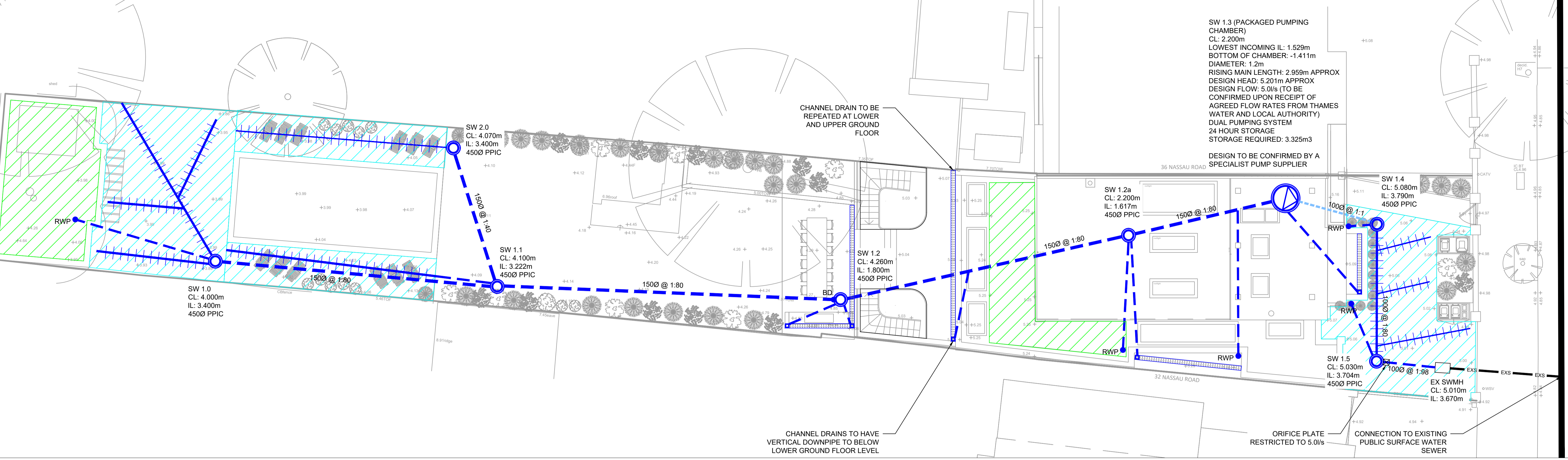


SW 1.3 (PACKAGED PUMPING CHAMBER)
 CL: 2.200m
 LOWEST INCOMING IL: 1.529m
 BOTTOM OF CHAMBER: -1.411m
 DIAMETER: 1.2m
 RISING MAIN LENGTH: 2.959m APPROX
 DESIGN HEAD: 5.201m APPROX
 DESIGN FLOW: 5.0l/s (TO BE CONFIRMED UPON RECEIPT OF AGREED FLOW RATES FROM THAMES WATER AND LOCAL AUTHORITY)
 DUAL PUMPING SYSTEM
 24 HOUR STORAGE
 STORAGE REQUIRED: 3.325m³
 DESIGN TO BE CONFIRMED BY A SPECIALIST PUMP SUPPLIER



- NOTES:**
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER ENGINEER'S AND ARCHITECT'S DRAWINGS, DETAILS & SPECIFICATIONS.
 - THE EXTERNAL WORKS DESIGN IS BASED UPON RICHARD JAMES HASTINGS ARCHITECTURE PLAN 2313_02-00 REV PA- DATED 16.05.2024
 - TOPOGRAPHICAL SURVEY DRAWING 2313_00-01 DATED 19.06.2023 BY RICHARD JAMES HASTINGS ARCHITECTURE HAS ALSO BEEN USED IN THE DESIGN.
 - REFER TO THE ARCHITECT FOR SETTING OUT OF ALL BUILDINGS & INTERNAL DOWN PIPES & RWPS
 - REFER TO SERVICE ENGINEERS DRAWINGS FOR FINAL SETTING OUT OF RWP AND SVP'S (BASED ON GUTTER SYSTEM).
 - REFER TO SERVICE ENGINEERS DRAWINGS FOR ABOVE GROUND PLUMBING ROUTES FROM APPLIANCES TO STUB STACKS ETC.
 - ALL EXISTING DRAINAGE THAT IS TO BE ABANDONED TO BE 'PLUGGED' IN WITH MASS CONCRETE (150mm MIN) OR REMOVED ENTIRELY.
 - ANY EXISTING SERVICES TO BE LOCATED AND CLEARLY MARKED PRIOR TO EXCAVATIONS BY CONTRACTOR.
 - ALL LEVELS ARE TO BE CONFIRMED BY THE CONTRACTOR ON SITE PRIOR TO CONSTRUCTION.
 - IT IS ASSUMED THAT ALL SINK AND TOILET DRAINAGE POINTS WILL HAVE RODDING ACCESS AT THE APPLIANCE BASE.
 - CONTRACTOR TO AVOID UNDERMINING ANY EXISTING FOOTPATHS/ BUILDINGS DURING WORKS BY ALLOWING ADEQUATE PROTECTION ADJACENT TO THESE AREAS.
 - ALL RAINWATER DOWN PIPES TO HAVE RODDABLE ACCESS AT THE BASE OF THE VERTICAL SECTION.
 - ALL BELOW GROUND DRAINAGE PIPES WITH LESS THAN 900mm COVER TO SOFFIT LEVEL IN TRAFFICKED AREAS I.E. CAR PARK AND SERVICE YARD AREA TO HAVE CLASS Z BEDDING SURROUND. REFER TO THE MANHOLE SCHEDULE AND DETAIL SHEETS FOR FURTHER DETAILS.
 - ALL BELOW GROUND DRAINAGE WITHIN THE SITE BOUNDARY HAS BEEN DESIGNED TO BSEN 752:2008 AND BUILDING REGULATIONS - PART H:2015. THE OFF SITE DRAINAGE TO THE PUBLIC SEWER ARE DESIGNED TO SEWERAGE SECTOR GUIDANCE.

HEALTH SAFETY AND ENVIRONMENTAL RISKS BOX		
CONSTRUCTION RISKS	MAINTENANCE RISKS	DEMOLITION/ ADAPTATION RISKS
<ol style="list-style-type: none"> REFER TO EXISTING SERVICES DRAWING AND TO ARCHITECTS SERVICES DRAWINGS FOR DETAILS & LOCATION OF EXTG AND PROPOSED DRAINAGE & SERVICES. DRAINAGE CONNECTION REQUIRES DEEP EXCAVATION TEMP WORKS REQUIRED. EXISTING SURFACE WATER DRAINS TO EITHER BE REMOVED OR GRUBBED UP. CONSTRUCTING NEW CONNECTIONS DRAINAGE, POTENTIAL FOR HAZARDOUS GASES. PERMIT TO ENTER EXISTING MANHOLES SHOULD BE OBTAINED FROM THAMES WATER BEFORE UNDERTAKING THE WORK, RELEVANT P.P.E SHOULD BE WORN AT ALL TIMES. IF ANY ASBESTOS CEMENT PIPES ARE FOUND, THEN SAFE SYSTEM OF WORK NEED TO BE PUT IN PLACE WITH ATTENTION DRAWN TO THE CONTROL ASBESTOS AT WORK (AMENDMENT) REGULATIONS 1992. 	<ol style="list-style-type: none"> PERMEABLE PAVING AND CHAMBERS REQUIRE THE STANDARD PERIODIC INSPECTION REGIME AND CLEANING ROUTINE TO ENSURE CONTINUED PERFORMANCE. CONFINED SPACE ENTRY. ALL MAINTENANCE MUST COMPLY WITH THE LONDON BOROUGH OF RICHMOND UPON THAMES' REQUIREMENTS. 	<ol style="list-style-type: none"> APPARATUS LOCATED IN LANDSCAPED AREAS HAS NOT BEEN DESIGNED TO SUPPORT HEAVY VEHICLE LOADING. THE SURFACE WATER DRAINAGE APPARATUS HAS BEEN DESIGNED TO ACCOMMODATE THE DESIGNED CATCHMENT AREA. NO ADDITIONAL AREAS OF HARDSTANDING CAN BE CONNECTION INTO THE SYSTEM WITHOUT RISK OF LOCALIZED FLOODING ON SITE. THE SURFACE WATER DRAINAGE HAS BEEN DESIGNED FOR THE DISCHARGE RATE OF 2.8l/s FOR EACH CATCHMENT AREA. ANY ADDITIONS TO THIS MUST BE CHECKED WITH THAMES WATER BEFORE ANY CONNECTION IS MADE.
<p>IN ADDITION TO THE HAZARDS & RISKS NORMALLY ASSOCIATED WITH THE TYPE OF WORK DETAILED ON THIS DRAWING, TAKE NOTE OF THE ABOVE. IT IS ASSUMED THAT ALL WORKS WILL BE CARRIED OUT BY A COMPETENT CONTRACTOR, WORKING WHERE APPROPRIATE, TO AN APPROVED METHOD STATEMENT.</p>		

LEGEND:

	NEW SURFACE WATER SEWER PIPE AND MANHOLE PIPE 1500 UNO
	NEW SURFACE WATER RISING MAIN
	EXISTING PRIVATE SURFACE WATER SEWER
	NEW RAINWATER PIPE DOWNPIPE LOCATIONS & SIZES BY ARCHITECT
	BACKDROP CONNECTION
	ORIFICE PLATE
	PERFORATED PIPE 1000 UNO
	LINEAR SW DRAINAGE CHANNEL & ACCESS CHAMBER
	PERMEABLE PAVING
	GREEN ROOF

Rev	Date	Description	By	Check	App.
P1	10.05.24	PRELIMINARY ISSUE	CN	AG	PL

Client: RICHARD HASTINGS ARCHITECTURE

Project: 34 NASSAU ROAD LONDON SW13 9QE

Office: NORWICH 01603 305190

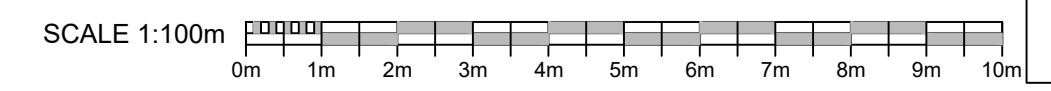
Discipline: CIVIL ENGINEERING

Title: DRAINAGE STRATEGY GENERAL ARRANGEMENT

Scale @ A1: 1:100 | Status: PRELIMINARY



Originator	Job Number	Discipline	Building/Zone
CCL	8/2898	C	NAS
Type	Level	Drawing No.	Revision
GA	DRN	4400	P1



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Appendix H – SuDS Maintenance Plan

Manholes and Inspection Chambers

Description

Manholes providing rodding and jetting access to pipe work.

Normally manholes, in similarity to inspection chambers, are designed for access by operatives. Manholes must only be accessed after a risk assessment, and the implementation of a safe system of work, which identifies the specific risk to confined space.

Maintenance Issues

It is not likely that Manholes will present maintenance issues. However, they allow both the access to the drainage infrastructure and allow visual inspection from the surface of any key maintenance issues.

Schedule	Action Required	Frequency
Routine/regular maintenance (inc. inspections and monitoring)	Remove covers and ensure that there are no blockages. Inspect and ascertain any parts that are not operating correctly and resolve.	For 3 months after installation
	Check covers do not need repairing.	Monthly
	Check drainage is running freely by inspecting manholes and inspection chambers.	Every 6 months and following the leaf fall in autumn.
Occasional maintenance	Suction sweeping and cleansing (to Water Jetting Association standards) and CCTV where appropriate.	2 – 4 Years
Remedial maintenance	<ul style="list-style-type: none">• Silt removal• Inlet/outlet repair• Erosion repairs• System recovery following a pollution event• Manhole Cover replacement• Repairs to brickwork or concrete• Chanel repair	When required (tasks to repair problems due to wear, damage or vandalism)

Linear Drains

Description

Surface Water is drained over impermeable sections towards grated, or slot-type linear drains at low points and water is carried to below ground pipework.

Maintenance Issues

Linear drains could get blocked by silt or debris, causing flooding.

Linear drains frequently include silt traps at outlets which can cause siltation of downstream drainage infrastructure if the appropriate maintenance is not undertaken.

Maintenance Regime

Schedule	Action Required	Frequency
Routine/regular maintenance (inc. inspections and monitoring)	Inspect linear drains to make sure that there are no blockages at surface level. Remove covers to outflow boxes and check for blockages or siltation. Inspect and identify any parts that are not operating correctly and resolve.	For 3 months after installation
	Inspect linear drains to make sure that there are no blockages at surface level.	Monthly
	Remove covers to outflow boxes and check for blockages or siltation.	Every 6 months and following the leaf fall in autumn.
Occasional maintenance	Jetting of linear drains and suction vacuuming of outlet boxes (to Water Jetting Association standards) and CCTV where appropriate.	1 – 2 Years
Remedial maintenance	<ul style="list-style-type: none"> • Silt removal • Inlet/outlet repair • Erosion repairs • System rehabilitation following a pollution event • Linear drain cover replacement • Chanel repair • Ensure that impermeable surfaces surrounding linear drains have not settled below top of linear drain level, causing ponding 	When required (tasks to repair problems due to wear, damage or vandalism)

Pipework

Description

Below ground drainage pipework connects drainage inlets (gullies, linear drains etc) to manholes as well as providing connections between manholes.

Maintenance Issues

Pipes could become blocked by silt, debris fat, grease, or collapse. In addition, it's possible for pipe joints to become displaced or for roots to grow from the surrounding ground into the pipes.

These factors can cause a reduction in, or loss of, the hydraulic capability of the pipes which could cause flooding to land and buildings.

Defects in pipes could cause a reduction in stability to ground underlying foundations, thus, causing settlement and damage to buildings and external surfaces.

The material of pipes and associated couplings can be damaged if aggressive liquids are passed through the pipes.

It is recommended that trees are not planted within 3m of pipes to reduce the risk of root ingress.

Maintenance Regime

Schedule	Action Required	Frequency
Routine/regular maintenance (inc. inspections and monitoring)	Inspect and identify any parts that are not operating correctly and resolve.	For 3 months after installation.
	Monitor working of drainage at ground level. The indications damaged pipework's may include localised flooding or emission of smells.	Monthly
	Remove manholes covers to check for blockages.	Every 6 months
Occasional maintenance	CCTV pipework, clean to WRC Sewer Jetting Code of Practice. Resolve issues as appropriate.	1 – 2 Years
Remedial maintenance	<ul style="list-style-type: none">• Silt removal.• Fat and Grease removal.• Erosion repairs.• Joint displacement.• Structural failure, cracking or collapse.• System rehabilitation following a pollution event.	When required (tasks to repair problems due to wear, damage or vandalism)

Green Roofs

Description

Green roofs are areas of living vegetation, installed on the top of buildings. Green roofs provide visual, ecological and biodiversity benefits as well as reducing surface water runoff.

Maintenance Issues

Intensive green roofs (similar to gardens) will require regular maintenance, with grassed areas mowed, and plant beds weeded, on weekly or fortnightly basis during the growing season.

Extensive green roofs (shallow with low maintenance planting) normally only need access once or twice a year to remove litter, check fire breaks and drains, and remove unwanted invasive plants.

Maintenance during the green roof establishment period is most likely undertaken by the green roof supplier.

Activity	Action Required	Frequency
Regular inspections	Inspect all components, including where appropriate, soil substrate, vegetation, drains, irrigation systems, membranes and roof structure for accurate operation, reliability of waterproofing and structural stability.	On an annual basis and after severe storms
	Inspect soil substrate for evidence of erosion channels and determine any sediment sources	On an annual basis and after severe storms
	Inspect drain inlets to ensure clear runoff from the drainage layer to the conveyance or roof drain system	On an annual basis and after severe storms
	Inspect underside of roof for evidence of leakage	On an annual basis and after severe storms
Regular Maintenance	Remove debris and litter to avert clogging of inlet drains and obstruction by plant growth	6 monthly, annually or as required
	During establishment (first year), replace dead plants as needed.	Monthly (but usually responsibility of manufacturer)
	After establishment, replace dead plants as required (where > 5% of coverage)	On an annual basis in autumn
	Remove debris from deciduous plant foliage	6 monthly or as required
	Remove nuisance and invasive foliage, including weeds	6 monthly or as required
	Mow grasses, prune shrubs and manage other planting (as necessary).	6 monthly or as required

Remedial actions	If erosion channels are evident, these should be stabilised with extra soil substrate like the original material, and sources of erosion damage should be identified and controlled.	As appropriate
	If drain inlet has settled, cracked or moved, investigate and resolve as necessary.	As appropriate

Permeable Pavements

Description

Pervious pavements provide a pavement suitable for pedestrian and vehicular traffic, while allowing rainwater to infiltrate through the surface and into the underlying structural layers. The water is temporarily stored beneath the overlying surface and into the underlying structural layers.

Maintenance Issues

For permeable pavements typical issues relate to the build-up of silt within the voids, causing a decrease in capacity and porosity over time.

Maintenance Regime

Schedule	Action Required	Frequency
Regular Maintenance	Surface brushing for appearance and to reduce silt accumulation.	Monthly
	Brushing and suction sweep or jet wash and suction sweep particularly for block pavement in autumn after leaf fall.	Annually
	Mow grass edges to paving at 35-50mm and remove weeds and leaves.	As required
	Check outlets and control structures.	Monthly depending on detail
Occasional tasks	Jetting and suction where silt has accumulated in joints or voids. Replace grit and vibrate surface to lock for permeable block paving	As required
Remedial Work	Where sinkage or surface damage occurs uplift blocks, remove grit bedding layer, geotextile if present and reinstate to design profile	As required

Table XX – Permeable Pavements Maintenance Information (Anglian Water Sustainable drainage systems (SuDS) adoption Manual)

Packaged Pumping Station

Description

Packaged pumping chambers are used to transfer water within deep drainage systems up to high level for discharge into existing systems which cannot be lowered to suit the proposed system.

Maintenance Issues

It is not likely that the pumping chamber will regularly present maintenance issues. However, there is the possibility for blockages or failures of either the duty or standby pump to occur, therefore a suitable maintenance plan should be put in place by the supplier with routine maintenance carried out by themselves in line with their standard maintenance procedures and guidance.

Appendix I – Pollution Mitigation



MRB do not act as a liability for any model or model average data. You, the user, require an ability to determine what all of the use an responsibility to use the tool, and to ensure that the user understands the possibility of the tool. The user is responsible for the use of the tool and the user is responsible for the use of the tool. The user is responsible for the use of the tool and the user is responsible for the use of the tool.

- The steps set out in the tool should be applied for each inflow or runoff area (in each impermeable surface area separately discharging to a SuDS component).
 - The supporting 'Design Conditions' stated by the tool must be fully considered and implemented in all cases.
 - Relevant design examples are included in the SuDS Manual Appendix C.
 - Each of the steps below are part of the process set out in the Flowchart on Sheet 1.
 - Sheet 4 summarises the selections made below and indicates the acceptability of the proposed SuDS components.
- DROP DOWN LIST RELEVANT INPUTS NEED TO BE SELECTED FROM THESE LISTS, FOR EACH STEP
USER ENTRY USER ENTRY CELLS ARE ONLY REQUIRED WHERE INDICATED BY THE TOOL

STEP 1: Determine the Pollution Hazard Index for the runoff area discharging to the proposed SuDS scheme
 This step requires the user to select the appropriate land use type for the area from which the runoff is occurring.

1. Review the area which the runoff will occur:
 - Use the tool and type with the highest Pollution Hazard Index.
 - Apply the approach to each of the land use types to determine whether the proposed SuDS design is sufficient to do it. If it is not, consider collecting more localised runoff, identifying and providing additional measures.
 2. If the ground level and type suggested are not applicable, select 'Other' and enter a description of the land use of the runoff area and agreed user defined indices in the tool below the drop down list.

Runoff Area Land Use Description	Hazard Level	Pollution Hazard Index	Notes	Design Conditions	
Residential (other)	Very low	0.2	0.2	0.6	1, 2
Landuse Pollution Hazard Index	Very low	0.2	0.2	0.6	

STEP 2A: Determine the Pollution Mitigation Index for the proposed SuDS components
 This step requires the user to select the proposed SuDS components that will be used to treat runoff - before it is discharged to a receiving surface/waterbody or downstream infiltration component.
 If the runoff is discharged directly into a watercourse component, without upstream treatment, select 'None' for each of the 3 SuDS components and move to Step 2B.

This step requires the user to indicate the water quality protection provided by proposed SuDS components for discharge to receiving surface or downstream infiltration components (see in Appendix 2). For all SuDS components, the user is required to indicate the level of protection provided by the proposed SuDS components for the discharge.
 If you have been to 3 components, select 'None' for the components that are not required.
 If the proposed component is a permeable surface, the user should also indicate the level of protection provided by the proposed component. See Appendix 2 for more information on the proposed component and agreed user defined indices that should be entered in the tool below the drop down list.

SuDS Component Description	Proposed SuDS Component	Pollution Mitigation Index	Notes	Design Conditions	
Permeable surface (e.g. grass, gravel, etc.)	Permeable surface (e.g. grass, gravel, etc.)	0.7	0.6	0.7	1, 2, 3
Aggregated Surface Water Pollution Mitigation Index		0.7	0.6	0.7	

Note: If the total aggregated mitigation index is < 1 (which is not explicitly indicated), then the solution is based at $1 - \text{Total}$. This assumes the proposed component is being used to provide a high level of protection for the runoff area. If the user has selected a component that is not required, the user should select 'None'.

STEP 2B: Determine the Pollution Mitigation Index for the proposed Groundwater Protection and the groundwater
 This step requires the user to select the type of groundwater protection that is either part of the SuDS component or that lies between the component and the groundwater.

This step requires the user to indicate the level of protection provided by the proposed groundwater protection for the runoff area. The user should select the level of protection provided by the proposed groundwater protection for the runoff area. The user should select the level of protection provided by the proposed groundwater protection for the runoff area. The user should select the level of protection provided by the proposed groundwater protection for the runoff area.

Groundwater Protection Description	Proposed Groundwater Protection	Pollution Mitigation Index	Notes	Design Conditions	
None	None	0	0	0	1, 2, 3, 4
Groundwater Protection Pollution Mitigation Index		0	0	0	

STEP 2C: Determine the Combined Pollution Mitigation Index for the Runoff Area
 This is an automatic step which combines the proposed SuDS Pollution Mitigation Index with any Groundwater Protection Pollution Mitigation Index.

Combined Pollution Mitigation Index	Total	Notes	Design Conditions	
Combined Pollution Mitigation Index for the Runoff Area	0.7	0.6	0.7	

Note: If the total aggregated mitigation index is < 1 (which is not explicitly indicated), then the solution is based at $1 - \text{Total}$. This assumes the proposed component is being used to provide a high level of protection for the runoff area. If the user has selected a component that is not required, the user should select 'None'.

STEP 2D: Determine Sufficiency of Pollution Mitigation Index for Selected SuDS Components
 This step requires the user to determine the Sufficiency of Pollution Mitigation Index for the selected SuDS components. To determine whether the proposed components are sufficient to manage each pollution category type.

This step requires the user to determine the Sufficiency of Pollution Mitigation Index for the selected SuDS components. To determine whether the proposed components are sufficient to manage each pollution category type. The user should select the level of protection provided by the proposed SuDS components for the runoff area. The user should select the level of protection provided by the proposed SuDS components for the runoff area. The user should select the level of protection provided by the proposed SuDS components for the runoff area.

Sufficiency of Pollution Mitigation Index	Sufficiency	Notes	Design Conditions	
Sufficiency of Pollution Mitigation Index	Sufficient	Sufficient	Sufficient	1

Note: If the total aggregated mitigation index is < 1 (which is not explicitly indicated), then the solution is based at $1 - \text{Total}$. This assumes the proposed component is being used to provide a high level of protection for the runoff area. If the user has selected a component that is not required, the user should select 'None'.