

Natural England Nutrient Neutrality budget calculator for the The Solent Marine Sites

This tool contains six worksheets with nine tables in total, as well as an additional worksheet hidden from the user.

This is the instructions sheet. It contains instructions on how to use the tool and provides an overview of each worksheet. This worksheet contains two tables.

You can move between worksheets using the tabs at the bottom of the page.

If you use screen reading software, you can use 'Ctrl' + 'Page Down' keys to move between the tabs.

If you use a keyboard only, to open any link in this form first select the cell with the link and then press the 'Shift' + 'F10' keys or the 'Fn' + the 'Menu' keys (both have a similar effect to a right click), then press the letter 'O' twice to highlight 'Open Hyperlink' and press 'Enter'.

If you use a keyboard only, any drop-down lists can be accessed by clicking the dropdown arrow or pressing the 'Alt' + 'Down' keys when the cell is selected.

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Topic of each table	Link to each worksheet
Worksheet 1 (Nutrients_from_wastewater): Nutrient loading from additional wastewater	Nutrients from wastewater
Worksheet 2 (Nutrients_from_current_land_use): Nutrient loading from current land use	Nutrients from current land use
Worksheet 3 (Nutrients_from_future_land_use): Nutrient loading from future land use	Nutrients from future land use
Worksheet 4 (SuDS): Nutrient loading from future land use after treatment through a sustainable urban drainage system (SuDS)	SuDS
Worksheet 5 (Final_nutrient_budgets): Nutrient budget calculations	Final nutrient budgets

General information about the calculator

This tool provides a step-by-step approach to calculating the nutrient budget for a new residential development.

The nutrient budget for a site is calculated in four key stages with an additional optional stage in which information about the SuDS features on the site can be entered. Each stage is implemented in worksheets 1-5 of this workbook.

Each worksheet is connected through a set of formulas which calculate the nutrient budget. As such, all sheets which represent the four key stages require data inputs in order to calculate the nutrient budget.

The total nutrient budget is calculated automatically by adding the values from the 'Nutrients_from_wastewater' and the outputs from the 'Nutrients_from_future_land_use' minus the 'SuDS' (if applicable), and then subtracting the values from the 'Nutrients_from_current_land_use', then adding a 20% precautionary buffer to the result. This calculation is completed in the 'Final_nutrient_budgets' worksheet.

Before a nutrient budget can be completed using the methodology, certain site-specific details for the development site in question need to be determined.

There is a guidance webpage that accompanies this calculator and provides further information on the user inputs required.

The required details and instructions for completing each stage of the nutrient budget methodology are shown in cell A2 of each worksheet.

This tool uses a set of lookup tables to find relevant values in a hidden spreadsheet titled the 'Value_look_up_tables' worksheet.

It is advisable to retain a blank copy of this workbook and 'Save As' a new copy each time you calculate a budget to minimise the risk of using incorrect data inputs and to ease the calculation of new nutrient budgets.

The values already included in this tool have been chosen based on research to determine suitable inputs to the nutrient budget that meet the HRA tests of beyond reasonable scientific doubt, in perpetuity (practically speaking this is 80-125 years) and in accordance with the precautionary principle.

If editing any values in this tool, you must make sure there is a sufficient evidence base to justify these changes and that the new inputs are selected in accordance with the precautionary principle.

Notes about the nutrients from wastewater worksheet

This sheet contains two tables.

The first table titled 'Table_3_Water_Infrastructure' under the heading 'Water infrastructure information' allows the user to enter key information about the wastewater generated and water infrastructure on the site. This table contains a mix of user specified values and values that are calculated automatically depending on the user selected inputs.

The date of first occupancy is required because some wastewater treatment works (WwTW) may be due an upgrade in 2025 or 2030 which will change the nutrient concentration permit values. This will be shown through two or three values for the permits and nutrients load from before and after the upgrade.

The amount of wastewater generated as a result of the population needs to be calculated using an average occupancy rate, a per capita water usage figure, and the number of new developments. The default water usage value is preset in the worksheet. The default setting for the average occupancy rate is preset in the worksheet and is the national occupancy rate of 2.4 people per dwelling/unit. Only change this value if there is sufficient evidence that the development will be different to the national average. The number of new developments is not preset and must be a whole number.

If it is uncertain what WwTW the development will drain into, please find this information from your sewerage company before completing the calculator. If it is not feasible to connect to a WwTW and a septic tank or package treatment plant is being used, please select this option. Please be aware that if the total nitrogen (TN) final effluent concentrations (in mg/l) are specified by the manufacturer, please select 'Septic Tank user defined' or 'Package Treatment Plant user defined' and enter the manufacturer specified value in the cell where prompted.

The second table titled 'Table_4_Wastewater_Load' under the heading 'Final calculation of nutrient load from wastewater' contains the calculation of the nutrient load from additional wastewater. This table may present up to three different values for the nutrient load.

If a nutrient permit is changing for the selected WwTW as of 01/01/2025, or 01/04/2030, the second table will be broken down into up to three parts: 'Post-2030 Stage 1 Nutrient Loading', 'Pre-2030 Stage 1 Nutrient Loading', and 'Pre-2025 Stage 1 Nutrient Loading'. If applicable, three nutrient budgets will be calculated for the loading before and after the 2030 and 2025 WwTW permit upgrades, and will be presented in cells B19, B21, or B23 if applicable.

Notes about the nutrients from current land use worksheet

This worksheet contains two tables that are used for calculating the annual nutrient load from existing (pre development) land use on the development site. Environmental information about the current site is required for the first table. The second table requires the user to input the existing type(s) and area(s) of landcover present in order to generate nutrient loads associated with the current landcovers on the site. Only landcovers for the land that is being altered by the development should be entered.

The drop-down list of landcover types contains up to eight agricultural landcover types and eight different non-agricultural landcover types. The full list of landcovers can be found in the associated guidance webpage or in the drop-down list. Please find out what landcover types are within the development before completing this tool. If there is a landcover within the development area that is not in the list please select the most similar landcover type.

The guidance webpage that accompanies this calculator provides further information about the landcover types used in this tool.

Sources of information required for nutrients from current land use worksheet

Description of the information:	Link
The Operational Catchment within which the development is located can be found using the Environment Agency Catchment Data Explorer	Environment Agency Catchment Data Explorer
The drainage associated with the predominant soil type within the development site can be found using the Soilscales Map	Soilscales
The annual average rainfall that the development will receive can be found using the National River Flow Archive for the '42019- Tanners Brook at Millbrook' station	National River Flow Archive
Whether the development is located within a Nitrate Vulnerable Zone (NVZ) can be found using the UK Soil Observatory 'Nitrate Vulnerable Zones - England' map	UK Soil Observatory

Notes about the nutrients from future land use worksheet

This worksheet contains a single table which is used to calculate the annual nutrient load from new (post-development) land use on the development site. The type(s) and area(s) of landcover present on the new development is required to generate nutrient loads associated with the current landcovers on the site.

The type(s) of landcover present on the new development site can be selected from a list of eight different landcover types: greenspace, woodland, shrub, water, residential urban land, commercial/industrial urban land, open urban land and community food growing. Please find out what landcover types will be within the development site before completing this tool. If there is a landcover within the development site that is not in the list please select the most similar landcover type.

The guidance webpage that accompanies this calculator provides further information about the landcover types used in this tool.

Notes about the SuDS worksheet

This worksheet contains one table in which the user can enter key information about the use of SuDS to treat the runoff from the site and reduce the nutrient loading from future land uses.

The table allows the user to enter the SuDS features or SuDS management trains that are proposed to treat the nutrient loading from future land uses. The land covers within the SuDS catchment area and the areas of these landcovers can be entered. Only landcovers entered into the 'Nutrients_from_future_land_use' worksheet can be selected. The nutrient loads associated with these landcovers are automatically calculated using the values from the worksheet 'Nutrient_loading_from_future_land_use'. The user must enter the percentage of flow that will be directed through the SuDS. Any numerical value less than or equal to 100% can be entered for the percentage of flow. Any numerical value less than or equal to 100% can be entered for the removal rates. The user can enter any text for the SuDS feature to allow for variability in the names of the SuDS features / management trains planned. Any numerical value less than or equal to 100% can be entered for the removal rates. However, the user will be required to present all evidence of these removal rates to the competent authority. As such, the most up to date SuDS guidance on SuDS for nutrient removal should be followed.

Notes about the final nutrient budgets

This final stage automatically calculates the results from worksheets 1-5 using the equation described in 'General information about the calculator'.

The value(s) shown represent the nutrient mitigation required in kilograms per year to achieve nutrient neutrality.

If there are two or three values due to changing permits, the calculator will show the total amount of nutrient mitigation that is needed before and after the changing permit date.

Nutrients from wastewater

This sheet contains two tables. The tables are seperated by a heading in the 'Headings 2' style, which describes the following table. The first table 'Table_3_Water_Infrastructure' may contain blank cells in rows 11 to 12 and column C. User inputs are required for cells B5 to B10. In addition, user inputs are required in C11 depending on the information entered by the user. The second table 'Table_4_Wastewater_Load' may contain blank cells in rows 20 to 23. No user inputs are required in this table.

You can enter the average occupancy rate of the development in cell B6. The default rate is 2.4, this should not be edited without sufficient evidence.

You can enter the water usage in cell B7. This value should be kept at 120 unless other efficiency measures are used.

You can enter the total number of dwellings/units that will be within the development site as of the project completion date in cell B8.

You can choose whether the catchment of the proposed development can apply deductible acceptable loading from the drop-down list in cell B9.

You can choose the receiving WwTW from the drop-down list in cell B10. The drop-down lists can be accessed by clicking the arrow or pressing the 'Alt' + 'Down' keys when the cell is selected. If the user selects 'Package Treatment Plant user defined' or 'Septic Tank user defined', the user must enter their certified value of TN in cell C11. Otherwise the default values will be used in the calculation of the nutrient load associated with wastewater.

Nutrient permits may be changing for the WwTW selected by the user as of 01/01/2025, or 01/04/2030. If the date of first occupancy is in-between changing permit dates, multiple permit limits may be automatically generated in cell B11 to B13. If applicable, up to three values for the nutrient loading associated with wastewater will be calculated for the loading will be presented in cell B19, B21, or B23.

Water infrastructure information

Description of required information	Data entry column	Additional data entry column
Date of first occupancy (dd/mm/yyyy):	01/07/2027	
Average occupancy rate (people/dwelling or people/unit):	2.31	
Water usage (litres/person/day):	110	
Development Proposal (dwellings/units):	90	
Include deductible acceptable loading?	Yes	
Wastewater treatment works:	Budds Farm WwTW	
Current wastewater treatment works N permit (mg TN/litre):	7.7	
Final calculation of nutrient load from wastewater		
Description of values generated	Values generated	

Stage 1 Nutrient Loading	
Additional population (people):	207.9
Wastewater by development (litres/day):	22869
Annual wastewater TN load (kg TN/yr):	57.89

Nutrients from current land use

This sheet contains two tables. The tables are seperated by a heading in the 'Headings 2' style, which describe the following table. The first table 'Table_5_Site_Information' requires user inputs in cells B5 to B8. The second table 'Table_6_Current_Land_Uses' requires user inputs in cells A11 to A27 and B11 to B27. The remaining columns are automatically calculated. The final Column (Column D) titled 'Notes on data' will remain empty unless the data automatically generated data has been extrapolated.

You can choose the Operational Catchment the site is located within from the drop-down list in cell B5. The drop-down lists can be accessed by clicking the arrow or pressing the 'Alt' + 'Down' keys when the cell is selected.

You can choose the soil drainage type associated with the predominant soil type within the development site from the drop-down list in cell B6.

You can choose the annual average rainfall the development will receive from the drop-down list in cell B7. If the rainfall volume is not on the list, please select the nearest value.

You can choose whether the development is in a Nitrate Vulnerable Zone (NVZ) from the drop-down list in cell B8.

You can choose the existing (pre-development) land use type(s) from the drop-down list in cells A11-A27. You can enter the area(s) (in hectares) of each land use type in cells B11-B27.

The nutrient load from current land uses is shown in cell C11-C27.

The total nutrient load from current land uses is shown in cell C28.

Current land use information

Description of required information	Data entry Column
Operational Catchment:	East Hampshire Rivers
Soil drainage type:	Impeded drainage
Annual average rainfall (mm):	750.1 - 800
Within Nitrate Vulnerable Zone (NVZ):	Yes

Current land uses

Existing land use type(s)	Area (ha)	Annual nitrogen nutrient export (kg TN/yr)	Notes on data
Commercial/industrial urban land	1.70	13.10	

Nutrients from future land use

This sheet contains one table. The table 'Table_7_Future_Land_Uses' requires user inputs in cells A5 to A21 and B5 to B21. The remaining columns are automatically calculated.

You can choose the future (post-development) land use type(s) of landcover present on the new site from the drop-down list in cells A5-A21. The drop-down lists can be accessed by clicking the arrow or pressing the 'Alt' + 'Down' keys when the cell is selected.

You can enter the area(s) (in hectares) of each land use type in cells B5-B21.

The nutrient load from future land uses is shown in cell C5-C21.

The total nutrient load from future land uses is shown in cell C22.

Future land uses

[illegible]

Totals:	1.7	24.56

This sheet contains one table. 'Table_8_SuDS_Features' requires user inputs in cells A4 to C28 and E4 to F28 if the user is including SuDS to remove nutrients from the surface runoff. The remaining columns are automatically calculated.

You can choose the future (post-development) land use type(s) of landcover present on the new site within the SuDS catchment area from the drop-down list in cells A4-A28. Only landcovers entered into the worksheet titled 'Nutrient_from_Future_Land_use' can be entered. The drop-down lists can be accessed by clicking the arrow or pressing the 'Alt' + 'Down' keys when the cell is selected.

You can enter the area(s) (in hectares) of each new land use type within the SuDS catchment area in cells B4-B28.

The percentage of the flow entering the SuDS feature can be entered in Column C4-C28. If all flow is being diverted to the SuDS feature then this value should be set to 100%.

The annual TN load associated with the landcovers in the SuDS catchment area are automatically calculated in cells D4-D28.

The name of the SuDS features used to intercept surface flows can be entered in E4-E28. Any text can be entered into these cells.

The nutrient removal rates associated with the SuDS features can be entered into F4-F28. These values must be identified by the user and must be specific to the SuDS features being implemented.

The annual TN load removed by the SuDS features are automatically calculated in cells G4-G28. These values are subtracted from the nutrient budget.

The 'Notes on data' column (Column H) does not require user inputs. This cell will be blank unless the cumulative area of each landcover within the SuDS catchment area exceeds the area of the landcovers entered into the worksheet titled 'Nutrients from future land use'.

The total nutrient load removed through the SuDS features is shown in cell G29.

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Final nutrient budgets		
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This worksheet contains one table 'Table_9_Final_Nutrient_Budgets'. This table is automatically populated using the outputs from the previous worksheets. It presents calculations that underpin the final annual nutrient budget for the development site. If applicable, up to three values for the nutrient budget may be presented in cells B10, B12, or B14. Some cells may be empty if there are no changing permits.

Total nutrient budget calculations

Description of values generated	Values generated
Wastewater TN load (kg TN/year):	57.89
Net land use TN change (kg TN/year):	11.46
TN budget:	69.35
TN budget + 20% buffer:	83.22
Annual Nutrient Budget	
The total annual nitrogen load to mitigate is (kg TN/yr):	83.22