

Highways England Carbon Tool Guidance

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Terms and Definitions

Road Investment Strategy (RIS)	Department for Transport document setting out a long-term approach to improve England's motorway and all-purpose trunk road network (the 'strategic road network').
Carbon dioxide equivalent emissions (CO₂e)	A standard unit for measuring carbon footprints. This expresses the impact of each different greenhouse gas in terms of the amount of carbon dioxide that would create the same amount of global warming. Hereafter the term carbon used in this guidance and the tool refers to carbon dioxide equivalent.
Carbon footprint	The total amount of carbon released into the atmosphere as a result of activities of a particular individual or organisation.
Supply chain	The organisations involved in the construction and maintenance of the strategic road network.
Carbon return	An accurate and complete summary of the carbon emissions associated with the activities of each contractor in the supply chain for a given period; inputting data into the Highways England carbon tool produces a carbon return.
Return period	The period of time which the carbon return covers, either a particular calendar month or financial quarter.
Specification for Highways Works	The requirements and approvals procedures for work, goods or materials used in the construction, improvement or maintenance of the strategic road network.
Carbon emissions	The amount of carbon dioxide equivalent released into the atmosphere.
Carbon factor	A number that when multiplied with the amount of material, fuel or energy used gives an expression of the carbon emissions. For example, the carbon emissions associated with a tonne of steel (emissions arising from its production) or a litre of petrol (emissions arising from its production and its subsequent combustion).

Standard Carbon factor	Carbon factors provided in the carbon tool derived from UK Government or the Inventory of Carbon and Energy (also known as the ICE database).
Custom Carbon factor	A carbon factor entered by the tool user from product specific data.
Transport distance	The travel distance is the distance between the location of the supplier to the site location/point of deposition.
Bulk materials	Materials which contribute a significant proportion of the overall carbon emissions
Materials forecast	An estimate of the amount of bulk materials anticipated to be required in the next return period.
Export file	The file created by clicking the 'create export file' the carbon tool which needs to be sent to Highways England once a carbon return has been completed. The file name ends with '.rct'. The file cannot be opened directly.

1. Introduction

The UK Government has national and international commitments to reduce greenhouse gas emissions including a stretching commitment to be carbon net zero by 2050. The infrastructure sector has a key role to play in this.

As the government company tasked with operating, maintaining and modernising England's motorway and all-purpose trunk road network (the 'strategic road network'), Highways England has an important role to play in delivering these commitments.

We have been collecting data on carbon emissions from our supply chain construction and maintenance contractors since 2008-09 through our carbon accounting tool. This process has allowed us to build up a database of carbon emissions for the construction and maintenance activities undertaken on our road network.

We launched the carbon tool in its current form at the start of the first Road Investment Strategy (RIS 1). The emphasis on reducing carbon emissions is continued in RIS 2, which includes a performance indicator on supply chain carbon emissions. We must measure the carbon associated with our supply chain.

As one of our supply chain members, you shall complete the carbon tool as completely and accurately as possible for the entirety of the contract or project. The data you input into the tool is known as your carbon return.

These carbon returns shall be sent to our team at Highways England on either a quarterly or monthly basis to allow us to monitor and report carbon emissions. Asset Delivery and other area based contracts shall make appropriate arrangements to submit a single area return to Highways England for each quarter by co-ordinating the receipt of carbon data from sub-contractors¹. The carbon data is reported with spend figures to determine the intensity of carbon per value of work.

This guidance document is intended to be a concise and informative guide containing all the information you need to collect the correct data and use our carbon tool.

¹ A spreadsheet that allows import of the sub-contractor carbon returns is available on request from the sustainability inbox.

2. Data Collection Process

2.1. Prompt and accurate carbon returns shall be provided to Highways England².

2.1.1. The carbon tool and guidance are designed to make the data collection process as simple as possible. This includes:

- Keeping all data in **one tool**;
- Designating **responsibility** and **timescales**;
- Familiar **data categories**;
- Improving **awareness**; and
- Enabling **accuracy**.

The Tool

2.2. The carbon tool is based in Microsoft Excel (Excel), and all of your data will be collected in one Excel file. This Excel file shall be used by all construction and maintenance contractors in our supply chain.

2.3. The data shall be exported and sent to sustainability@highwaysengland.co.uk where the carbon returns are then processed and interpreted.

Responsibility

2.4. Each project or contract shall have a designated person or persons responsible for completing the carbon returns and sending these to Highways England.

2.5. The designated person shall:

- Read this guidance document;
- Collect the required data;
- Keep records of the data sources used;
- Input the data into the carbon tool; and
- Send the completed tool output to Highways England.

2.6. An accurate carbon return shall be sent each month or quarter, depending on preference, throughout the contract period by the main contractors in our supply chain.

NOTE: Quarters are based on the financial year as follows:

- *Quarter 1 – April, May, June;*

² Asset Delivery and other area based contracts shall make appropriate arrangements to submit a single area return to Highways England for each quarter by co-ordinating the receipt of carbon data from sub-contractors

- Quarter 2 – July, August, September;
- Quarter 3 – October, November, December; and
- Quarter 4 – January, February, March.

NOTE: Depending on your role, or the projects you are working on, you may be submitting data for more than one office or site. However, only one file is to be sent per contract per monthly / quarterly reporting period.

NOTE: In some instances, multiple contracts may form part of a larger project. In these cases, it may be suitable to combine multiple contracts into one carbon return. However, this should be agreed with Highways England.

2.7. The designated person shall keep copies of all data sources used to complete the tool (see Section 2.11 for appropriate data sources).

2.7.1. The designated person should liaise with staff from a variety of disciplines and locations as required to gather information to complete the carbon return.

NOTE: It may also be necessary for you to contact sub-contractors and your suppliers directly to obtain data. Further guidance on this is provided in Section 3.

NOTE: To assist you with collecting and recording the required data, a pro forma has been developed, and is provided in Appendix 1 at the end of this report.

Data categories

2.8. The designated person shall select the items appropriate to their contract or project from the drop-down menus contained within Excel cells.

2.8.1. The tool is split into ten categories, primarily based upon the Specification for Highways Works.

2.9. Data shall be collected and recorded in the most appropriate units (as shown in the tool and the pro forma).

NOTE: For example, kilowatt hours (kWh) for electricity, kilometres (km) for business travel, tonnes for asphalt, cubic metres (m³) for ready mixed concrete.

Raising staff awareness

2.10. The designated person shall inform colleagues at an early stage in the project of the data requirements for carbon returns including total spend for the month or quarter.

2.10.1. The designated person should provide colleagues with the pro forma, so that they understand what data they will need to provide.

2.10.2. Advance warning may help provide a more co-operative and efficient data collection process.

Data accuracy

2.11. Data shall come from reliable and auditable sources wherever possible to achieve accurate data on carbon emissions.

NOTE: Examples of sources could be delivery notes, invoices, receipts, bills, waste transfer notes or similar. We will be required to check the carbon returns for errors, and may need to look at these records.

NOTE: We understand that in a small number of instances estimation may be required. Where this is the case, data should be based upon professional judgement and should be as representative as possible. Where such estimation has taken place, the method of estimation should be recorded on the 'Notes' tab of the carbon tool.

2.11.1. The designated person may input their own carbon factor where more accurate data on carbon emissions is available. This includes a cell to state the methodology used to derive the carbon factor.

2.11.2. The designated person may pick the closest item on the list if the exact option is not available within the tool.

NOTE: Details on how to do this are given in Section 4 of this guidance document.

3. Data Categories

3.1. The designated person shall enter quantities of all the appropriate categories purchased and delivered to site or depot, people movement and waste removal into the tool.

3.1.1. These categories should help you to see where materials, and the carbon emissions associated with them, are used across a construction or maintenance contract.

NOTE: The data required by the tool is split into categories largely based upon the Specification for Highways Works.

NOTE: The tool calculates the carbon emissions associated with these categories, based on the quantities submitted within the return.

NOTE: Categories 1-7 can be considered as materials and Categories 8-10 can be considered as non-materials:

1. Bulk Materials
2. Earthworks
3. Fencing, Barriers and Road Restraint Systems
4. Drainage
5. Road Pavements
6. Street Furniture and Electrical Equipment
7. Civil Structures and Retaining Walls
8. Fuel, Electricity and Water
9. Business and Employee Transport
10. Waste

Materials

3.2. The designated person shall enter all materials or items which fall within categories 1 to 8 purchased for the construction or maintenance activity into the tool³.

3.2.1. The designated person should use data sources such as delivery notes, invoices, bills, receipts or similar.

NOTE: See Appendix 1 for a full list of materials and items included within the tool.

NOTE: The tool calculates carbon emissions by multiplying the quantities entered by a 'carbon factor'.

³ While the categories of materials and items should cover most of the things that are likely to be used on site, we recognise that new materials and items will emerge from time to time. If you find that a next nearest material doesn't exist to allow you to report, let us know. This will aid future revisions to the tool.

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- 3.2.2. The carbon factors may be viewed in the tool, and if necessary, you may enter your own custom 'carbon factor'.

NOTE: Section 4 of this guidance document provides further details on this.

Material Transport

- 3.3. The designated person shall also enter the transport distance.

- 3.3.1. The transport distance is the **single one-way** distance between the location of the supplier to the site location/point of deposition.

NOTE: This could be at your construction site or a storage depot within your maintenance area for example.

- 3.3.2. The tool factors in the return journeys automatically, and calculates how many journeys would be needed to move the quantity of materials you have already entered.

*NOTE: When entering the distance from the supplier to the site there is no need to do any additional calculation for multiple journeys. Simply enter the distance of a **single one-way** journey from the supplier to the location where they deposit the item.*

NOTE: The onward emissions from transport of materials around your own site or maintenance area is accounted for in your fuel use in the Fuel, Electricity and Water category.

Bulk Materials

- 3.4. The designated person shall enter the quantity of bulk material purchased, and the transport distance. They shall also assign estimates of where these materials were used on site, and provide a forecast of the quantity to be delivered for the next reporting period.

NOTE: Bulk Materials, contains items which are likely to make up a significant proportion of the overall carbon emissions.

NOTE: This category requires some extra detail due to the increased relative importance of these materials to your carbon return.

- 3.5. The tool presents a range of typical concrete types. Selecting data for a specific cement content in the concrete type will give much greater accuracy than selecting a 'general' value. Where possible the designated person shall identify the specific cement content used, select the appropriate option from the tool or enter a custom carbon factor if an appropriate option is not available. If additional cement is added to ready mix concrete this should be added separately in the cement item.

Assigning Bulk Materials

- 3.6. The designated person shall assign the percentage of materials entered in the bulk materials category to the other categories in the tool.

NOTE: This is covered in detail in the step by step guide in Section 4 of this guidance document

Forecasting Bulk Materials

- 3.7. The designated person shall input the forecast for bulk materials likely to be delivered in the next return period.

NOTE: The forecast of bulk materials helps Highways England to see that the supply chain is considering its future materials use. Carbon accounting should be a process through which the sources of carbon emissions are identified, and measures considered to reduce them where possible.

NOTE: Forecasts should be based upon the contract programme and/or planned activities in the next month or quarter using the best available estimate and information.

Fuel, Energy and Water

Site offices, Site Vehicles and Plant Energy

- 3.8. Reporting for a **construction project**: the designated person shall record the fuels and electricity used in all buildings, vehicles and plant on site.

NOTE: This includes the site office, on-site accommodation and any other buildings on the site involved in the contract. This includes those that are directly operated by the main contractor and those operated by subcontractors.

NOTE: Any buildings owned or occupied by the reporting contractor and subcontractors but not at the construction site are not included, for example head offices.

- 3.9. Reporting for a **maintenance area**: the designated person shall record the fuels and electricity from all buildings, vehicles and plant in the maintenance area involved in the contract.

NOTE: This includes site offices, storage depots and all other buildings in the maintenance area involved in the contract. Any buildings owned by the reporting contractor but not within the maintenance area are not included, for example head offices.

Water

- 3.10. The designated person shall include all water used in construction/maintenance activities and water used in welfare facilities.

NOTE: This includes separate reporting of metered (mains), tankered and abstracted water.

Business and Employee Transport

- 3.11. The designated person shall enter all transport relating to business using the “Business Transport” option.

NOTE: The value entered should be the total summed km travelled from all business travel journeys by type (mode).

- 3.12. The designated person shall enter the distance travelled by all employees from their place of residence to site/depot using the “Employee Commuting” option.

NOTE: You should include both those directly employed by the reporting contractor and tier 1 subcontractors working on your site. If this data is not currently recorded by the reporting contractor, you may have to conduct a short survey of staff on site (or a sample of) to make an estimation based on the best available information.

NOTE: The value entered should be the total summed km travelled from all employee commuting journeys by type (mode).

Waste Disposal and Transport

- 3.13. The designated person shall enter all waste exported off site into the tool.

NOTE: See Appendix 1 for the types of waste included in the tool.

*NOTE: As with the transport of materials, the transport calculations for waste only requires you to include a **single one-way** distance from site/depot to the location of the waste disposal.*

Figure 1, Scope of Carbon Emissions Included in the Carbon Tool, outlines the carbon emission sources included in the tool. The flow chart at the top of the figure outlines the key sources of emissions associated with Highways England construction and maintenance supply chain contracts. The boxes below the flow chart show how these carbon emission sources relate to the input categories within the tool.

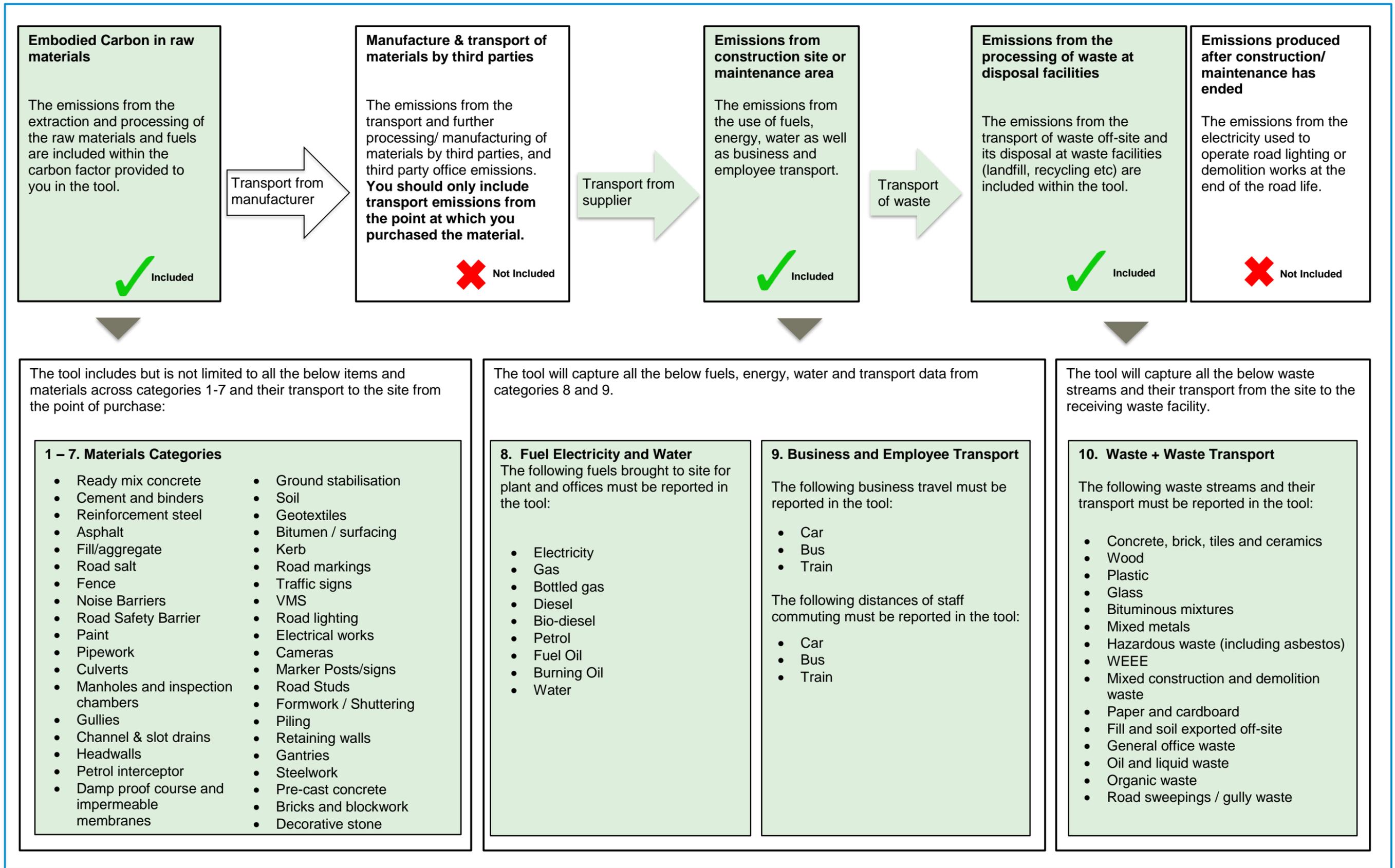
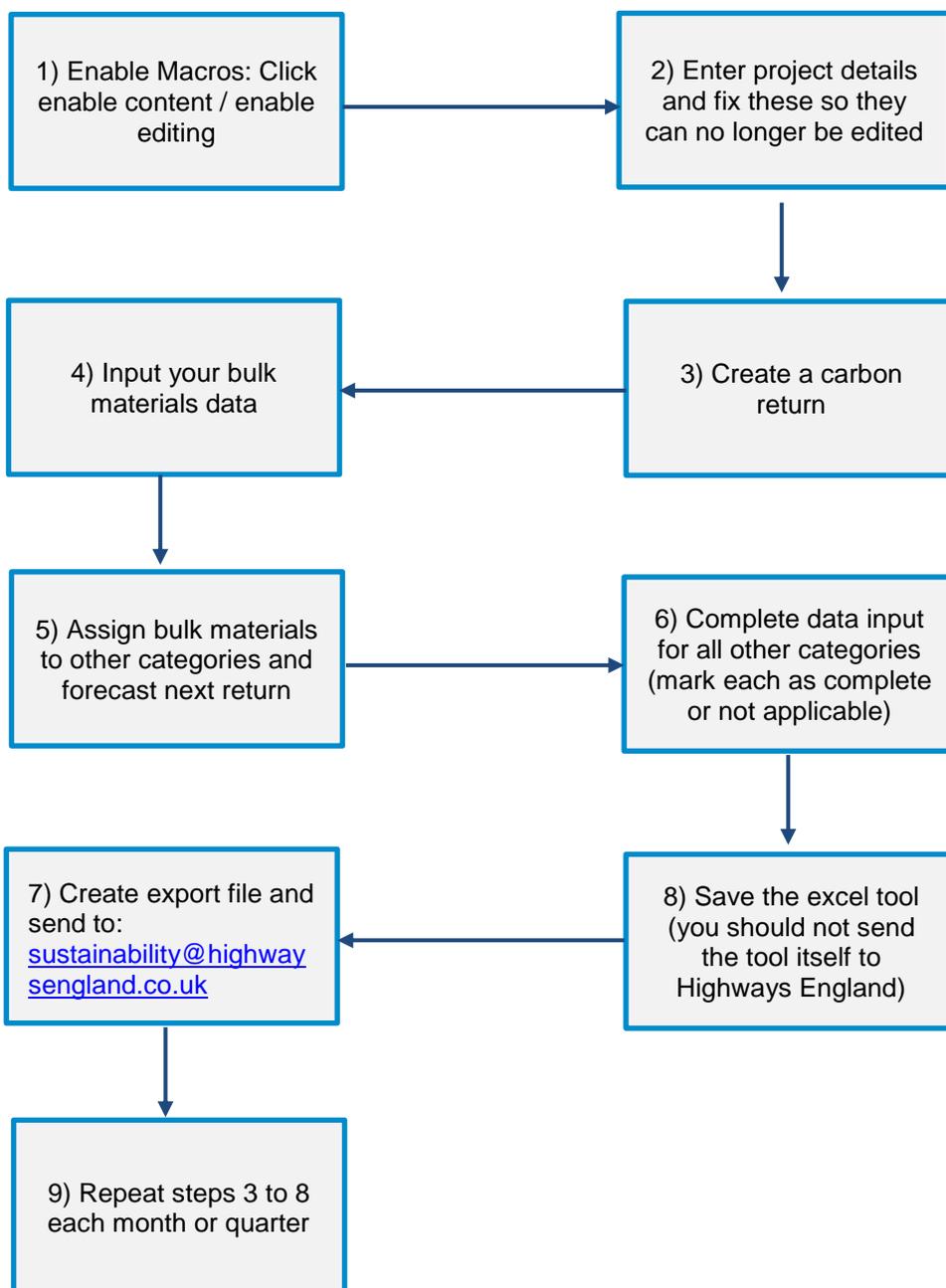


Figure 1: Scope of Carbon Emissions Included in the Carbon Tool

4. Using the Tool

4.1 This section of the guidance provides an overview of the tool and a step by step guide to inputting your data.

Summary Flow Chart



Overview of the Tool

- 4.2 The Carbon Tool is centred around the 'Home Page'; from there you can create your 'carbon returns'.

The designated person should enter data including total spend for the period of the return.

NOTE: Returns can be saved and resumed to continue data entry.

Once a carbon return is created or resumed, the second row of buttons at the top of the page will appear which take you to the ten data category pages within which the designated person shall enter the data.

NOTE: These have already been shown in Section 3, but as a reminder, these are:

1. *Bulk Materials*
2. *Earthworks*
3. *Fencing, Barriers and Road Restraint Systems*
4. *Drainage*
5. *Road Pavements*
6. *Street Furniture and Electrical Equipment*
7. *Civil Structures and Retaining Walls*
8. *Fuel, Electricity and Water*
9. *Business and Employee Transport*
10. *Waste*

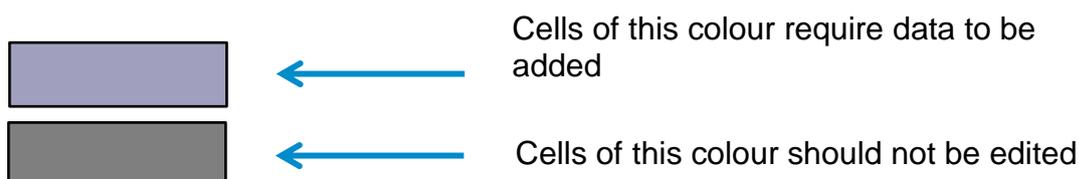
If a category is not relevant for your project or contract, you can 'switch it off' by clicking the category title in the table at the bottom of the Home Page.

NOTE: Once you click the category it will turn the cells below that category grey, indicating that data is not required for this category in carbon returns you submit.

The designated person shall input data into all cells that have purple formatting.

NOTE: Some purple formatted cells are drop down options that require you to select an option; others will require you to input a number or some text.

NOTE: Some purple cells will change to grey when they do not need to be filled in. Do not try to edit grey cells.



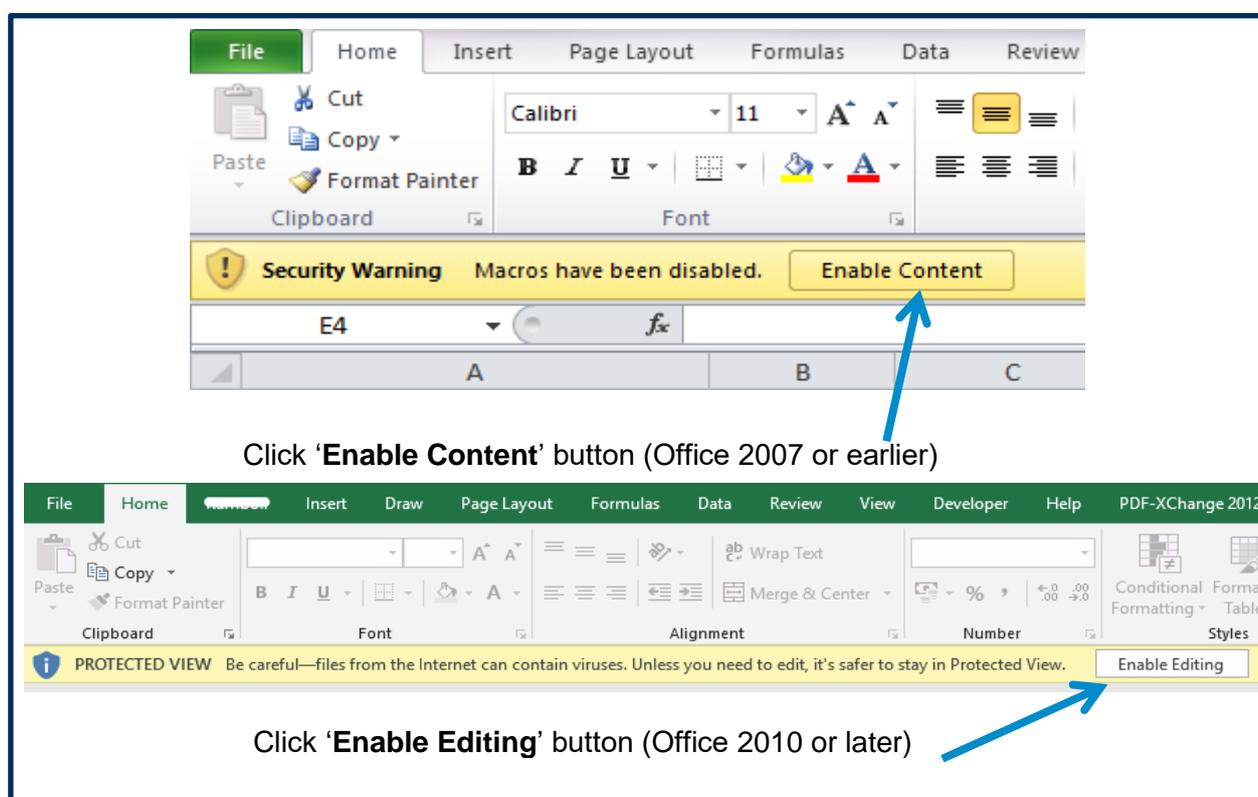
4.3 The designated person shall follow the step-by-step guide when using the tool for the first time and should refer to this guide for subsequent entries as required.

Step 1) Enable Macros / Editing

The first step is to enable macros / Editing.

- If you are using an Excel version of 2007 or earlier, click the 'Enable Content' button on the yellow banner at the top of any page when you first open the tool. Once you have clicked this button, the banner should disappear and you can begin using the tool.
- If you are using an Excel version of 2010 or later, click the 'Enable Editing' button on the yellow banner instead.

NOTE: The worksheet may take a short while to load once macros have been enabled.



NOTE: If the yellow banner does not appear and the tool does not function properly, this is due to your Excel settings.

- Check that your Excel does not automatically disable macros without informing you and enable macros manually:
 (Office 2003 or earlier) Tools > Macro > Security > Security level: Medium
 (Office 2007 or later) File > Options > Trust Centre > Trust Centre Settings > Macro Settings > Enable all macros.
- Close and re-open the document and follow Step 1 as normal

If macros are automatically enabled then no action is required, move to Step 2.

Step 2) Project Details

Now that you have enabled macros, the buttons at the top of the page will work. These buttons allow you to move between pages in the tool.

NOTE: In addition to this guidance document, there is a separate guidance page within the tool. You should quickly read the in-tool guidance to refresh your knowledge of the tool, and refer to it when needed.

After reading the guidance, begin your carbon return at the 'Home Page'. You shall enter the project details in the purple formatted cells – as outlined in 4.2.

These questions can only be filled in **once per contract/project** and **cannot be edited once you fix your project details which is required before you can submit your first quarter/month of data to Highways England**. This includes the choice of entering your carbon returns monthly or quarterly. Once you have entered your project details you shall click the 'Fix Project Details' button to save these details. Please ensure they are correct as they can no longer be edited. Please note the contract end date and value can still be edited once the details have been fixed.

Project Details	
Contractor Name:	
Project / Contract Name:	
Contract Type:	
Return Frequency:	
Contract Location:	
Contract Activity:	
Type of Construction:	
Lane km Maintained:	
Contract Start Date:	dd/mm/yyyy
Contract End Date:	dd/mm/yyyy
Contract Value (£):	£0

Click each cell in the project details section and enter the required information.

NOTE: the contents of the table may alter as you enter data to ensure you are only asked for the applicable data for your contract.

In some of the cells you shall enter text, in others you will select from a drop-down list. The final question asks how many lane km are constructed or maintained.

- For **maintenance contracts**: include **all lane km** involved in the contract.
 - For example, if you are maintaining 50km of 4 lane motorway and 100km of dual carriage way for both directions of travel, the total would be 800 lane km of maintenance $((50 \times 4) + (100 \times 2)) \times 2$
- For **construction projects**: include **all new lanes constructed**, but please do not include lanes on the stretch of road that are not part of the construction or only subject to minor works (works lasting 3 days or less).
 - For example, for a widening or smart motorway project, include the length of new lanes created or the hard shoulder converted but not lanes subject to minor works.

Step 3) Create a Carbon Return

Next, from the 'Home Page' you will need to click 'Add new return'. This will bring up a box where you will need to input the relevant year and month (e.g. 2020-01 for January 2020) or financial quarter (e.g. 2019 Q4 for January to March 2020) for which you are reporting. This will then appear as a line in the table on the Home Page. Enter 'estimated spend in the return period' in pounds Sterling.

As your project or contract progresses and you enter multiple carbon returns, they will all be saved here.

Once you have created a carbon return you can close the tool down, re-open it and enter your data into the tool at any time by clicking resume. The tool autosaves when it is closed.

Add new return

←

Click the **'Add new return'** button and your new carbon return will be added to the table below. The blue line signifies which return you currently have open. This will be useful once you have multiple returns saved in this file.

Create export file

Return Period	Return Status	Click a category to switch it on / off...										Options			Estimated spend in return period (£)	
		Bulk Materials	Earthworks	Fencing, Barriers & Road Restraint Systems	Drainage	Road Pavements	Street Furniture & Electrical Equipment	Civils Structures & Retaining Walls	Fuel, Energy & Water	Business and Employee Transport	Waste	Resume	Restart	Delete		
2019 Feb	Not Started	-	-	-	-	-	-	-	-	-	-	-	-	-	-	£0

NOTE: The blue line around the carbon return shows which return you currently have loaded and active, as you add multiple returns this will help you keep track of which return you are inputting data into.

Step 4) Inputting Data - Start with Bulk Materials

Now that you have created a carbon return, you shall enter the data into each of the pages which are accessible from the second row of buttons at the top of the page.

You shall **start with the bulk materials page**. This contains the materials which are likely to make up a significant proportion of the overall carbon emissions. For each material you need to click 'standard carbon factor' under the 'add new row' heading and enter the information required in the purple cells.

Standard carbon factor

2020 Jan - Mar - Bulk Materials

Mark page as complete | Delete selected row | Show / hide methodology column | Total CO2e: 0.000 Tonnes

Add new row: Standard carbon factor | Custom carbon factor

Material / Product							Assign % of total quantity to categories						Transport				Forecast	
Item	Type	Unit	This Return Quantity	Carbon Factor Value	Carbon Factor Unit	Conversion Factor	This Return tCO2e	Not Allocated %	Fencing %	Drainage %	Road Pavements %	Civils Structures %	Waste %	Transport mode	Transport distance value (km)	Carbon Factor tCO2e/Lkm	This Return tCO2e	Next Return Quantity Forecast
								100.00%										

Some cells will require you to select an option from a drop-down list

Some cells will require you to enter a number

Custom carbon factor

If you believe you have a more accurate or representative carbon factor than the one shown in the tool, you should click the 'custom carbon factor' button which will allow you to put in your own carbon factor. More of the cells in the row turn purple, and you should enter information in to each of these, including the methodology as to where the factor came from and why it has been used. The default carbon factor value for the transport carbon emissions is still provided if you do not want to use your own value.

2020 Jan - Mar - Bulk Materials

Mark page as complete | Delete selected row | Show / hide methodology column | Total CO2e: 0.000 Tonnes

Add new row: Standard carbon factor | Custom carbon factor

Material / Product							Assign % of total quantity to categories						Transport				Forecast		
Item	Type	Unit	This Return Quantity	Carbon Factor Value	Carbon Factor Unit	Conversion Factor	This Return tCO2e	Methodology	Not Allocated %	Fencing %	Drainage %	Road Pavements %	Civils Structures %	Waste %	Transport mode	Transport distance value (km)	Carbon Factor tCO2e/Lkm	This Return tCO2e	Next Return Quantity Forecast
									100.00%										

Input unit here for the custom carbon factor

Input detail on the methodology used to produce the custom carbon factor for verification and auditing purposes

Step 5) Bulk Materials - Forecasting and Assigning to Other Categories

The Bulk Materials category works slightly differently to the other nine categories in the tool. It requires two extra steps as shown below. These steps will not be required in the rest of the tool.

Assigning materials to the other categories

You will need to assign the percentage of materials you have entered in the bulk materials category to the other categories in the tool, using the best available information or estimation. You **do not need to input these into each category separately**.

For example, out of 100 tonnes of concrete delivered during a given period, 20% might have been for drainage, 30% for road pavements and 50% for structures. This data will then be carried over to the appropriate categories automatically by the tool, so that you are reminded of the materials which you have already entered.

NOTE: Some items constructed on site do not appear as separate options in the tool. These are captured by assigning the bulk materials to the relevant category, for example, concrete elements made on site such as slip formed concrete step barriers or in-situ concrete piles.

Forecasting

You will need to forecast how much of the bulk materials you are likely to have delivered in the next reporting period.

For example, you may have had 137 tonnes of asphalt delivered during the current quarter/month and be expecting approximately 200 tonnes for the next quarter/month.

Assign % of total quantity to categories						Transport				Forecast
Not Allocated %	Fencing %	Drainage %	Road Pavements %	Civils Structures %	Waste %	Transport mode	Transport distance value (km)	Carbon Factor (tCO ₂ e/t.km)	This Return tCO ₂ e	Next Return Quantity Forecast
100.00%										

↑
Input an approximate % of the material used in each category here.

↑
Input the approximate quantity of the bulk material expected next quarter/month

Once you have entered all your data into the bulk materials category, please double check your data inputs are correct and no row in between data inputs is left empty. Then click the **'Mark page as complete'** tick box on the top left of each page.

Step 6) Complete Carbon Return

When you have completed the Bulk materials, repeat the process for Step 4 for each of the nine categories which are relevant to your project or contract. **If the exact item you have is not available in the drop-down list, choose the closest option available.**

For example, if you have a 475mm pipe and the tool only has 450mm pipe then choose this. You shall also record the mode of transport and the distance from the supplier to your site for each item (only include the one-way distance, the tool automatically calculates the return journey of the supplier's transport).

As you complete each category, you should **click the 'Mark page as complete' box** at the top of the page and move onto the next category. When you have finished inputting your data, click the Home Page button to return to the front screen.

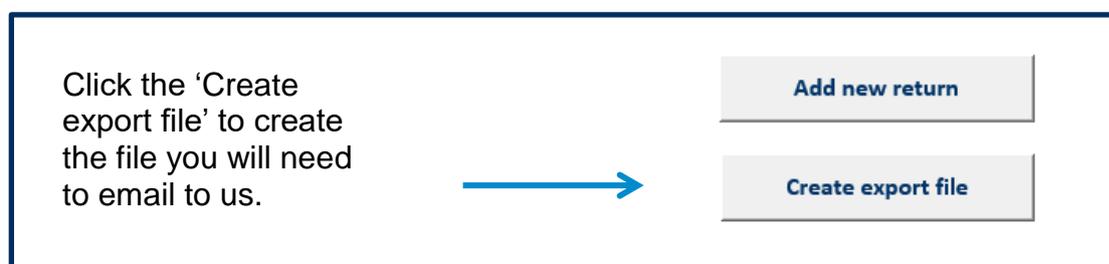
The carbon return you have just entered will now be marked as 'Complete' and highlighted as green. If it is not, check each of the categories again, making sure you have entered the necessary data and ticked each category as complete.

Step 7) Create Export file and Email to Highways England

Once you have finished inputting your data and returned to the Home Page, you should click the 'Create export file' button. This will generate an export file (which has a '.rct' file extension) which you will automatically be saved into the same folder that the carbon tool is saved in. You need to email the export file to us at the following address:

sustainability@highwaysengland.co.uk

The export file will not open directly, Highways England will open the .rct file upon receipt.



Step 8) Save the Tool

Save the completed tool on your computer to use for the next return. All returns for a contract shall be saved in the same excel file. The tool autosaves when it is closed.

You shall not send the tool itself to Highways England, only the export '.rct' file.

Step 9) Next Carbon Return

Open up the file you saved last month/quarter.

Click on 'Home Page' > 'Add new return' > Check that the date is correct > click 'Add'.

This will now appear in the table along with your other completed carbon returns. Follow the same steps outlined in this guide to enter your data and create a new export file to send to Highways England.

5. What Happens Next?

Notes

- 5.1 There is a function in the carbon tool to send notes to Highways England. This can be accessed from the 'Notes' button on the top right of the tool. First you need to select which carbon return you wish to add a note about from the drop-down list, then enter text in the large grey cell. Once you have finished writing your note click save.

NOTE: The notes you enter into this part of the tool are exported with your data and sent to Highways England.

An example of a note you might add is to identify why you believe there were particularly high or low carbon emissions for a particular carbon return or to identify some materials you added to the tool under the closest available match because the exact material was not available as an option. If you estimated any data your method of estimation should be recorded in notes.

Summary Report

- 5.2 The designated person may view or print a summary of the carbon return data. To do this, click on the 'Summary Report' button at the top of the page.

NOTE: This report contains a summary of your overall emissions compared to a baseline.

Collation and Analysis of Results

- 5.3 Once you have created your export file and sent this to Highways England, your results will be analysed. This analysis will look at how complete and accurate the carbon return is as well as the total carbon emissions.

Highways England's supply chain performance will be monitored and reported upon internally. Ultimately this will inform our decision-making processes as we drive towards reducing our carbon emissions.

Auditing and Verification of Carbon Returns

- 5.4 You may be asked to take part in our verification process. This will be carried out periodically to check the accuracy and validity of the data Highways England collect. This will involve checking the data you are inputting into the tool and assisting you to improve the accuracy of your carbon returns where possible.

Continued collaboration with our supply chain

- 5.5 Our carbon tool has been developed taking account of feedback from suppliers that use the tool to ensure it makes the carbon reporting process as easy as possible for you, whilst ensuring we receive the data we need.

We would like to thank the members of our supply chain that assisted with this process and welcome continued feedback from our supply chain community.

If you have comments on how we can improve the carbon tool further, would like to take part in training, or if you require assistance in using the tool or following this guidance, let us know by contacting sustainability@highwaysengland.co.uk

FAQs

1) I'm not sure if the carbon tool records quarters in financial years or calendar years. Can you advise?

When you add a new return a 'pop up' will appear. If you are submitting a quarterly return then please be aware that quarters are fiscal, so relate to the financial year. In 2020-21, for example the quarters are as follows:

2020 Q1: April to June, 2020

2020 Q2: July to September, 2020

2020 Q3: October to December, 2020

2020 Q4: January to March, 2021

2) I can't find where the export file has saved to, where should I look?

The tool autosaves to the file location where the carbon tool spreadsheet is saved. The tool also provides an option of opening the file location once you have created an export file so you can see where it has been saved.

3) Why is my transport carbon so high?

The transport distance required by the tool is the distance between the location of the supplier to the site location / point of deposition. This is just a one-way distance for a single journey because the carbon tool automatically estimates the number of trips and return journeys based on the quantity of material. If your transport emissions are particularly high, it might be because you have entered more than the distance of one journey from the supplier to the site / point of deposition.

4) We have a company carbon report; can't I just submit this?

The aim of the Carbon Tool is to produce a carbon account for the Highways England construction and maintenance supply chain. A company carbon report will have a different scope (include different things). The carbon tool standardises the approach across the Highways England supply chain.

5) I have carbon figures for the product I am using already, what should I do?

There is an option to submit custom carbon factors should you have these accessible to you. The custom carbon factor used must be based on reliable evidence, therefore any custom carbon factors require a methodology description to aid validation and verification efforts.

6) Why am I required to send an export file, can't I just send the spreadsheet?

The spreadsheet is your carbon account to use for the duration of your contract. It should be used to create each carbon return (monthly or quarterly). Highways England only require the export file for each carbon return. These are loaded into a master spreadsheet to allow each contract to be reviewed and collate the data to provide the national picture.

7) My carbon return is high, what should I do to reduce it?

Larger projects will inevitably have higher carbon emissions associated with them. The reason for a high amount of carbon may be due to a large amount of materials, fuel or energy use. Or it could be due to business and employee travel, the distance items are being transported (see Q3) or the way that waste is being disposed of. You must keep carbon returns as accurate as possible. These will be quality checked and measures to reduce carbon will be identified upon review of the carbon returns for the supply chain.

There are many things that you can do to reduce carbon, and many carbon saving opportunities may also save money. If you would like to discuss carbon saving opportunities further, please contact sustainability@highwaysengland.co.uk.

8) Most of the carbon seems to be associated with just a few categories of materials, why is this?

The carbon emissions for different items in the tool varies considerably. This is dependent on a number of factors for example the energy and fuels associated with the extraction of raw materials and production. Some of the data categories you can enter into the tool may not be applicable for your contract, but please do check that you have entered all the relevant information for your contract.

9) I can't enter data in the tool, what am I doing wrong?

There are a number of reasons that you might not be able to enter data into the tool. Please ensure you have read through this guidance document thoroughly, for example have you enabled macros?

If you have followed the guidance and still cannot enter data please let us know by contacting: sustainability@highwaysengland.co.uk

10) I am experiencing an error message, or the spreadsheet has become corrupted? Can I start using a new copy of the carbon tool?

If your copy of the spreadsheet has become corrupted for some reason, you should first try closing and reopening the tool to see if this solves the problem.

If the problems persist you can use a new copy of the spreadsheet for your next carbon return. However, **in the project on the home page you must enter your contract name with 'Tool No. 2' added to the end of the name.** This will ensure we can identify your new export files correctly when you email them to us. You must not duplicate carbon returns that you had already provided in the previous copy of the spreadsheet you were using. If an error message occurs, press ok, close the tool and re-open it. If the error message occurs again, please email a copy of the spreadsheet and a screenshot of the error message to: sustainability@highwaysengland.co.uk

11) If I delete a carbon return from my carbon tool spreadsheet will Highways England be notified of this update?

Yes, if you delete a carbon return from your carbon tool, when you next send us your export file this will update our records to remove the carbon return(s) you have deleted. Therefore, be careful to only delete carbon returns that were submitted in error. We must have a carbon return for each return period (either quarters or months) for your whole contract period.

12) Can I edit returns I have already submitted previously?

If you wish to edit data from previous carbon returns just click resume on the relevant carbon return from the home page and then update the data in the relevant category, this will then update in on our records next time you submit your export file to us. You should not edit data from previous years.

13) The carbon tool is running slowly, and I get a 'spinning wheel' or error messages?

The 'spinning wheel' and error messages may indicate that your computer is consuming significant CPU resources. This may be for a variety of reasons. It may help to open the carbon tool when you are not working on other documents.

14) I cannot create an export file to send to Highways England. What should I do?

If you have correctly completed the carbon tool you should press the 'Create export file' button on the Home Page. If you are unable to do this you may need to fix project details, by pressing the 'Fix project detail' button on the Home Page. Please also check that you have marked the material category pages as complete, or switched categories off on the Home Page where they are not relevant, before creating an export file.

15) The data I have entered is not displaying in the 'Summary Report'?

Please check that you have marked each material category page as complete by checking the 'Mark page as complete' box on each page.

Appendix 1 – Data Collection Pro-forma

To complete the Highways England carbon tool, you may need the following information. You do not need to fill in every box, just the items appropriate to your project or maintenance area.

1. Bulk Materials

Item	Type	Unit	Quantity this period	Quantity next period	Transport distance (km)
Ready mix concrete	General	m ³			
	General C6/8 (Gen 0, ST1)	m ³			
	General C8/10 (Gen 1, ST 2)	m ³			
	General C12/15 (Gen 2, ST 3)	m ³			
	General C16/20 (Gen 3, ST 4)	m ³			
	General C20/25 (ST 5)	m ³			
	General C25/30	m ³			
	General C28/35	m ³			
	General C32/40	m ³			
	General C35/45				
	General C40/50	m ³			
	100% CEM I - C6/8 (Gen 0, ST1)	m ³			
	100% CEM I - C8/10 (Gen 1, ST 2)	m ³			
	100% CEM I - C12/15 (Gen 2, ST 3)	m ³			
	100% CEM I - C16/20 (Gen 3, ST 4)	m ³			
	100% CEM I - C20/25 (ST 5)	m ³			
	100% CEM I - C25/30	m ³			
	100% CEM I - C28/35	m ³			
	100% CEM I - C32/40	m ³			
	100% CEM I - C35/45	m ³			
	100% CEM I - C40/50	m ³			
14% Limestone replacement - C6/8 (Gen 0, ST1)	m ³				
14% Limestone replacement - C8/10 (Gen 1, ST 2)	m ³				

14% Limestone replacement - C12/15 (Gen 2, ST 3)	m ³			
14% Limestone replacement - C16/20 (Gen 3, ST 4)	m ³			
14% Limestone replacement - C20/25 (ST 5)	m ³			
14% Limestone replacement - C25/30	m ³			
14% Limestone replacement - C28/35	m ³			
14% Limestone replacement - C32/40	m ³			
14% Limestone replacement - C35/45	m ³			
14% Limestone replacement - C40/50	m ³			
35% natural pozzolanic ash replacement - C6/8 (Gen 0, ST1)	m ³			
35% natural pozzolanic ash replacement - C8/10 (Gen 1, ST 2)	m ³			
35% natural pozzolanic ash replacement - C12/15 (Gen 2, ST 3)	m ³			
35% natural pozzolanic ash replacement - C16/20 (Gen 3, ST 4)	m ³			
35% natural pozzolanic ash replacement - C20/25 (ST 5)	m ³			
35% natural pozzolanic ash replacement - C25/30	m ³			
35% natural pozzolanic ash replacement - C28/35	m ³			
35% natural pozzolanic ash replacement - C32/40	m ³			
35% natural pozzolanic ash replacement - C35/45	m ³			
35% natural pozzolanic ash replacement - C40/50	m ³			

	30% fly ash replacement - C6/8 (Gen 0, ST1)	m ³			
	30% fly ash replacement - C8/10 (Gen 1, ST 2)	m ³			
	30% fly ash replacement - C12/15 (Gen 2, ST 3)	m ³			
	30% fly ash replacement - C16/20 (Gen 3, ST 4)	m ³			
	30% fly ash replacement - C20/25 (ST 5)	m ³			
	30% fly ash replacement - C25/30	m ³			
	30% fly ash replacement - C28/35	m ³			
	30% fly ash replacement - C32/40	m ³			
	30% fly ash replacement - C35/45	m ³			
	30% fly ash replacement - C40/50	m ³			
	25% GGBS replacement - C6/8 (Gen 0, ST1)	m ³			
	25% GGBS replacement - C8/10 (Gen 1, ST 2)	m ³			
	25% GGBS replacement - C12/15 (Gen 2, ST 3)	m ³			
	25% GGBS replacement - C16/20 (Gen 3, ST 4)	m ³			
	25% GGBS replacement - C20/25 (ST 5)	m ³			
	25% GGBS replacement - C25/30	m ³			
	25% GGBS replacement - C28/35	m ³			
	25% GGBS replacement - C32/40	m ³			
	25% GGBS replacement - C35/45	m ³			
	25% GGBS replacement - C40/50	m ³			
Cement and binders	Average CEM I, Ordinary Portland Cement (OPC)	tonnes			
	CEM II-A-S - 13% GGBs	tonnes			

	CEM II/B-S - 28% GGBs	tonnes			
	CEM II/A-P - 13% natural pozzolanic ash	tonnes			
	CEM II/B-P 28% natural pozzolanic ash	tonnes			
	CEM II/A-V - 13% fly ash siliceous	tonnes			
	CEM II/B-V - 28% fly ash siliceous	tonnes			
	CEM II/A-W - 13% fly ash calcareous	tonnes			
	CEM II/B-W - 28% fly ash calcareous	tonnes			
	CEM II/A-L - 13% limestone	tonnes			
	CEM II/B-L - 28% limestone	tonnes			
	CEM II/A-LL - 13% limestone	tonnes			
	CEM II/B-LL - 28% limestone	tonnes			
	CEM II/A-M - 16% cement replacement	tonnes			
	CEM II/B-M - 28% cement replacement	tonnes			
	CEM III/A - 50.5% GGBS	tonnes			
	CEM III/B - 73% GGBS	tonnes			
	CEM III/C - 88% GGBS	tonnes			
	CEM IV/A - 23% cement replacement	tonnes			
	CEM IV/B - 46% cement replacement	tonnes			
	CEM V/A - 24% GGBS and 24% cement replacement	tonnes			
	CEM V/B - 36% GGBS and 36% cement replacement	tonnes			
Reinforcement steel	Steel bar and rod	tonnes			
Asphalt	General Asphalt	tonnes			
Fill, aggregate and sand	Site-won	tonnes			
	General mixture	tonnes			

	Recycled and secondary mixture	tonnes			
	Virgin mixture of land won and marine	tonnes			
	Virgin land won resources	tonnes			
	Virgin marine resources	tonnes			
	Recycled resources, no heat treatment	tonnes			
	Recycled resources, with heat treatment	tonnes			
	Expanded clay	tonnes			
	Expanded foamed glass	tonnes			
	Secondary resources	tonnes			
Road salt/grit	Road salt/grit	tonnes			

2. Earthworks

Item	Type	Unit	Quantity	Transport (km)
Imported Soil	General soil/top soil	tonnes		
	Stabilised soil - Cement, Fly Ash or GGBS	tonnes		
Site won soil/ muck shift	General soil	tonnes		
Ground stabilisation	Portland CEM I cement	tonnes		
	GGBS	tonnes		
	Fly ash	tonnes		
	Lime	tonnes		
Geotextiles	Polypropylene geotextile / matting	m ²		

3. Fencing, Barriers and Road Restraint Systems

Item	Type	Unit	Quantity	Transport (km)
Fence	Fence timber (by volume)	m ³		
	Timber rail fence (all types, includes posts)	metres		
	Timber panels and posts	no.		
	Steel/wire/chain fence (includes posts)	metres		
Noise Barriers	Timber barrier 2m	metres		

Item	Type	Unit	Quantity	Transport (km)
	Timber barrier 3m	metres		
	Timber barrier 4m	metres		
	Steel barrier 2m	metres		
	Steel barrier 3m	metres		
	Steel barrier 4m	metres		
	Aluminium barrier 2m	metres		
	Aluminium barrier 3m	metres		
	Aluminium barrier 4m	metres		
	Plastic barrier 2m	metres		
	Plastic barrier 3m	metres		
Plastic barrier 4m	metres			
Road Restraint System/ Safety Barrier	Steel RRS barrier single sided	metres		
	Steel RRS barrier double sided	metres		
	Pre-cast concrete step barrier	metres		
Paint or timber treatment	Solvent based paint	Litres		
	Water based paint	Litres		

4. Drainage

Item	Type	Unit	Quantity	Transport (km)
Plastic pipework (HDPE)	150mm diameter	metres		
	225mm diameter	metres		
	300mm diameter	metres		
	450mm diameter	metres		
	600mm diameter	metres		
	900mm diameter	metres		
	1200mm diameter	metres		
	1500mm diameter	metres		
	1800mm diameter	metres		
Plastic pipework (PVC)	150mm diameter	metres		
	225mm diameter	metres		
	300mm diameter	metres		
	450mm diameter	metres		

Item	Type	Unit	Quantity	Transport (km)
	600mm diameter	metres		
	900mm diameter	metres		
	1200mm diameter	metres		
	1500mm diameter	metres		
	1800mm diameter	metres		
Plastic pipework (Polypropylene)	150mm diameter	metres		
	225mm diameter	metres		
	300mm diameter	metres		
	450mm diameter	metres		
	600mm diameter	metres		
	900mm diameter	metres		
	1200mm diameter	metres		
	1500mm diameter	metres		
	1800mm diameter	metres		
Vitrified clay pipework	150mm diameter	metres		
	225mm diameter	metres		
	300mm diameter	metres		
Precast concrete circular pipework	225mm diameter	metres		
	300mm diameter	metres		
	450mm diameter	metres		
	600mm diameter	metres		
	900mm diameter	metres		
	1200mm diameter	metres		
	1500mm diameter	metres		
	1800mm diameter	metres		
	2100mm diameter	metres		
Corrugated Steel pipework	300mm diameter	metres		
	450mm diameter	metres		
	600mm diameter	metres		
	900mm diameter	metres		
	1200mm diameter	metres		
	1500mm diameter	metres		
	1800mm diameter	metres		
	2400mm diameter	metres		
	3000mm diameter	metres		
	3600mm diameter	metres		
Glass reinforced plastic GRP (Fibreglass) pipework	150mm diameter	metres		
	225mm diameter	metres		
	300mm diameter	metres		

Item	Type	Unit	Quantity	Transport (km)
	450mm diameter	metres		
	600mm diameter	metres		
	900mm diameter	metres		
	1200mm diameter	metres		
	1500mm diameter	metres		
	1800mm diameter	metres		
	2400mm diameter	metres		
Iron pipework	150mm diameter	metres		
	300mm diameter	metres		
	400mm diameter	metres		
Brick manholes and inspection chambers	Brick (includes mortar)	no.		
Precast concrete manholes	900mm diameter, up to 3m depth	no.		
	900mm diameter, 3m - 6m depth	no.		
	1050mm diameter, up to 3m depth	no.		
	1050mm diameter, 3m - 6m depth	no.		
	1200mm diameter, up to 3m depth	no.		
	1200mm diameter, 3m - 6m depth	no.		
	1500mm diameter, up to 3m depth	no.		
	1500mm diameter, 3m - 6m depth	no.		
	1800mm diameter, up to 3m depth	no.		
	1800mm diameter, 3m - 6m depth	no.		
	2400mm diameter, up to 3m depth	no.		
	2400mm diameter, 3m - 6m depth	no.		
	3000mm diameter, up to 3m depth	no.		
	3000mm diameter, 3m - 6m depth	no.		
	4000 diameter, up to 3m depth	no.		
	4000 diameter, 3m - 6m depth	no.		
Precast concrete inspection chambers	600mm diameter, up to 1.2m depth	no.		

Item	Type	Unit	Quantity	Transport (km)
	750mm diameter, up to 1.2m depth	no.		
	1000mm diameter, 1.2m - 3m depth	no.		
Plastic inspection chambers	450mm diameter, up to 1.2m depth	no.		
	600mm diameter, up to 1.2m depth	no.		
	600mm diameter, 1.2m - 3m depth	no.		
Gullies	Plastic gully pots - PVC	no.		
	Plastic gully pots - PE	no.		
	Plastic gully pots - PP	no.		
	Precast concrete gully pots	no.		
Channel & slot drains	Plastic (Polypropylene) channel (light duty)	metres		
	Precast concrete channel (heavy duty)	metres		
Headwalls	Brick (includes mortar)	no.		
Petrol interceptor	Plastic (Polyethylene)	no.		
	Glass reinforced plastic GRP (Fiberglass)	no.		
Damp proof course and impermeable membrane	Polyethylene membrane	m ²		

5. Pavements

Item	Type	Unit	Quantity	Transport (km)
Bitumen/ surface treatment	Straight-run bitumen	tonnes		
	High friction surfacing	tonnes		
Kerb	Pre-cast concrete 125x150mm	metres		
	Pre-cast concrete 125x255mm	metres		
	Pre-cast concrete 125x305mm	metres		
Road markings	Thermoplastic road marking	tonnes		

6. Street Furniture & Electrical Equipment

Item	Type	Unit	Quantity	Transport (km)
Traffic signs	Aluminium	m ²		
	Steel	m ²		
Variable Message Signs (VMS)	MS4 Sign	no.		
	AMI (advanced motorway indicator)	no.		
Road lighting and columns	LED light	no.		
	Steel columns 8m	no.		
	Steel columns 10m	no.		
	Steel columns 12m	no.		
	Aluminium columns 8m	no.		
	Aluminium columns 10m	no.		
	Aluminium columns 12m	no.		
Cable	Armoured cable / Power cable	metres		
	Miscellaneous cable	metres		
Cabinets	Average roadside cabinet	no.		
Cameras	Hard shoulder camera and steel pole	no.		
	Camera unit	no.		
Marker Posts/signs	Aluminium marker sign	no.		
	Plastic marker post	no.		
Road Studs	Any type	no.		
Handrail	Galvanised steel	tonnes		

7. Civils Structures & Retaining Walls

Item	Type	Unit	Quantity	Transport (km)
Formwork / Shuttering	Plywood	m ³		
	Softwood	m ³		
	Particle board	m ³		
	Plastic formwork (disposable)	tonnes		
Piling	Steel piles	tonnes		
	Pre-cast concrete piles	tonnes		
Retaining walls	Steel sheet piles	tonnes		
	Plastic sheet piles	tonnes		
	Gabion wall (stone and wire mesh)	tonnes		
Gantries	'Bendy Pole' MS4	no.		
	9m 'Flagpole' MS4	no.		
	14m ADS Tubular Cantilever	no.		
	19m Sign/Signal Cantilever	no.		
	Up to 33m Portal	no.		
	33m to 45m Portal	no.		
	45m to 57m Portal	no.		
57m plus Portal	no.			
Paint	General paint	Litres		
Steelwork	General steel	tonnes		
	Galvanised steel	tonnes		
Pre-cast Concrete	General concrete	tonnes		
	High strength concrete	tonnes		
Bricks and blockwork	Concrete blocks (includes mortar)	no.		
	Standard bricks (includes mortar)	no.		
Decorative stone	General stone	tonnes		

8. Fuel Electricity and Water

Item	Type	Unit	Quantity	Transport (km)
Site offices and plant energy use	Electricity	kWh		
	Gas	kWh		
	Bottled Gas	kg		
	Gas Oil (red diesel)	Litres		

Item	Type	Unit	Quantity	Transport (km)
	Petrol	Litres		
	Diesel	Litres		
	Biodiesel	Litres		
	Fuel Oil	Litres		
	Burning Oil / Kerosene	Litres		
Water	Mains	Litres		
	Abstracted	Litres		
	Transported (Tanker)	Litres		

9. Business and Employee Transport

Item	Type	Unit	Quantity
Business Travel	Private vehicle (any type)	km	
	Bus/coach	km	
	Train	km	
Employee commuting	Private vehicle (any type)	km	
	Bus/coach	km	
	Train	km	

10. Waste – Exported off-site

Waste	Disposal Method	Quantity (tonnes)	Distance Transported (km)
Mixed construction & demolition waste			
General office waste			
Organic waste			
Plastic			
Glass			
Concrete, brick, tiles and ceramics			
Wood/Timber			
Bituminous mixtures			
Mixed metals			
WEEE			

Waste	Disposal Method	Quantity (tonnes)	Distance Transported (km)
Paper and cardboard			
Aggregate and soil exported off-site			
Oil and liquid fuel waste			
Hazardous waste			
Road sweepings / gully waste			

NOTE: Disposal Methods vary with waste material and include: recycled, reuse off-site, incineration (with energy recovery), composting and, landfill.