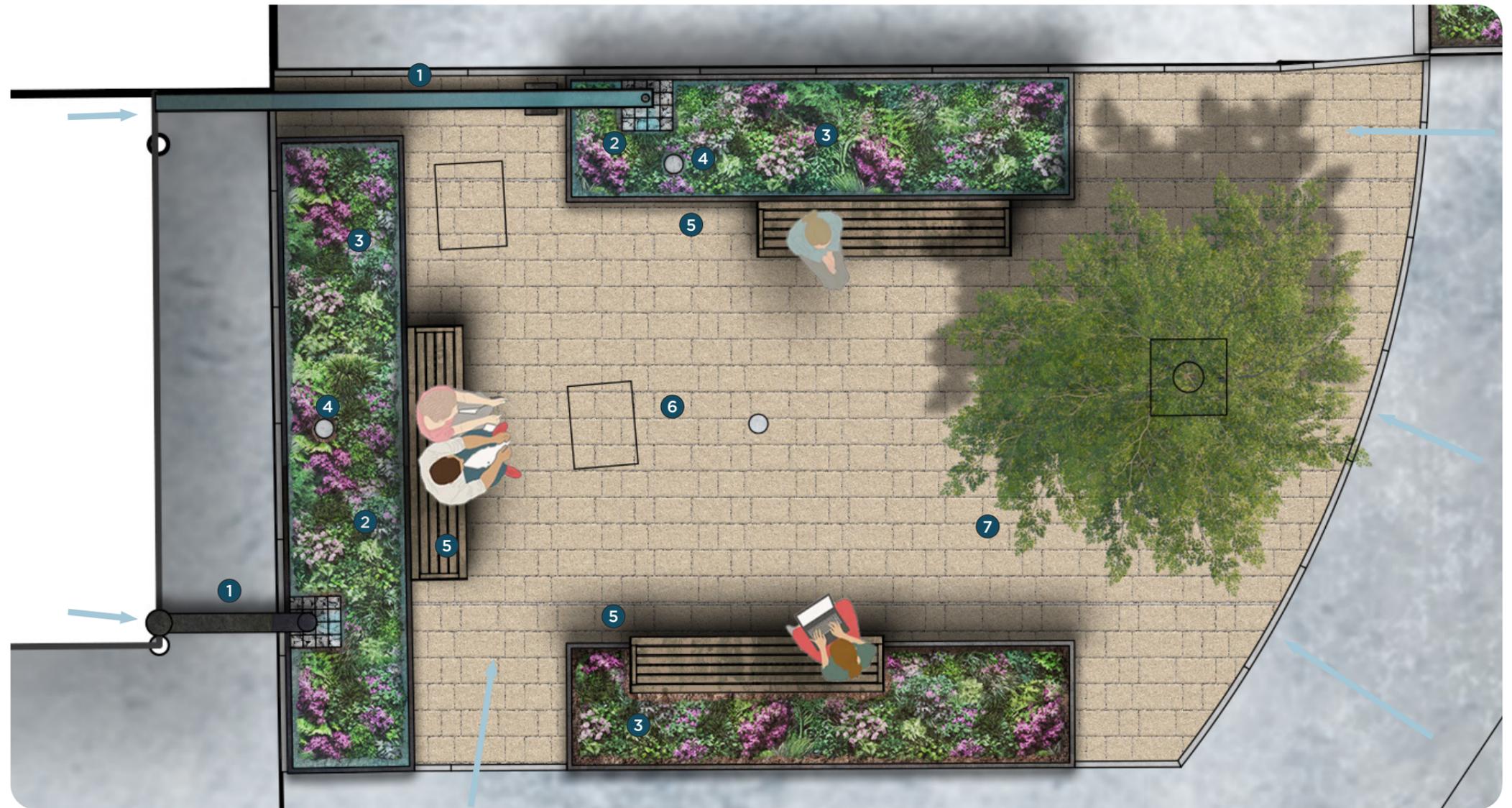
Two areas with rainplanters have been proposed to intercept rainwater from the roofs of adjacent buildings. Two to the east (Figure 4/Photo 3) and one to the north (Figure 5). A third planter in the eastern area creates an enclosed calming space for children, with seating. Permeable paving was also proposed to capture surface water currently waterlogging this area.

**Design features:**

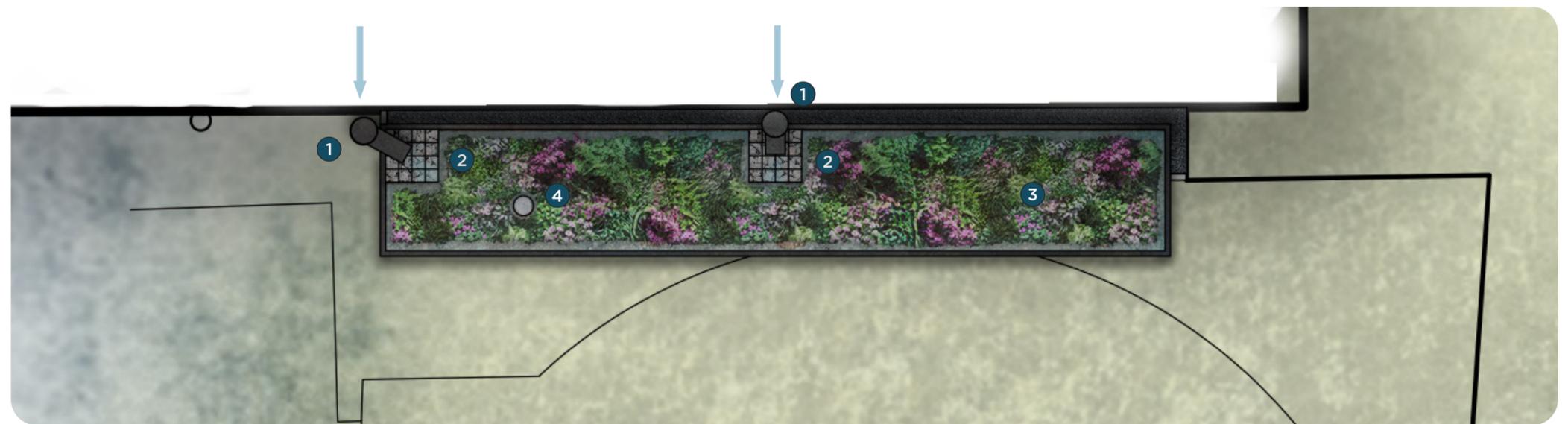
- 1 Downpipes or overhead channels with rain chains channel rainwater from roofs into rainplanters.
- 2 Erosion pad to dissipate rainwater flows and catch debris.
- 3 Mixed grass and perennial planting to enhance biodiversity and amenity.
- 4 Flow control removes excess water from the rainplanters.
- 5 Raised metal planter with or without seating.
- 6 Permeable paving to capture surface water currently waterlogging this area.
- 7 Newly installed tree to replace existing tree that has been felled.



**Photo 3:** View north, large area of artificial turf prone to waterlogging assumed partly as result of recently installed pipe to gully which falls in this area.



**Figure 4:** Eastern rainplanters



**Figure 5:** Northern rainplanter

### Southern Swale and Basin

A swale and basin have been proposed along the southern boundary of the school. The purpose of this feature is to mitigate the large volume of surface water that currently flows down the sloped playing field into a gully, that is connected into the school's sewer system (Photo 4).

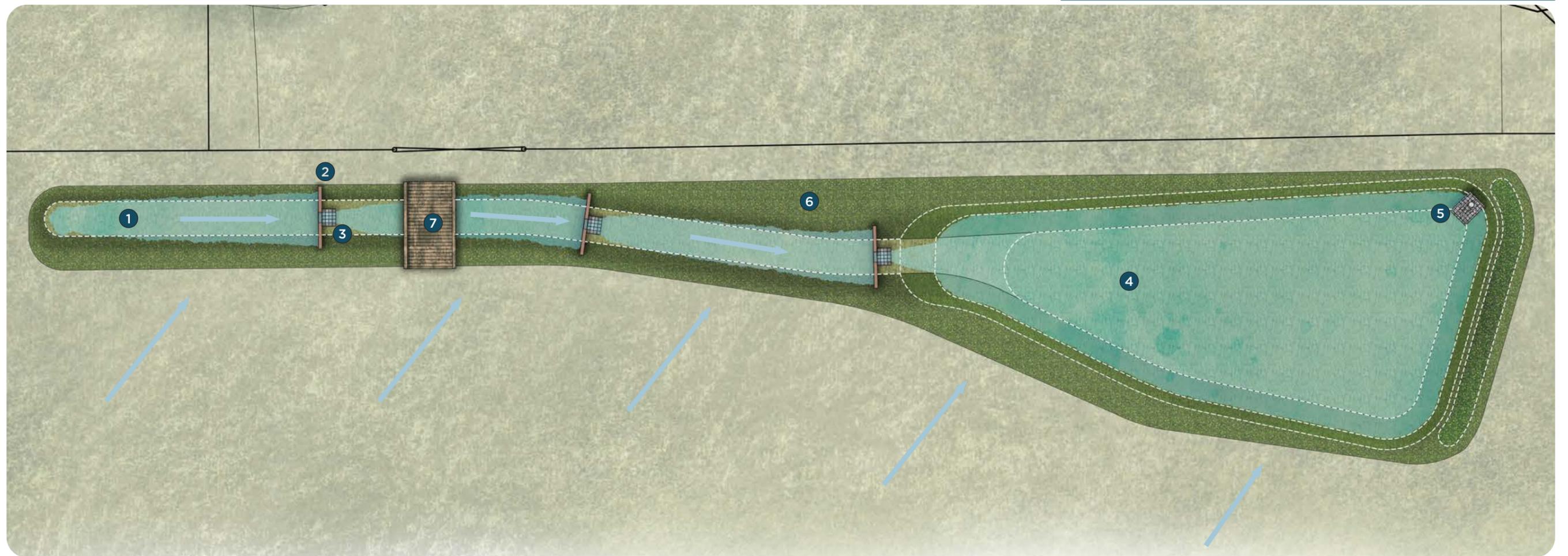
The swale and basin will intercept the surface water flows from the playing field and allow the water to infiltrate into the ground. This makes the existing gully obsolete and will dramatically decrease the amount of water entering the school's sewer system.

#### Design features:

- 1 Swale captures surface water flows from playing field and allows the water to infiltrate into the ground or conveys it into the basin..
- 2 Weir walls slow the flow of water from the top of the swale towards the basin.
- 3 Erosion pad to dissipate surface water flows and catch debris from top of weir
- 4 Basin stores surface water and allows it to infiltrate into the ground..
- 5 If required, a flow control removes excess water from the basin.
- 6 Flower rich meadow within the swale and basin will increase opportunities for biodiversity locally.
- 7 Footbridge allows children to easily cross the swale, between the school playground and playing field.



**Photo 4:** . View south east, across tarmac playground. Recently installed drainage pipe installed to mitigate drainage issues from adjacent playing field.



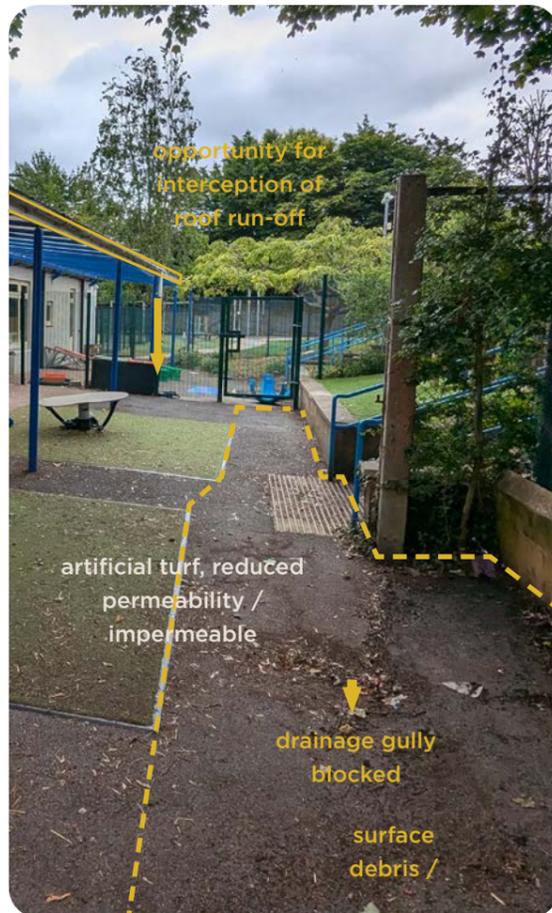
**Figure 6:** Southern swale and basin

### Permeable Paved Areas

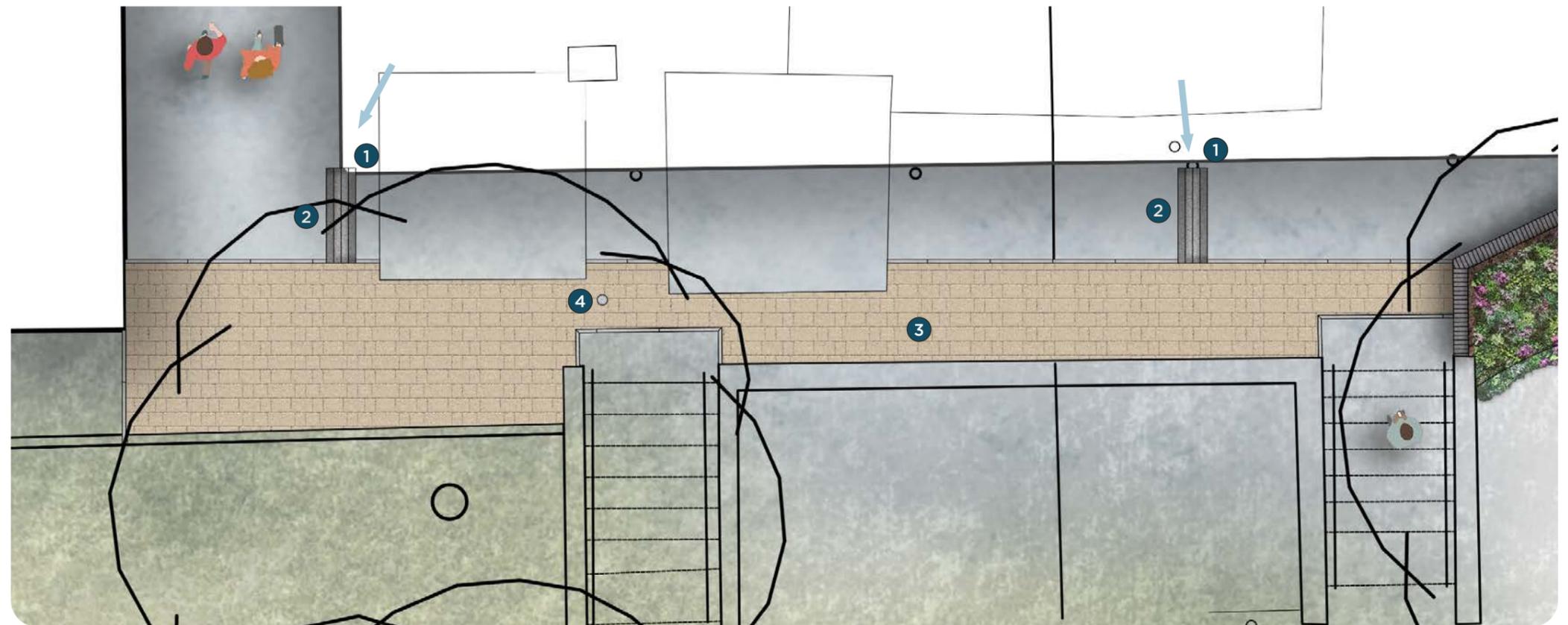
Three areas of permeable paving are proposed in specific areas to capture surface water currently waterlogging areas, but also intercept rainwater runoff from the roofs of adjacent buildings.

#### Design features:

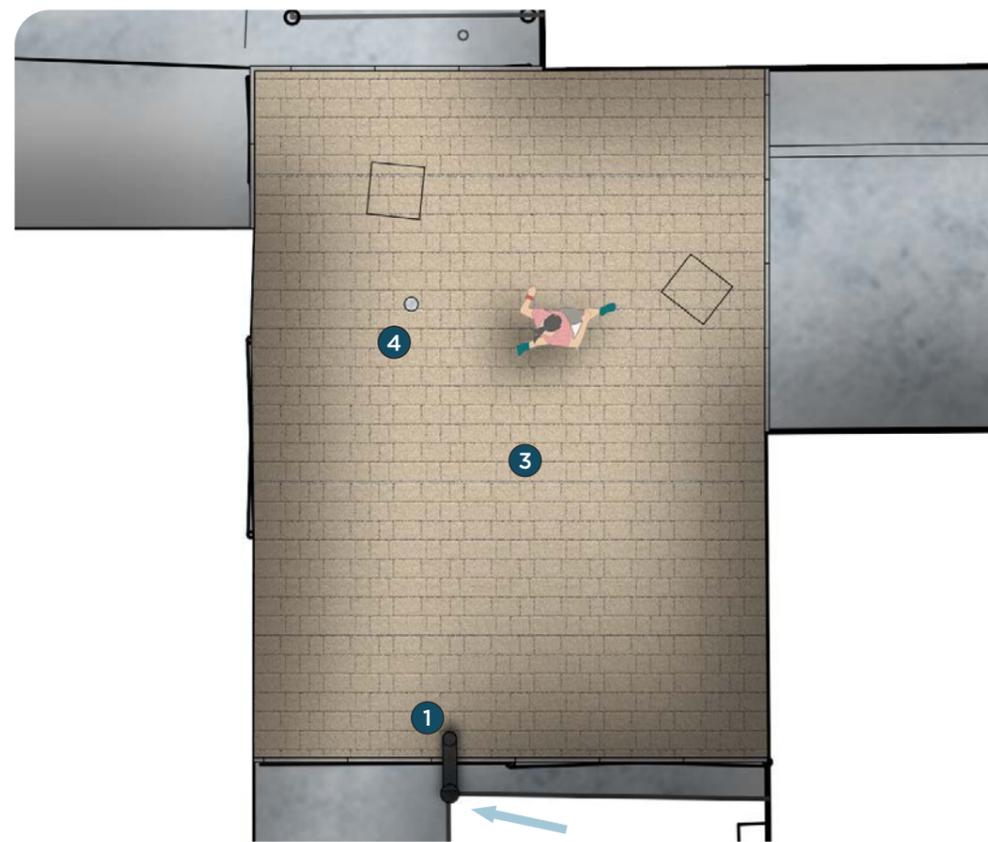
- 1 Downpipes convey rainwater from roofs onto permeable paving or into surface channels
- 2 Surface channels convey rainwater runoff onto permeable paving.
- 3 Permeable paving allows surface water and rainwater from roofs to infiltrate into the ground below
- 4 Flow control removes excess water from permeable paving.



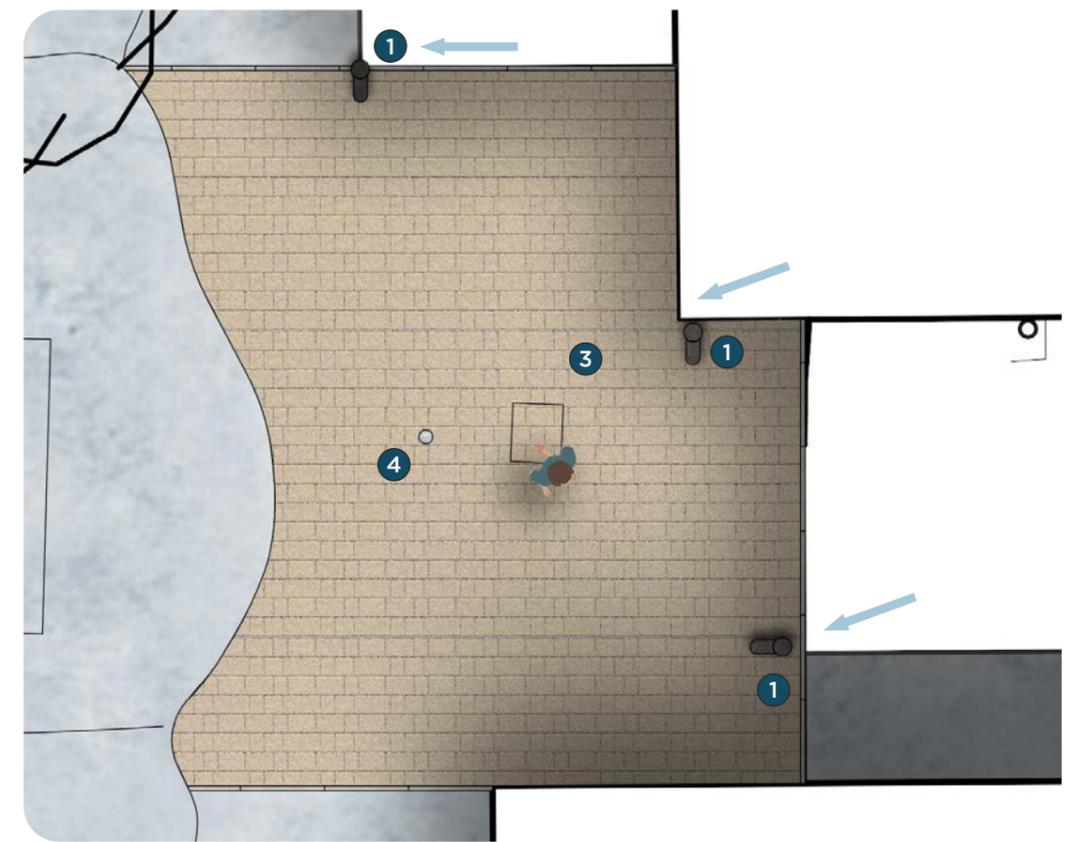
**Photo 5:** . View east at central area, a combination of impermeable asphalt and artificial turf surfaces. Blocked gully and surface debris indicate some drainage issues. Shelter with external pipes.



**Figure 7:** Central permeable paved area



**Figure 8:** North-western permeable paved area



**Figure 9:** Western permeable paved area

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