

Quick guide:

Excel templates and add-in for bills of quantities

1 Introduction

As part of our digital strategy, we have developed a set of templates, as well as an add-in, that we can use to automate some of the processes involved in compiling and formatting bills of quantities (BoQs). By using these digital tools, we can deliver BoQs for tender documentation quickly and easily.

There are bill programs on the market that are based on database technology and that have some advantages over Microsoft Excel. Excel is commonly used in the engineering industry for the compilation of BoQs, however, and it may thus be difficult to transition to a bill program. Therefore, we have developed a set of templates and an add-in specifically for Excel. Using Excel has the following advantages:

- Most computer users who create BoQs are familiar with Excel and thus do not have to learn how to use a new or another computer program.
- No additional software licences have to be acquired.

The templates and add-in that we have developed, as well as the ways in which they are linked, are discussed in the sections that follow.

2 Excel template

BoQ templates have been compiled based on standard specifications like those of the Committee for Land Transport Officials (COLTO), South African National Standards (SANS), the Southern Africa Transport and Communications Commission (SATCC) and the City of Tshwane Metropolitan Municipality (CTMM). The templates are databases of payment items that are defined in the standard specifications and of items that have been used in BoQs for projects over many years.

Each of the templates consists of several worksheets (each section of the BoQ is a separate worksheet) and is set up in such a way that items can be selected from the existing database of payment items, or new items can be added to the worksheets, whenever a BoQ must be compiled for a new project. However, it is vital that the worksheets in the template be set up correctly so that the Excel add-in, which can do most of the formatting of the BoQ automatically, can work properly.

All the templates contain **BillTemplate**, **SumTemplate** and **Info** worksheets. When the databases of payment items are not applicable and consequently not used, and a new BoQ is created from scratch, these worksheets are automatically generated when the Excel add-in is run.

The purpose of the **BillTemplate**, **SumTemplate** and **Info** worksheets is explained below.

2.1 BillTemplate worksheet

In order for the Excel add-in to function as it should, information in the worksheets that make up the BoQ must be given in a specific format, and identified and tagged by means of specially developed identifiers. When the **BillTemplate** worksheet is selected, the following information is displayed:

	A	B	C	D	E	F	G	H	I	J	K	L
1	#BillSheet	Bill A:	Test									
2												
3	ColHDR	PAYMENT	ITEM	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT		RATE	AMOUNT	
4	ColHDR	REFERS	ITEM	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT		RATE	AMOUNT	
5	ColHDR	TO	NO									
6												
7												
8	NOTE											
9												
10	ITEM		#NAME?									
11												
12	ITEM1		#NAME?									
13												
14	ITEM2		#NAME?									
15												
16	ITEM3											
17												
18	IHDR		#NAME?									
19												
20	IHDR1		#NAME?									
21												
22	IHDR2		#NAME?									
23												
24	IHDR3		#NAME?									
25												
26												
27	PB											
28	PB		CARRIED FORWARD									
29	PB											
30	PB											
31	PB		BROUGHT FORWARD									
32	PB											
33												
34												
35	#BillEnd#											
36	#BillEnd#		TOTAL CARRIED TO SUMMARY PAGE									
37	#BillEnd#											
38												
39												
40												
41												

2.1.1 Identifiers

In Column A of the **BillTemplate** worksheet, the identifiers used in the templates are indicated. The identifiers are **#BillSheet#**, **ColHDR**, **NOTE**, **Item**, **Item1**, **Item2**, **Item3**, **IHDR**, **IHDR1**, **IHDR2**, **IHDR3**, **PB**, **#BillEnd#** and an **empty row** (see Row 39 in Column A). These identifiers are described below.

The **#BillSheet#** identifier specifies the start of each worksheet.

The **ColHDR** identifier shows the header rows that are to be repeated at the top of every page of the different worksheets of the BoQ. By default, there are three header rows, but the number of rows can be increased or decreased as necessary.

Note:

In Print Preview, the information tagged by means of **#BillSheet#** and **ColHDR** appears on every page.

The **NOTE** identifier is used to identify rows that should be displayed as notes in the worksheet.

The **Item**, **Item1**, **Item2**, **Item3**, **IHDR**, **IHDR1**, **IHDR2** and **IHDR3** identifiers are used to specify the structure in which payment items should be displayed in the BoQ. The following figure illustrates how the formatting of the text in Column D is affected by the different heading and item identifiers in Column A:

	A	B	D	E	F	G	H
1	#BillSheet#						SECTION 3
2	ColIHDR	PAYMENT					
3	ColIHDR	REFERS	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
4	ColIHDR	TO					
5	IHDR	1	Example				
6	item	1.1	Example	m	1		
7	IHDR1	1.1.1	Example				
8	item1	1.1.1.1	Example	m	1		
9	IHDR2	1.1.1.1.1	Example				
10	item2	1.1.1.1.1.1	Example	m	1		
11	IHDR3	1.1.1.1.1.1.1	Example				
12	item3	1.1.1.1.1.1.1.1	Example	m	1		
13							

The **PB** (page break) identifier is used to insert page breaks at the tops and bottoms of the pages of those worksheets that are spread over more than one page.

The **#BillEnd#** identifier indicates the ends of the various sections. All the sections in the template must end with this identifier so that the Excel add-in can determine where the different sections end.

The **empty row** identifier sets up the formatting for the empty rows that are added to the worksheets of the BoQ when the **Page Format** function of the Excel add-in is run.

2.1.2 Columns

In **Column B** through **Column K** of the **BillTemplate** worksheet, the format in which information is (or should be) set out in the worksheets of the BoQ is indicated.

In **Column B**, reference numbers can be added to link the items in the BoQ to payment items described in the standard specifications and/or project specifications.

Numbers for the payment items in the BoQ can be added in **Column C**. They can be added manually or by means of formulas that will enable the Excel add-in to generate the numbers automatically. Importantly, the numbers given in this column are not necessarily linked to the standard and/or project specifications: they are usually unique values that are used to identify, and differentiate between, the payment items in the BoQ.

Descriptions of the payment items can be inserted in **Column D**.

Note:

The length of the description that can be included in **Column D** is limited to the number of characters that Excel allows per cell.

In this template, cells set aside for the descriptions of payment items are formatted to wrap text. Consequently, these cells will automatically be resized vertically to ensure that the text in them fits the column width specified for **Column D**.

In **Column E**, the standard units in which items will be measured for payment are indicated.

Column F contains the estimated quantities that have been calculated for the various payment items.

Column G is not populated during the preparation of tender documents: the tenderer will insert his tendered rates for the payment items in this column at tender stage.

Column H is not populated during the preparation of tender documents: the tenderer will insert his tendered amounts for the different payment items in this column at tender stage.

Designers insert in **Column J** their estimated rates for the different payment items.

In **Column K**, the estimated amounts for the payment items are calculated. (The cells of this column contain formulas that calculate the estimated amounts automatically.)

2.2 SumTemplate worksheet

The **SumTemplate** worksheet is used to set up the formatting and formulas that are required to generate the summary page of the BoQ by means of the **Create Summary** function of the Excel add-in.

2.3 Info worksheet

In the **Info** worksheet, the page layout of the worksheets of the BoQ can be specified or changed by means of the settings indicated in the figure below:

	A	B	C	D	E	F	G	H	I	J
1	#BillInfo#	This sheet contains info that is used to set up the page layout								
2										
3	LeftHeader	X								
4	CenterHeader	Y								
5	RightHeader	Z								
6										
7	LeftFooter									
8	CenterFooter	Page &P								
9	RightFooter	Print date: &D								
10										
11	FirstPageNumber	1	must be numeric. The page numbers of the next selected sheets follow on this number							
12										
13	PrintTitleRows	\$1:\$4	Must be a row range e.g. "\$2:\$4"							
14										
15	LeftMargin	2	cm							
16	RightMargin	0.5	cm							
17	TopMargin	1.5	cm							
18	BottomMargin	1.5	cm							
19	HeaderMargin	0.5	cm							
20	FooterMargin	0.5	cm							
21										
22	#EndBillInfo#									

The different settings are **LeftHeader**, **CenterHeader**, **RightHeader**, **LeftFooter**, **CenterFooter**, **RightFooter**, **FirstPageNumber**, **PrintTitleRows**, **LeftMargin**, **RightMargin**, **TopMargin**, **BottomMargin**, **HeaderMargin** and **FooterMargin**. These settings are described below.

The settings [LeftHeader](#), [CenterHeader](#), [RightHeader](#), [LeftFooter](#), [CenterFooter](#) and [RightFooter](#) are used to add headers and footers to the left, in the centre, or to the right of the worksheets of the BoQ.

Note:

There are special codes that can be used to set parameters in the headers and footers. These codes, as well as descriptions of these codes, are given in the [Info](#) worksheet itself, just below the #EndBillInfo# row.

The [FirstPageNumber](#) setting is used to specify the number of the first page of the BoQ. Once the number of the first page is indicated, subsequent pages will be numbered automatically and sequentially.

The number of rows that appear on each page of the worksheets of the BoQ is specified by means of the [PrintTitleRows](#) setting.

The settings [LeftMargin](#), [RightMargin](#), [TopMargin](#) and [BottomMargin](#) are used to specify the margins of the pages of the worksheets of the BoQ.

The header and footer margins can be set by means of the [HeaderMargin](#) and [FooterMargin](#) settings.

Note:

The above-mentioned settings are applied to the selected worksheets as soon as the [Setup Pages](#) function of the Excel add-in is run for these worksheets.

2.4 Formatting of worksheets

The text, formatting and formulas inserted in the [BillTemplate](#) worksheet are automatically copied on to the worksheets of the BoQ when the [Page Format](#) function of the Excel add-in is run for those worksheets.

Note:

No formatting is linked to the **NOTE** identifier; the text in rows marked by means of this identifier is displayed exactly as it is shown in the cells of those rows themselves.

The widths of the columns on the pages of the worksheets of the BoQ must be adjusted manually. However, the column widths can be adjusted for several worksheets simultaneously if the worksheets are selected at the same time (grouped).

2.5 Altering, adding, and deleting of items

2.5.1 Changing of existing items

Existing payment items can be changed in either the [Page Format](#) view or the [Edit Format](#) view of the Excel add-in.

2.5.2 Adding of items

New items should be added in the [Edit Format](#) view of the Excel add-in. When new items are added, the rows of these items must be tagged by means of the identifiers indicated in the [BillTemplate](#) worksheet.

Note:

If no identifier is inserted in **Column A** and there is information in **Column D**, the information in **Column D** will be displayed in the **Edit Format** view, but not in the **Page Format** view. Adding items in this way is useful if notes, remarks or comments are to be added but not to be displayed in the final BoQ.

Calculations to determine the quantities to be added in **Column F** can be done to the right of **Column K**: the Excel add-in functions do not apply to these columns, which means that these columns can be used in the same way as any other Excel worksheet. However, the quantities that are calculated in these columns must not be linked to any other part of the worksheet or to any other worksheet, and should be typed in as values.

If **Column F**, **Column G** and **Column H** are left empty for the items under a heading (**IHDR**), the items and the heading are not displayed in the **Page Format** view.

2.5.3 Deleting of items

2.5.3.1 Deleting of columns

Circumstances may require that one of the columns in the template not be used. For example, if the BoQ is based on the standard specifications published by COLTO, **Column C** will not be used, because **Column B** will serve as **Column C**. In such a case, **Column C** must be hidden, and not deleted: if any column is deleted from the templates, the Excel add-in will no longer work as it should.

2.5.3.2 Deleting of worksheets

If there are worksheets in the templates that are not to be included in the BoQ, the information in **Column F**, **Column G** and **Column H** of these worksheets must be deleted. Once the **Page Format** function is run, the tabs of these worksheets will become yellow (instead of red). Worksheets of which the tabs are yellow are not included in the BoQ (while they remain part of the template) and appear neither in the summary page of the BoQ nor in the stripped bill or the priced bill.

3 Excel add-in

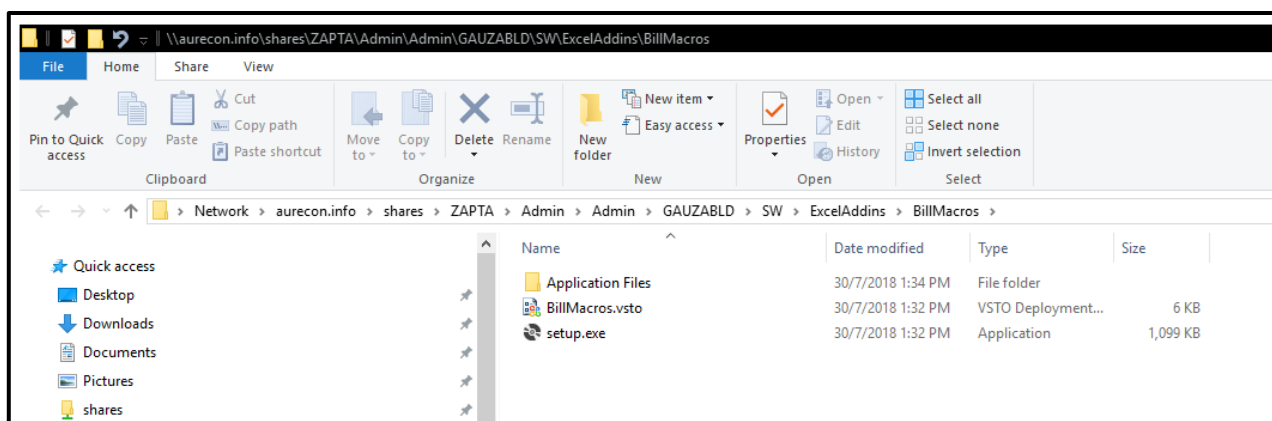
The Excel add-in applies the formatting and settings that are specified in the **BillTemplate**, **SumTemplate** and **Info** worksheets of the Excel template.

In the sections that follow, it is indicated how the add-in must be installed and updated, and what the various functions of the add-in are, and what they are used for.

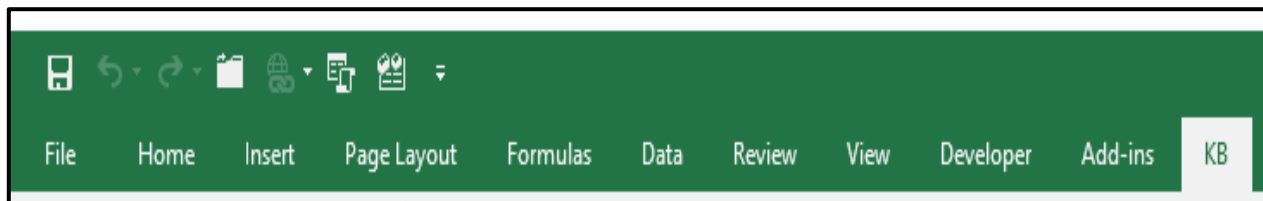
3.1 Installing of add-in

The installation file for the add-in can be found at the following location on the Aurecon server:

<\\aurecon.info\shares\ZAPTA\Admin\Admin\GAUZABLD\SW\ExcelAddins\BillMacros>



Once the add-in has been installed, a KB tab is visible in Excel's top toolbar (next to Add-ins):

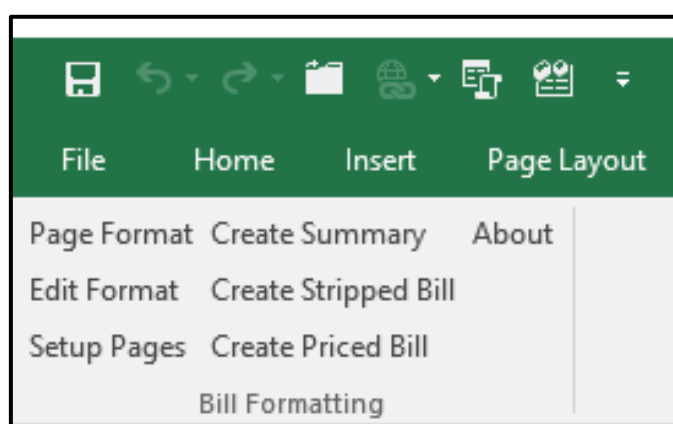


3.2 Updating of add-in

The add-in is updated automatically every time Excel is opened.

3.3 Functions of add-in

As soon as the KB tab is clicked, the following functions are made available in the ribbon:



The functions are [Page Format](#), [Edit Format](#), [Setup Pages](#), [Create Summary](#), [Create Stripped Bill](#), [Create Priced Bill](#) and [About](#). These functions are discussed below.

The [Page Format](#) function applies the formatting specified in the [BillTemplate](#) worksheet to the worksheets of the BoQ that have been selected. Once the formatting of all the rows in the sheet has been completed, a new view of the sheet appears, indicating what the selected worksheets will look like when printed.

The [Edit Format](#) function changes the view of the selected worksheets from [Page Format](#) to [Edit Format](#). In the [Edit Format](#) view, [Column A](#) of the selected worksheets of the BoQ is visible. Furthermore, the [Edit Format](#) view shows all the payments items that are included in the database of payment items that forms part of the Excel template. However, for the items to be displayed in the [Page Format](#) view, information must be added to [Column F](#), [Column G](#) and [Column H](#) of these items. If these three columns are empty, the items will not be displayed in the [Page Format](#) view, and will not be included in the final BoQ.

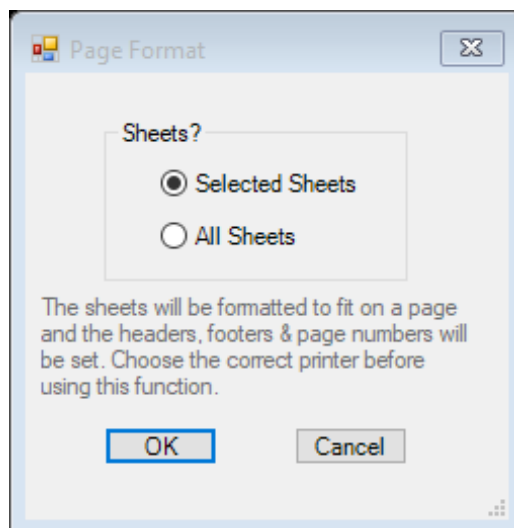
Note:

The only difference between the [Page Format](#) view and the [Edit Format](#) view is that the [Page Format](#) view adds empty rows between the payment items in the worksheets of the BoQ, while the [Edit Format](#) view deletes these empty rows. Neither view deletes any information from the worksheet.

The [Setup Pages](#) function applies the formatting that has been set up in the [Info](#) worksheet of the template to those worksheets of the BoQ that have been selected.

Note:

When the [Page Format](#), the [Edit Format](#) or the [Setup Pages](#) function is clicked, the following pop-up window appears:



When 'Selected Sheets' is selected, the function mentioned above is applied to those worksheets of the BoQ that have been selected.

If 'All Sheets' is selected, the function mentioned above is applied to all the worksheets of the BoQ.

The [Create Summary](#) function creates a summary page for all the sections that make up the BoQ.

Note:

Worksheets of which the tabs are red are included in the summary, while worksheets of which the tabs are yellow are not.

The [Create Stripped Bill](#) function should be used only once all the worksheets that are to be included in the BoQ have been finalised: it creates a final version of the BoQ as a new Excel file that comprises only those worksheets of which the tabs are red (instead of yellow). This final BoQ can be inserted in the tender document.

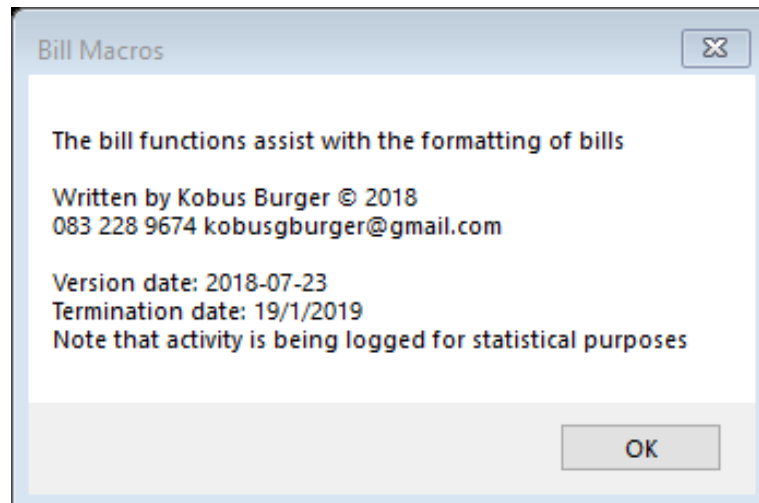
Note:

Before the [Create Stripped Bill](#) or [Create Priced Bill](#) function is applied, the following should be done:

- The worksheets of which the tabs are red must be selected and the [Page Format](#) function must be run.
- The worksheets of which the tabs are red, as well as the [summary](#) page of the BoQ, must be selected and the [Setup Pages](#) function must be run.
- The document must be saved.

In the [Page Format](#) and [Edit Format](#) views, rates can be entered for the items included in the worksheets of the BoQ in [Column J](#). Amounts for these items are then calculated in [Column K](#) of these worksheets. Moreover, total amounts for the worksheets are calculated and linked to the summary page of the BoQ. The [Create Priced Bill](#) function moves the information in [Column J](#) and [Column K](#) to [Column G](#) and [Column H](#) of the worksheets, and creates a priced BoQ as a new Excel file.

The [About](#) function displays the following pop-up window:



The version date displayed in this window indicates which version of the add-in is currently running.