CONTRACT PRICE ADJUSTMENT FOR COST FLUCTUATION: INFRASTRUCTURE CONTRACTS

JUNE 2023

VERSION 3.0 – AMENDMENT 2

Instructions for contract price adjustment using either a Waka Kotahi NZ Transport Agency index alone or the bitumen volume-based method

Waka Kotahi publishes standard methods for contract price adjustment for cost fluctuation. Adjustments are either calculated using an index alone or by using both an index and the Waka Kotahi bitumen price adjustment series. This second method is known as the bitumen volume-based method.

This document explains how to use both the index alone based method and the bitumen volume-based method.

The Waka Kotahi *Procurement manual* (refer sections 6.6 and 7.6 'Contracts') provides guidelines on contract price adjustment for cost fluctuation in infrastructure contracts.

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More information

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This document is available on the Waka Kotahi website at
https://www.nzta.govt.nz/resources/procurement-manual/procurement-tools/#tools

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1 CONTRACT PRICE ADJUSTMENT METHODS

This document explains how to use either an index alone based method or the bitumen volume-based method.

The bitumen volume-based method usually employs a two-part process. It uses both a Waka Kotahi index and a Waka Kotahi bitumen price adjustment series.

Using this second method to calculate the amount of a monthly adjustment payment both the value of works delivered and the volume of residual bitumen (litres) applied during the month are required. The nominated index is applied to the value of work, and the bitumen price adjustment series to the volume of bitumen.

The bitumen price adjustment series are monthly series, but Waka Kotahi indexes are quarterly.

Contract price adjustment payments are calculated monthly.

The formula for calculating contract price adjustment is fully described in section 3. It takes the general form:

C = CI + CB

where:

C = contract price adjustment

CI = index-based part

CB = bitumen volume-based part

Where a contract specifies that the two-part bitumen volume-based method will be used then the above formula takes its full general form C = CI + CB.

Where a contract specifies that contract price adjustment will employ an index alone then the above formula reduces to C = CI.

A contract may specify use of the bitumen volume-based method, but without the use of an index. In this case the above formula reduces to C = CB.

The web-based Adjuster tool calculates both CI and CB. It can therefore calculate C = CI + CB, but equally can be used to calculate C = CI alone or C = CB alone.

Throughout this document, including in the worked example in Appendix 6, the full two-part process is generally assumed, i.e. C = CI + CB.

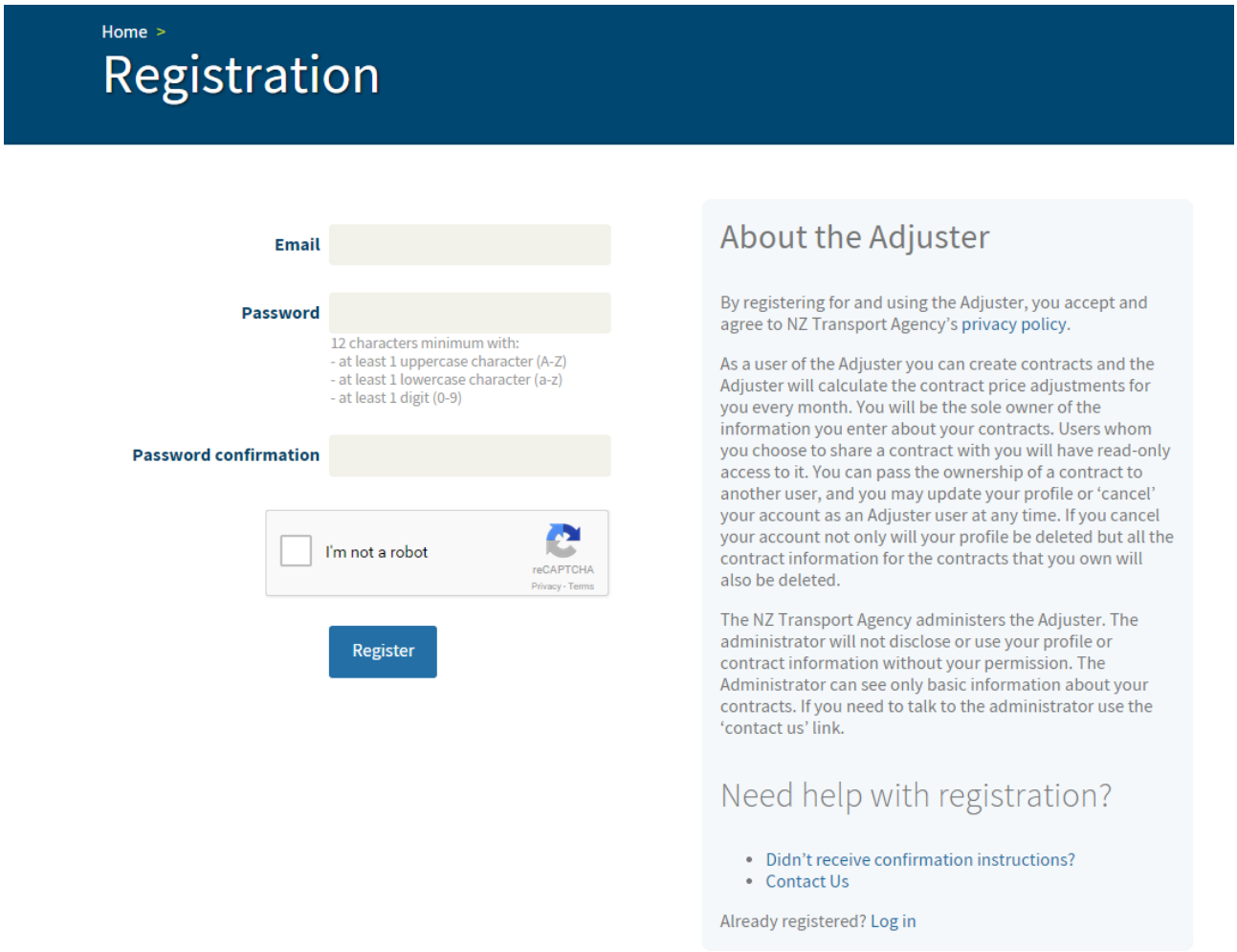
2 USING THE WEB-BASED ADJUSTER TOOL

Monthly cost fluctuation adjustment calculations are best performed using the web-based Adjuster tool. It is designed to be used by either contractors or purchasers. You can access the Adjuster from the procurement page on the Waka Kotahi website.

How the Adjuster calculates the monthly contract cost fluctuation adjustment is set out in section 3 *Calculating the contract cost fluctuation adjustment*. To use the Adjuster you need to register as a user, follow the steps set out here to input basic contract information plus monthly contract data, and know how to use the single figure output, the cumulative cost fluctuation adjustment, in a progress payment claim – see section 6.

2.1 Registering as a user

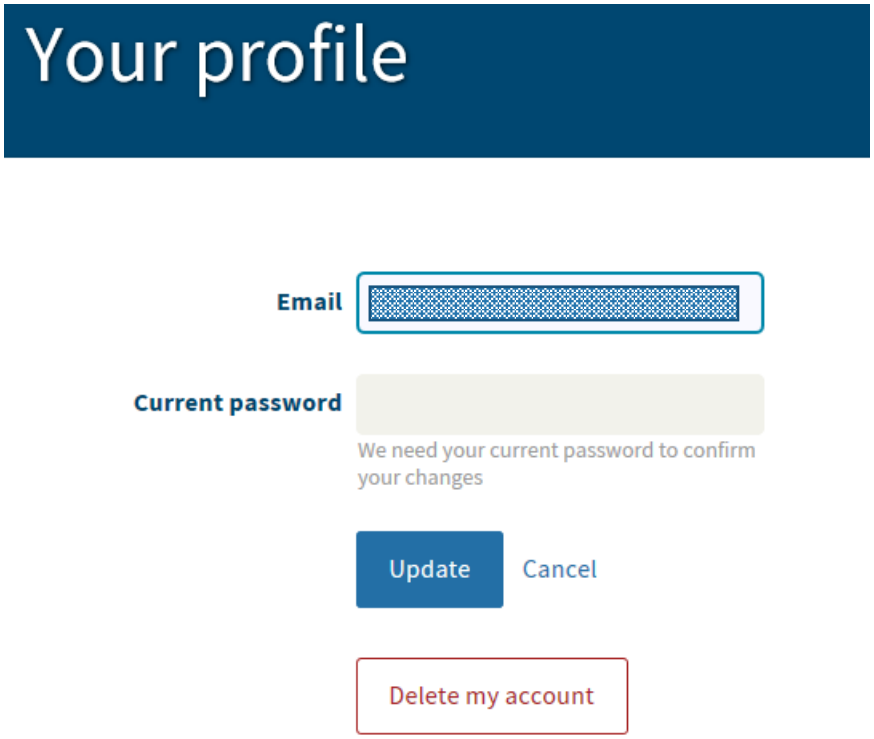
Go to the Adjuster and register as a user. The Adjuster identifies users by their email address.



2.2 Changing your *profile*

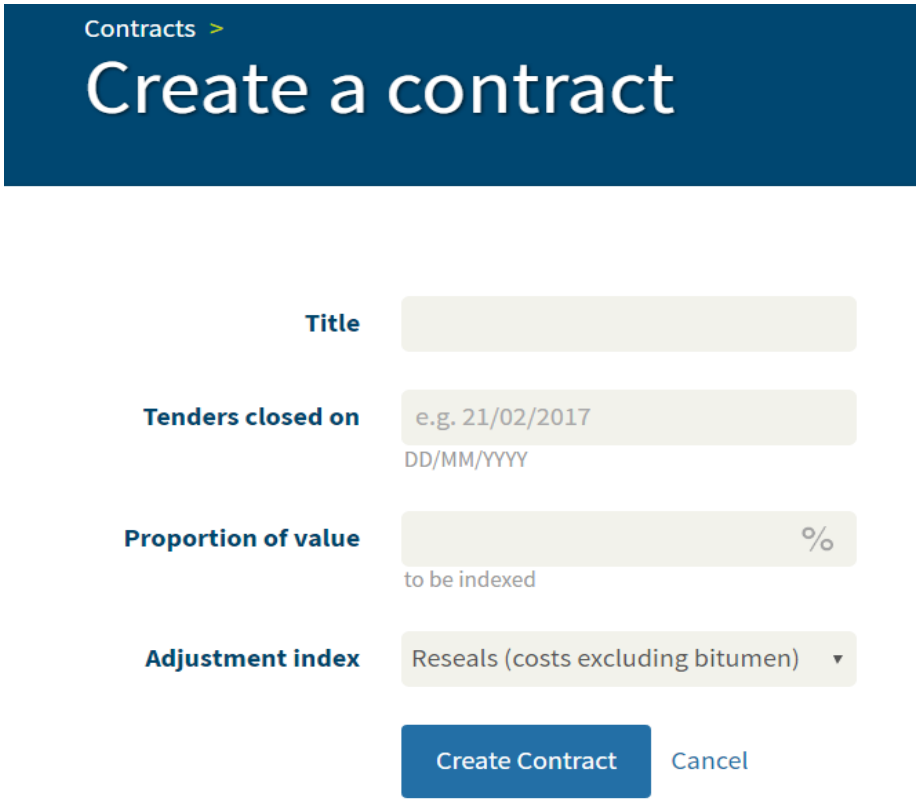
Select *Profile* from the menu to change your profile, ie to change your email address.

Please note that email addresses have been blanked out in the screen shots shown below.



2.3 Creating a contract

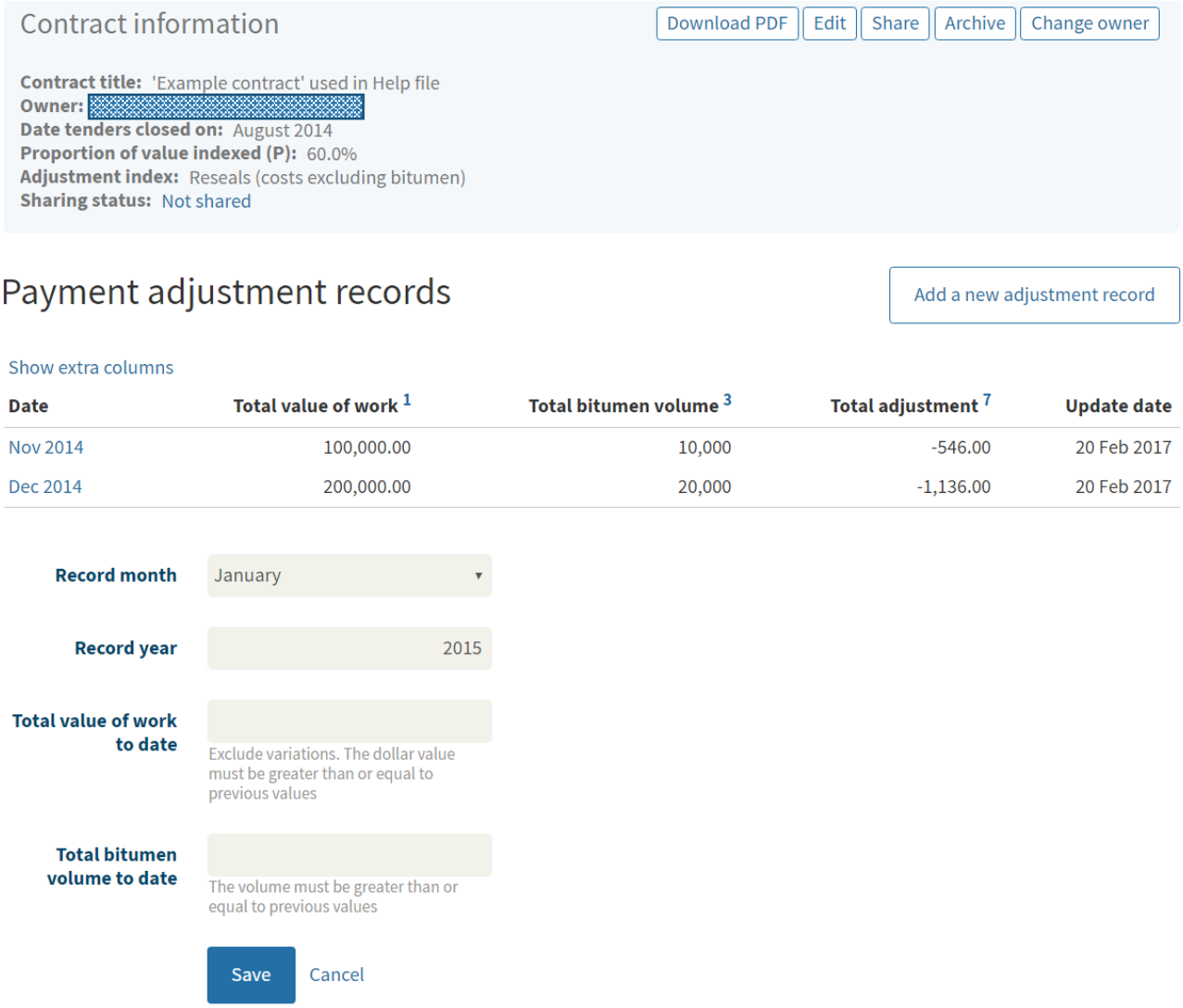
Create a contract by using the *Create contract* button, found near the top right of the home page screen. Fill in the form shown below, including choosing the correct *Adjustment index* from the drop-down list. For guidance on establishing a value for the *Proportion of value to be indexed* (P) see section 4. Select the *Create contract* button.



You will be the sole owner of this contract information and all subsequent information you enter about this contract. Users whom you choose to share this contract with will have read-only access to it.

2.4 Adding a new adjustment record

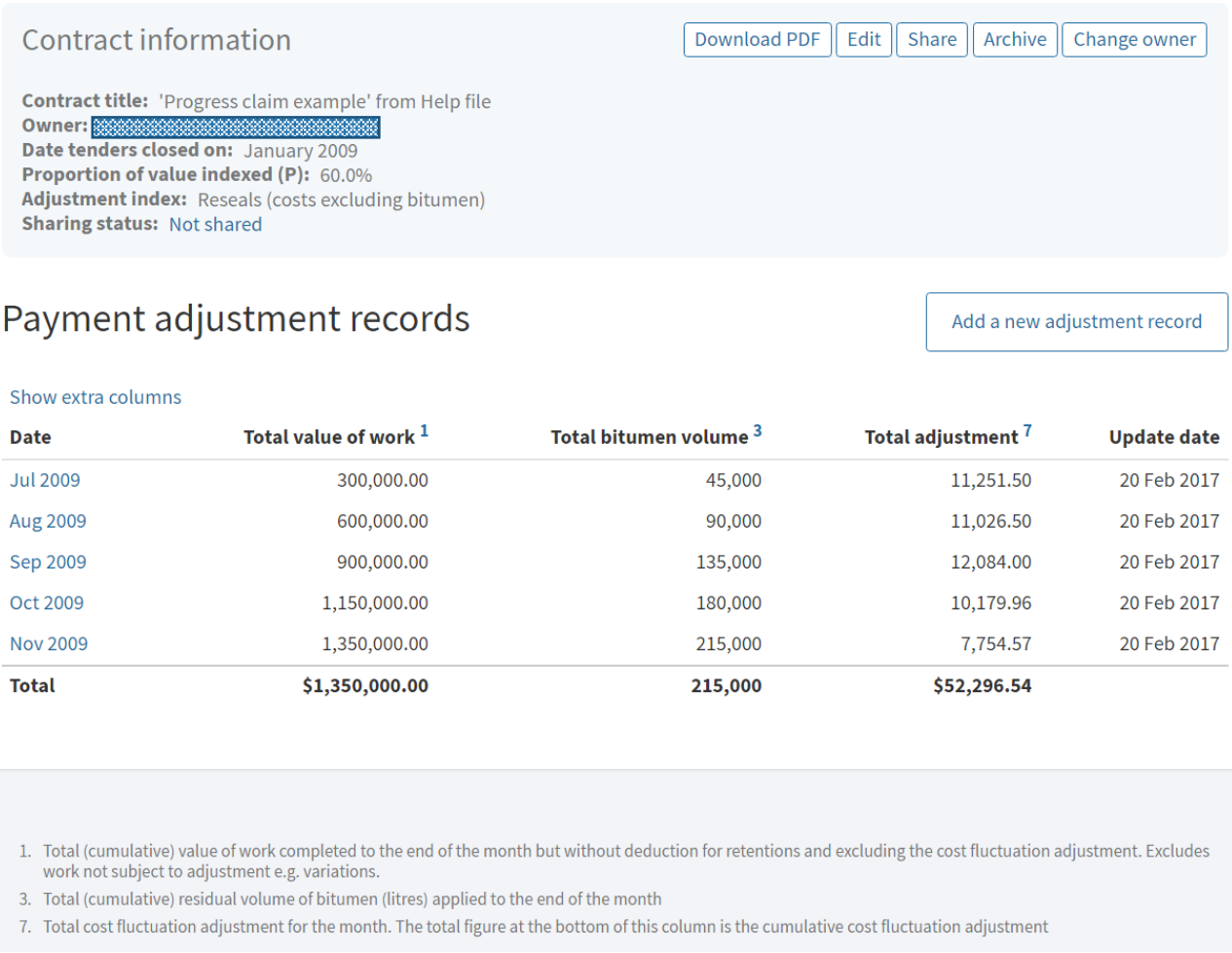
You will need to enter data for every month in which work is done. Having selected the contract from the *My contracts* list, select *Add a new adjustment record*, fill in the form below and *Save*.



Make sure the month automatically chosen by the Adjuster is correct.

2.5 Using the monthly Adjuster output

Each month the Adjuster gives a cumulative total cost fluctuation adjustment figure, which is the sum of the adjustments shown for all months. In the example screen shot below, the figure is $52,296.54. This cumulative cost fluctuation adjustment is transferred directly to the progress claim – see section 6.



Contract information

Download PDF | Edit | Share | Archive | Change owner

Contract title: 'Progress claim example' from Help file
Owner: [redacted]
Date tenders closed on: January 2009
Proportion of value indexed (P): 60.0%
Adjustment index: Reseals (costs excluding bitumen)
Sharing status: Not shared

Payment adjustment records

Add a new adjustment record

Show extra columns

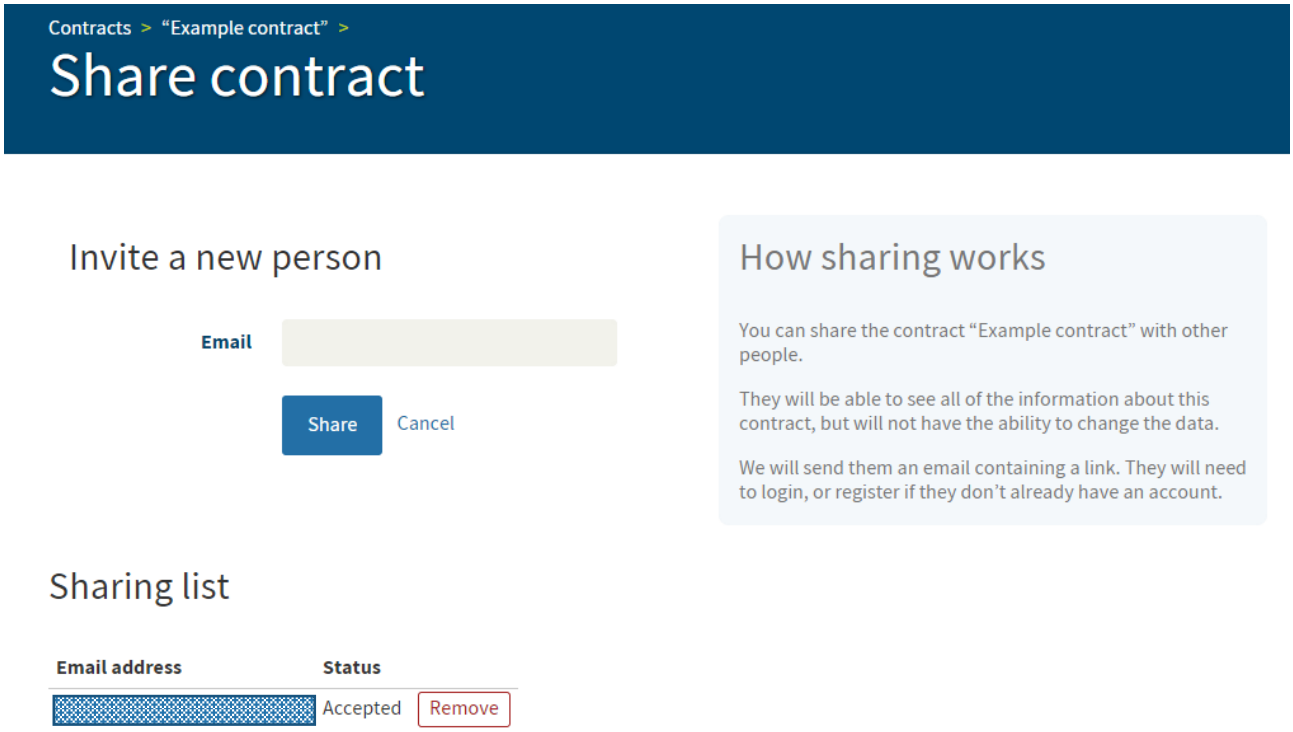
Date	Total value of work [1]	Total bitumen volume [3]	Total adjustment [7]	Update date
Jul 2009	300,000.00	45,000	11,251.50	20 Feb 2017
Aug 2009	600,000.00	90,000	11,026.50	20 Feb 2017
Sep 2009	900,000.00	135,000	12,084.00	20 Feb 2017
Oct 2009	1,150,000.00	180,000	10,179.96	20 Feb 2017
Nov 2009	1,350,000.00	215,000	7,754.57	20 Feb 2017
Total	**$1,350,000.00**	**215,000**	**$52,296.54**	

1. Total (cumulative) value of work completed to the end of the month but without deduction for retentions and excluding the cost fluctuation adjustment. Excludes work not subject to adjustment e.g. variations.
3. Total (cumulative) residual volume of bitumen (litres) applied to the end of the month
7. Total cost fluctuation adjustment for the month. The total figure at the bottom of this column is the cumulative cost fluctuation adjustment

2.6 Sharing contracts with other users

You can share a contract with other people. They will be able to see all of the information about the contract, but will not be able to change the data. The Adjuster will send them an email containing a link. They will need to log in or register if they do not already have an account.

To share a contract, select it from the *My contracts* list and use the *Share* button. Enter the email address of the person with whom you wish to share the contract.



You can also remove people from the list of people with whom the contract has been shared.

2.7 Letting the Adjuster take care of changes in the data used in calculations

Most months the total cost fluctuation adjustment output from the Adjuster will be an interim value – see section 7. The Adjuster takes care of the fact that the index value for a particular month will not be published until up to five months after the month's end.

The Adjuster will also manage changes in an adjustment record. If the supplier and purchaser agree that an adjustment record for a particular month needs to be altered, for example by changing either the *Total value of work to date* or the *Total bitumen volume to date*, then the adjustment record for that month can be edited. See section 2.9.

2.8 Keeping a record of each month's Adjuster output

Use the *Download PDF* button to take a snapshot of input data and output from the Adjuster used in a progress claim.

The *Download PDF* button is visible once you have selected a particular contract from the *My contracts* list.

Standard contract conditions will demand that records, to support progress claims, be kept for a defined period. A monthly pdf download will likely be required to be kept for this purpose.

2.9 Editing previously entered data

Select the contract you wish to change from the *My contracts* list. You will then be able to use the *Edit* button to change any of the basic contract data. The Adjuster will immediately recalculate the adjustment figures for all months based on the new information.

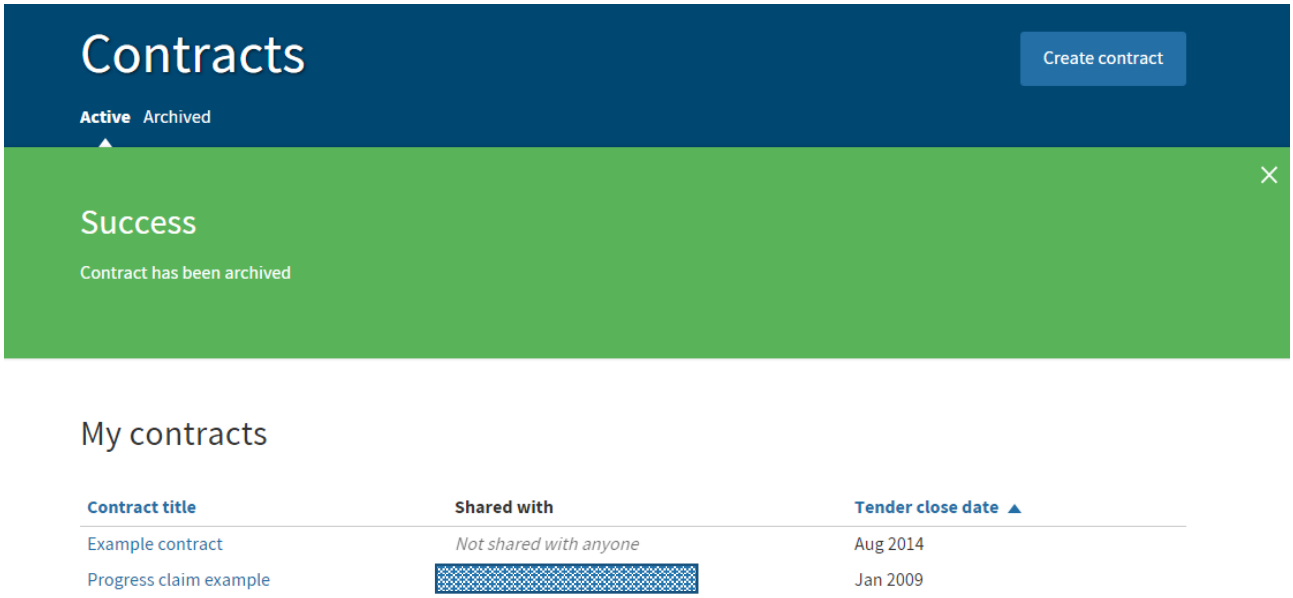
Having selected a particular contract from *My contracts* you will also be able to edit any previously entered adjustment record. Click on the date for the month that you wish to edit. Again, once the changes you make have been saved, the Adjuster will recalculate.

2.10 Archiving a contract

The *My contracts* list has two list options – *Active* and *Archived*.

Having brought up a particular contract from the *My contracts* list, you can move it from the *Active* to the *Archived* list using the *Archive* button.

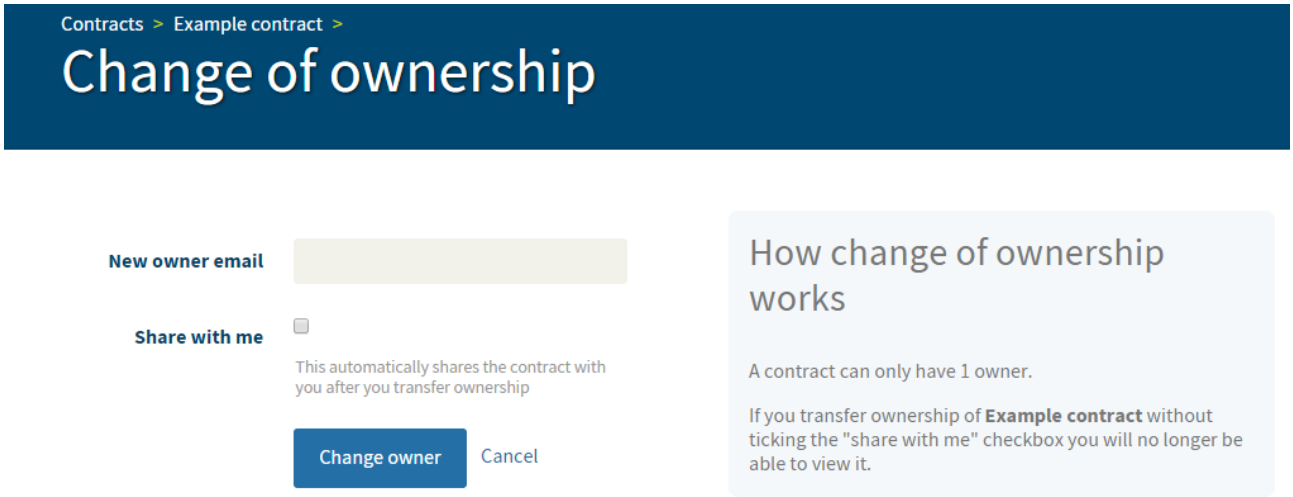
This facility will allow you to limit the *Active* list to those contracts that are of immediate interest. Once a contract has been archived it can be *Un-archived* and thus brought back into the *Active* list.



2.11 Changing the ownership of a contract

You may share the contracts you create with other users, giving them read-only access, but there can be only one owner of a contract.

If you wish to relinquish ownership, select the contract from the *My contracts* list and use the *Change owner* button. The Adjuster requires you to enter the new owner's email address. If you wish to relinquish ownership, but still wish to view the contract, you will need to tick the *Share with me* checkbox.



2.12 Using the Adjuster with an index alone (C = CI)

Some contracts will specify that contract price adjustment is to be based on the use of an index alone.

When creating the contract enter a value for the *Proportion of value to be indexed (P)* of 100%. When adding a new adjustment record for a particular month, enter a zero, '0', for the *Total bitumen volume to date*. The Adjuster will use the zeros entered for total bitumen volume and return a value of zero for CB, the bitumen volume-based part.

Contract information

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Contract title: 'C=CI' from Help file
Owner: [redacted]
Date tenders closed on: October 2012
Proportion of value indexed (P): 100.0%
Adjustment index: Reseals (costs excluding bitumen)
Sharing status: Not shared

Payment adjustment records

Add a new adjustment record

Show extra columns

Date	Total value of work [1]	Total bitumen volume [3]	Total adjustment [7]	Update date
Jan 2013	1,000.00	0	2.06	20 Feb 2017
Feb 2013	2,000.00	0	2.06	20 Feb 2017
Mar 2013	3,000.00	0	2.06	20 Feb 2017
Apr 2013	4,000.00	0	3.43	20 Feb 2017
May 2013	5,000.00	0	3.43	20 Feb 2017
Jun 2013	6,000.00	0	3.43	20 Feb 2017
Jul 2013	7,000.00	0	10.30	20 Feb 2017
Aug 2013	8,000.00	0	10.30	20 Feb 2017
Sep 2013	9,000.00	0	10.30	20 Feb 2017
Oct 2013	10,000.00	0	6.87	20 Feb 2017
Total	**$10,000.00**	**0**	**$54.26**	

2.13 Using the Adjuster for bitumen cost fluctuation alone (C = CB)

Some contracts will specify that contract price adjustment is to be based on the bitumen volume-based part of the adjustment formula alone.

When creating the contract enter any value for the *Proportion of value to be indexed (P)* and choose any adjustment index. When adding a new adjustment record, for a particular month, enter a zero, '0', for the *Total value of work to date*. The Adjuster will then calculate a value of zero for CI, the index-based part.

Contract information

Download PDF | Edit | Share | Archive | Change owner

Contract title: 'C=CB' from Help file
Owner: [redacted]
Date tenders closed on: November 2013
Proportion of value indexed (P): 1.0%
Adjustment index: Reseals (costs excluding bitumen)
Sharing status: Not shared

Payment adjustment records

Add a new adjustment record

Show extra columns

Date	Total value of work [1]	Total bitumen volume [3]	Total adjustment [7]	Update date
Dec 2013	0.00	100	-0.65	20 Feb 2017
Jan 2014	0.00	200	0.87	20 Feb 2017
Feb 2014	0.00	300	0.14	20 Feb 2017
Mar 2014	0.00	400	0.01	20 Feb 2017
Apr 2014	0.00	500	-3.07	20 Feb 2017
May 2014	0.00	600	-4.86	20 Feb 2017
Jun 2014	0.00	700	-3.69	20 Feb 2017
Jul 2014	0.00	800	-2.24	20 Feb 2017
Aug 2014	0.00	900	-4.96	20 Feb 2017
Total	**$0.00**	**900**	**-$18.45**	

2.14 Using the Adjuster when the basis of adjustment changes during the contract term

Some contracts will specify that the basis for contract price adjustment will change at some point in the term of the contract. For example, a term service maintenance and renewal contract may specify that for the first 12 months adjustment will be based on bitumen volume alone (C = CB) but from the end of the first year indexation will also be employed (C = CI + CB).

Create a separate contract in the Adjuster for each of these phases of the contract. Using the example quoted a C = CB contract would be created for the first year and for the second and subsequent years, a C = CI + CB contract would be created. For this second contract the *Total value of work to date* entered each month would be the total value since the beginning of the second year.

Alternatively, for the example quoted, a single contract could be created, but for the first 12 months the *Total value of work to date* would be entered as zero. From the beginning of the second year of the contract the *Total value of work to date* entered would be the total value since the beginning of the second year.

2.15 Using the Adjuster with two indexes

Two indexes may be used when the costs incurred to deliver work are not of a single type.

Appendix 1 – Calculating contract cost fluctuation adjustments using two indexes describes the calculation process using two indexes. Appendix 3 provides a model schedule to the conditions of contract using two indexes.

The cost fluctuation adjustment 'C' will have up to three components – $C = (CI_A + CI_B) + CB$. To calculate these three components using the Adjuster it will be necessary to create two separate

contracts, splitting the cost of the contract works between the two. For example, the first contract set up in the Adjuster may be used to calculated CI_A plus CB, and the second contract could be used to calculate CI_B.

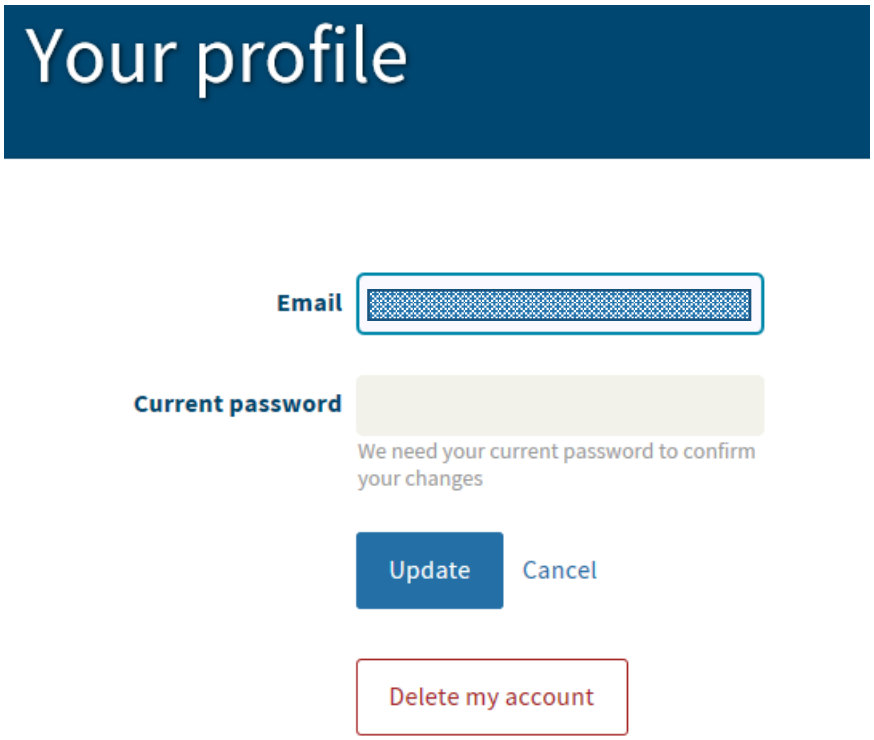
2.16 Viewing index values in the Adjuster

To see the values for an index, or a bitumen price adjustment series, that the Adjuster 'looks up', select *Help* from the *Menu* dropdown list, then select *Index & and bitumen series values*.

2.17 Deleting your Adjuster account

Select *Profile* from the menu. Use the *Delete my account* button to remove your profile and all the contracts you have created. If you have shared a contract with another user, and then delete your account, that other user will no longer be able to see the contract.

If you accidentally delete your account then contact Waka Kotahi. The administrator may be able to recover your profile and contracts.



3 CALCULATING THE CONTRACT COST FLUCTUATION ADJUSTMENT

The formula used to calculate the amount of the month's adjustment, up or down, takes the general form C = CI + CB

Where:

C	=	Cost fluctuation adjustment for the month under consideration
CI	=	Value × (P/100) × (I/I' – 1) …… (See Note 1)
CB	=	Volume × (Bit – Bit') ……..(See Note 1)
Value	=	Value of work completed during the month under consideration but without deduction for retentions and excluding the cost fluctuation adjustment (See Note 2)
P	=	The *Proportion of value to be indexed* expressed as a percentage (See Note 3)
I/I'	=	The value of the nominated index for the month under consideration divided by the value of the index for the month during which tenders closed
Volume	=	Volume of residual bitumen applied during the month under consideration (litres) (See Note 4)
Bit	=	Value of the Waka Kotahi bitumen price adjustment series for the month under consideration, published on the Waka Kotahi website[1]
Bit'	=	Value of the Waka Kotahi bitumen price adjustment series for the month during which tenders closed, published on the Waka Kotahi website

Note 1: 'CI' uses the change in the nominated index to adjust for fluctuation in costs. 'CB' uses the residual bitumen volume applied plus the change in the bitumen price adjustment series to adjust for fluctuation in the cost of bitumen.

Note 2: This will not include the value of work which is not to be adjusted for cost fluctuation. For example if a variation or work under a prime cost sum is valued at current prices then this would not be included.

Note 3: The proportion of value to be indexed (P) is usually 100% in the C = CI case and is irrelevant in the C = CB case. When the full bitumen volume-based method is used, the C = CI + CB case, 'P' will usually be the proportion of costs excluding bitumen. It will be calculated by dividing an estimate of the cost of plant, labour and materials, **excluding** bitumen supply, by an estimate of all costs – namely of plant, labour and all materials **including** bitumen supply. Estimates of all costs, and of all costs excluding bitumen, will also exclude costs associated with items that are not to be adjusted for cost fluctuation. 'P' will normally be determined by the principal and advised to tenderers through the request for proposals document, so they can assess its impact before finalising their tender price. It will normally be fixed for the duration of the contract. This proportion will vary from contract to contract depending on the scope of the contract works.

[1] Waka Kotahi publishes two bitumen price adjustment series, the EXISTING contracts bitumen price adjustment series, used where the contract has a tender close date prior to 1 September 2023 and the NEW contracts bitumen price adjustment series, used where the tender close date is on or after 1 September 2023. Refer Appendix 5 – Calculation of the Waka Kotahi bitumen price adjustment series.

Note 4: Residual bitumen is the non-volatile fraction of the bitumen binder that remains in service after evaporation. Volume is measured at 15 degrees Celsius.

Note that the above description of the contract price adjustment calculation process assumes that one index is to be used. Two indexes may be used when the costs incurred to deliver work are not of a single type – for example a construction contract could include structures plus other 'general' road construction. The two indexes may thus be the Waka Kotahi structures index (costs excluding bitumen) and the Waka Kotahi construction index (costs excluding bitumen). Appendix 1 – Calculating contract cost fluctuation adjustments using two indexes describes the calculation process using two indexes.

4 ESTABLISHING A VALUE FOR ‘P’

Where no index is to be used, the C = CB case, then ‘P’ is not used in calculations. When creating a contract in the Adjuster any value can therefore be entered for ‘P’.

Where an index alone is to be used, the C = CI case, then ‘P’ will usually be 100%.

Where the full bitumen volume-based method is used, the C = CI + CB case, ‘P’ will usually be the proportion of costs excluding bitumen. This will need to be determined.

Some purchasers will have limited data to help determine a value for ‘P’. Discussions with contractors who are likely to tender for contracts will help.

The value of ‘P’ can be calculated from the value of Bit’, defined in Section 3 above, taken from the ‘NEW contracts bitumen price adjustment series’. Given that Bit’ is the bitumen price adjustment series value for the month in which tenders close, it will typically not be published until after the RFX has been posted on GETS. Consequently the calculation of ‘P’ will have to wait until the series value for the tender close month is known and will be advised to tenderers through a notice to tenderers. Based on recent bitumen price adjustment series values an indicative value for ‘P’ could still be advised through the RFX.

> Let E = The estimated contract price, but excluding any amount that is not to be adjusted for cost fluctuation – for example a prime cost sum that will be paid for on the basis of actual cost.
>
> Let T = The estimated total quantity of bitumen (tonne) to be incorporated in the works.
>
> Then P = 1 – (T X 960 X Bit’) / E

Note that ‘P’ is expressed as a percentage, it will typically have a value over 90%, but for a reseals contract, where bitumen supply represents a larger proportion of total cost, ‘P’ could be significantly less than 90%.

In establishing the value for ‘P', be aware of the narrow effective definition of the 'cost of bitumen supply’, it includes no more than the overseas purchase price of the bitumen plus its freight to NZ. Hence the bitumen volume-based part of the cost fluctuation adjustment covers the same very narrow range of cost drivers.

5 DETERMINING THE VOLUME OF RESIDUAL BITUMEN SUPPLIED IN THE MONTH

Under the bitumen volume-based method, either the C = CI + CB case or the C = CB case, the contract price adjustment will depend on the volume of bitumen supplied.

Bitumen supply will usually be included in scheduled items for each type of surfacing and paid for on the basis of the road surface area sealed, resealed or paved, and there will be no specific 'bitumen' item. This needs to be borne in mind when considering the precision required in measuring the volume of bitumen supplied.

Contract documents need to specify how the volume of residual bitumen will be calculated and agreed each month. Purchasers may choose to ask tenderers to describe a proposed method in their response to the request for proposals to then be discussed and agreed between the parties before work commences.

6 USING THE ADJUSTER OUTPUT IN PROGRESS PAYMENT CALCULATIONS

Each month the Adjuster will be used to calculate the cumulative cost fluctuation adjustment.

The following example, a C = CI + CB case, shows how to use that adjustment figure in a progress payment calculation.

A contractor has a simple resealing contract that has two items in the schedule. The priced schedule from the contractor's winning tender looks like this:

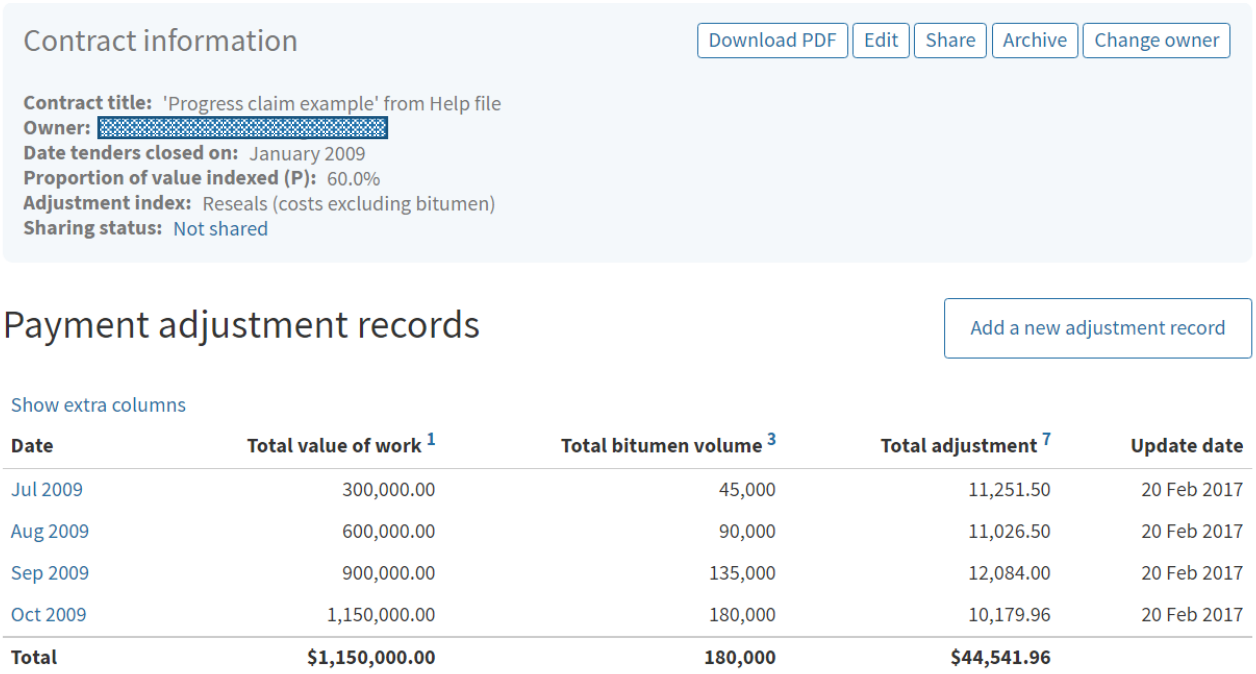
Item	Unit	Quantity	Rate	Amount
1.0 Grade X chip sprayed bitumen reseals (including the cost of bitumen)	m^2	150,000	6.50	975,000
2.0 Grade Y chip sprayed bitumen reseals (including the cost of bitumen)	m^2	230,000	7.00	1,610,000
Tender price				**2,585,000**

After four months the schedule used for the progress claim looks like this:

Progress claim 4				
Item	**Unit**	**Quantity**	**Rate**	**Amount**
1.0 Grade X chip sprayed bitumen reseals (including the cost of bitumen)	m^2	80,000	6.50	520,000
2.0 Grade Y chip sprayed bitumen reseals (including the cost of bitumen)	m^2	90,000	7.00	630,000
Total to date (to be cost adjusted)				**1,150,000**
Total bitumen volume applied to the end of the month	litres	180,000		
Cumulative cost fluctuation adjustment				44,542
Total value of items not to be cost adjusted (e.g. variations)				XXX,XXX
TOTAL to date for claim				**1,194,542**

The total value of work to date, shaded yellow, and the total bitumen volume to date, also shaded yellow, will have been entered into the Adjuster. The output from the Adjuster, the cumulative cost fluctuation adjustment ($44,542), is shown shaded red.

The PDF download from the Adjuster, which shows the cumulative cost fluctuation adjustment to the end of month four, looks like this:



Contract information

Download PDF | Edit | Share | Archive | Change owner

Contract title: 'Progress claim example' from Help file
Owner: [redacted]
Date tenders closed on: January 2009
Proportion of value indexed (P): 60.0%
Adjustment index: Reseals (costs excluding bitumen)
Sharing status: Not shared

Payment adjustment records

Add a new adjustment record

Show extra columns

Date	Total value of work [1]	Total bitumen volume [3]	Total adjustment [7]	Update date
Jul 2009	300,000.00	45,000	11,251.50	20 Feb 2017
Aug 2009	600,000.00	90,000	11,026.50	20 Feb 2017
Sep 2009	900,000.00	135,000	12,084.00	20 Feb 2017
Oct 2009	1,150,000.00	180,000	10,179.96	20 Feb 2017
Total	**$1,150,000.00**	**180,000**	**$44,541.96**	

After five months the schedule used for the progress claim looks like this:

Progress claim 5				
Item	**Unit**	**Quantity**	**Rate**	**Amount**
1.0 Grade X chip sprayed bitumen reseals (including the cost of bitumen)	m^2	100,000	6.50	650,000
2.0 Grade Y chip sprayed bitumen reseals (including the cost of bitumen)	m^2	100,000	7.00	700,000
Total value of work to the end of the 5th month (to be cost adjusted)				**1,350,000**
Total bitumen volume applied to the end of the month	litres	215,000		
Cumulative cost fluctuation adjustment				52,297
Total value of items not to be cost adjusted (eg variations)				YYY,YYY
TOTAL to date for claim				**1,402,297**

Again the total value of work to date ($1,350,000) and the total bitumen volume to date (215,000 litres) will have been entered into the Adjuster which will have calculated the cumulative cost fluctuation adjustments ($52,297).

Note that items not subject to cost fluctuation adjustment, eg variations need to be shown separately.

7 THE ADJUSTER CALCULATES INTERIM ADJUSTMENT VALUES

A *Model cost fluctuation adjustment schedule to conditions of contract* is included in this document – see Appendix 2. This model schedule includes a clause 9 which states that:

> *Where the index for the quarter has not yet been published, interim payments will be made on the basis of the index for the most recent quarter for which an index is available. A correction to the interim payment will be made following the publication of the applicable index and will be processed with subsequent progress payments.*

The Adjuster uses the most recently published index value and the most recently published Waka Kotahi bitumen price adjustment series value to calculate the total adjustment value for a particular month until the correct values for that month have been published.

The Adjuster automatically manages the issue created by the fact that the index value applicable to a particular month may not be published until up to five months after the end of that month. The publication of a new quarterly index value therefore will typically change the previous total adjustment values for the last five months.

One of the consequences of this lag in the publication of the correct index value for a particular month is that the final cumulative cost fluctuation adjustment figure for a contract may not be known until five months after all contract work is completed.

To learn when the latest index values have been published you can subscribe to the Waka Kotahi Procurement Manual and procurement policy update service.

This interim payments approach is consistent with NZS3910 *Conditions of contract for building and civil engineering construction, Appendix A cost fluctuation adjustment by indexation*. It is similarly consistent with the approach taken in NZS3915, NZS3916 and NZS3917.

APPENDIX 1 – CALCULATING CONTRACT COST FLUCTUATION ADJUSTMENTS USING TWO INDEXES

This Appendix is based on section 3 *Calculating the contract cost fluctuation adjustment*. Section 3 assumes that one index is used in the calculation of contract price adjustments, here two indexes are used, referred to as Index(A) and Index(B).

Two indexes may be used when the costs incurred to deliver work are not of a single type – for example a construction contract could include structures plus other 'general' road construction. Index(A) may thus be the Waka Kotahi structures index (costs excluding bitumen) and Index(B) the Waka Kotahi construction index (costs excluding bitumen).

Two options are described reflecting different approaches to the use of two indexes. In **Option A** it is envisaged that a fixed percentage of the 'Value' will be indexed using Index(A) and different fixed percentage will be indexed using Index(B). In **Option B** it is envisaged that a schedule is used for the purpose of making progress claims and that the schedule has been divided between items to be indexed using Index(A) and items to be indexed using Index(B). Common items, for example preliminary and general items, may be divided on some agreed percentage split basis.

Option A

The formula used to calculate the amount of the month's adjustment, up or down, takes the general form C = CI + CB.

Where:

C	=	Cost fluctuation adjustment for the month under consideration
CI	=	$CI_A + CI_B$
	=	Value × (P_A/100) × (I_A/I_A' – 1) + Value × (P_B/100) × (I_B/I_B' – 1) ... (See Note 1)
CB	=	Volume × (Bit – Bit') ……..(See Note 1)
Value	=	Value of work completed during the month under consideration but without deduction for retentions and excluding the cost fluctuation adjustment (See Note 2)
P_A	=	The proportion of Value to be indexed using Index(A) expressed as a percentage (See Note 3)
P_B	=	The proportion of Value to be indexed using Index(B) expressed as a percentage (See Note 3)
I_A/I_A'	=	The value of Index(A) for the month under consideration divided by the value of the Index(A) for the month during which tenders closed
I_B/I_B'	=	The value of Index(B) for the month under consideration divided by the value of the Index(B) for the month during which tenders closed
Volume	=	Volume of residual bitumen applied during the month under consideration (litres) (See Note 4)
Bit[2]	=	Value of the Waka Kotahi bitumen price adjustment series for the month under consideration, published on the Waka Kotahi website

[2] Waka Kotahi publishes two bitumen price adjustment series, the EXISTING contracts bitumen price adjustment series, used where the contract has a tender close date prior to 1 September 2023 and the NEW contracts bitumen price adjustment series, used where the tender close date is

Bit'	=	Value of the Waka Kotahi bitumen price adjustment series for the month during which tenders closed, published on the Waka Kotahi website

Note 1: 'CI' uses the changes in Index(A) and in Index(B) to adjust for fluctuation in costs other than in the cost of bitumen. 'CB' uses the residual bitumen volume applied plus the change in the bitumen price adjustment series to adjust for fluctuation in the cost of bitumen.

Note 2: This will not include the value of work which is not to be adjusted for cost fluctuation. For example if a variation or work under a prime cost sum is valued at current prices then this would not be included.

Note 3: P_A will usually be calculated by dividing an estimate of the cost of plant, labour and materials that are Index(A) 'type' costs, **excluding** bitumen supply cost, by an estimate of all costs – namely of all plant, labour and all materials **including** bitumen supply. Estimates of all costs, and of all costs excluding bitumen, will also exclude costs associated with items that are not to be adjusted for cost fluctuation.

P_B will be determined in a similar way. It will relate to that part of the work to be indexed using Index(B).

P_A and P_B will normally be determined by the principal and advised to tenderers through the request for proposals document, so they can assess the impact before finalising their tender price. P_A and P_B will normally be fixed for the duration of the contract. These proportions will vary from contract to contract depending on the scope of the contract works.

Note 4: Residual bitumen is the non-volatile fraction of the bitumen binder that remains in service after evaporation. Volume is measured at 15 degrees Celsius.

Option B

The formula used to calculate the amount of the month's adjustment, up or down, takes the general form C = CI + CB.

Where:

C	=	Cost fluctuation adjustment for the month under consideration
CI	=	$CI_A + CI_B$
	=	Value(A) × (P_A/100) × (I_A/I_A' – 1) + Value (B) × (P_B/100) × (I_B/I_B' – 1)) ... (See Note 1)
CB	=	Volume × (Bit – Bit') ……..(See Note 1)
Value(A)	=	Value of work completed during the month under consideration that is to be indexed using Index(A) but without deduction for retentions and excluding the cost fluctuation adjustment (See Note 2)
Value(B)	=	Value of work completed during the month under consideration that is to be indexed using Index(B) but without deduction for retentions and excluding the cost fluctuation adjustment (See Note 2)
P_A	=	The proportion of Value(A) to be indexed using Index (A) expressed as a percentage (See Note 3)

on or after 1 September 2023. Refer Appendix 5 – Calculation of the Waka Kotahi bitumen price adjustment series.

P_B	=	The proportion of Value(B) to be indexed using Index(B) expressed as a percentage (See Note 3)
I_A/I_A'	=	The value of Index(A) for the month under consideration divided by the value of the Index(A) for the month during which tenders closed
I_B/I_B'	=	The value of Index(B) for the month under consideration divided by the value of the Index(B) for the month during which tenders closed
Volume	=	Volume of residual bitumen applied during the month under consideration (litres) (See Note 4)
Bit[3]	=	Value of the Waka Kotahi bitumen price adjustment series for the month under consideration, published on the Waka Kotahi website
Bit'	=	Value of the Waka Kotahi bitumen price adjustment series for the month during which tenders closed, published on the Waka Kotahi website

Note 1: 'CI' uses Value(A) plus Value(B) and the changes in Index(A) and in Index(B) to adjust for fluctuation in costs other than in the cost of bitumen. 'CB' uses the residual bitumen volume applied plus the change in the bitumen price adjustment series to adjust for fluctuation in the cost of bitumen.

Note 2: Neither Value(A) nor Value(B) will include the value of work which is not to be adjusted for cost fluctuation. For example if a variation or work under a prime cost sum is valued at current prices then this would not be included.

Note 3: P_A will usually be calculated by dividing an estimate of the cost of plant, labour and materials that together make up Value(A), namely the Index(A) 'type' costs, **excluding** bitumen supply cost, by an estimate of all Index(A) type costs – namely of all plant, labour and all materials **including** bitumen supply. Estimates of all costs, and of all costs excluding bitumen, will also exclude costs associated with items that are not to be adjusted for cost fluctuation.

For example, if Index(A) is the 'Waka Kotahi structures index (costs excluding bitumen)', and the 'structures' part of the contract cost does not include any bitumen supply then P_A would usually be set at 100%.

P_B will be determined in a similar way. It will relate to that part of the work to be indexed using Index(B).

P_A and P_B will normally be determined by the principal and advised to tenderers through the request for proposals document, so they can assess the impact before finalising their tender price. P_A and P_B will normally be fixed for the duration of the contract. These proportions will vary from contract to contract depending on the scope of the contract works.

Note 4: Residual bitumen is the non-volatile fraction of the bitumen binder that remains in service after evaporation. Volume is measured at 15 degrees Celsius.

[3]. Waka Kotahi publishes two bitumen price adjustment series, the EXISTING contracts bitumen price adjustment series, used where the contract has a tender close date prior to 1 September 2023 and the NEW contracts bitumen price adjustment series, used where the tender close date is on or after 1 September 2023. Refer Appendix 5 – Calculation of the Waka Kotahi bitumen price adjustment series.

APPENDIX 2 – MODEL COST FLUCTUATION ADJUSTMENT SCHEDULE TO CONDITIONS OF CONTRACT

Approved organisations are encouraged to use the appropriate model schedule presented here, without alteration, to help ensure efficient application of contract price adjustment for cost fluctuation. The model schedules are written so as to be consistent with the method as set out in this document and with use of the web-based Adjuster tool.

They have been written as a schedule to *NZS 3910 Conditions of contract for building and civil engineering construction* and terminology has been chosen to align with that standard. Section 12 *Payments* of NZS3910 includes contract requirements in relation to cost fluctuations. Section 12.8 *Cost fluctuations* provides for use of either the provisions of *Appendix A* or as 'otherwise provided for in the Special Conditions'. When this schedule is used with NZS3910 it will need to be referred to in the Special Conditions of contract. The same provisions are found in section 12 in NZS3915, NZS3916 and NZS3917.

The formula for calculating contract price adjustment is fully described in section 3. It takes the general form:

C = CI + CB

Where:

C = contract price adjustment

CI = index-based part

CB = bitumen volume-based part

There are three possible contract situations: C = CI or C = CI + CB or C = CB. A model schedule for each of these three cases is presented below.

Where the schedule text needs to be tailored to the actual contract it is shaded in yellow. Further alteration of the text will not normally be required.

Model schedule case 1: C = CI

In this case an index alone is used. It is therefore not an application of the bitumen volume-based method.

This case will apply where the volume of bitumen to be supplied under the contract is small. It may be used, for example, for a maintenance or bridge construction contract using an index appropriate to the type of work.

The text of the model schedule follows:

Schedule – cost fluctuation adjustment

1. The provisions of this schedule shall apply when provided for in the Special Conditions.
2. Subject to the remainder of this schedule, the amounts payable by the principal to the contractor under the contract shall be adjusted up or down by amounts calculated in accordance with the following formula:

   C = Value × (I/I' – 1)

   where:

C = cost fluctuation adjustment for the month under consideration

Value = value of work completed during the month under consideration taken from the Payment Schedule but without deduction for retentions and excluding the cost fluctuation adjustment

I/I' = the value of the index defined in Clause 3 for the month under consideration divided by the value of the index for the month during which tenders closed.

3. The index shall be the << index name>> published on the Waka Kotahi website.

4 Cost fluctuation provisions shall be applied from the commencement of the contract period.

<< OR Cost fluctuation adjustment for months 1 to 12 of the contract period shall be deemed = $Nil.>>

5. Cost fluctuations are calculated on a monthly basis.

6. For the purpose of calculating the cost fluctuation adjustment in Clause 2, any daywork, prime cost sums, variations and other payment items which are based on actual cost, or current prices and any advances shall be excluded from the value of work completed.

7. The contractor shall not be entitled to claim cost fluctuation adjustment for work completed after the due date for completion greater than that which would apply had the work been completed on the due date for completion.

8. The index values to be used in the calculation of the cost fluctuation in Clause 2 shall be those first published by Waka Kotahi for the appropriate quarter.

9. Where the index for the quarter has not yet been published, interim payments will be made on the basis of the index for the most recent quarter for which an index is available. A correction to the interim payment will be made following the publication of the applicable index and will be processed with subsequent progress payments.

10. If at any time any of the Statistics New Zealand indexes which are inputs into the Waka Kotahi index(es) referred to in Clause 2 or later clauses are no longer published, or if the basis of any index is materially changed, the adjustment shall thereafter be calculated by using such other input index, or in such other manner as will fairly reflect the changes as previously measured by that index.

Model schedule case 2: C = CI + CB

Where a contract includes supply of a significant volume of bitumen and has a longer term, of say 12 months or more, then providing for cost fluctuation adjustment for both bitumen supply and costs excluding bitumen will usually be appropriate. Longer term contracts which include reseals will usually fit this case.

The text of the model schedule follows:

Schedule – cost fluctuation adjustment

1. The provisions of this schedule shall apply when provided for in the Special Conditions.

2. Subject to the remainder of this schedule, the amounts payable by the principal, to the contractor under the contract shall be adjusted up or down by amounts calculated in accordance with the following formula:

C = CI + CB

where

C = cost fluctuation adjustment for the month under consideration

CI = [(Value × (P/100) × (I/I' – 1)]

CB = [Volume × (Bit – Bit')]

and

Value = value of work completed during the month under consideration taken from the payment schedule but without deduction for retentions and excluding the cost fluctuation adjustment

P = the proportion of value to be indexed. It is fixed for the duration of the contract and has a value of Z% <<specify the value of Z% >>

I/I' = the value of the index defined in Clause 3 for the month under consideration divided by the value of the index for the month during which tenders closed

Volume = volume of residual bitumen binder applied during the month under consideration (litres) taken from the payment schedule. Residual bitumen is the non-volatile fraction of the bitumen binder that remains in service after evaporation. Volume is measured at 15 degrees Celsius

Bit[4] = value of the Waka Kotahi bitumen price adjustment series for the month under consideration, published on the Waka Kotahi website

Bit' = value of the Waka Kotahi bitumen price adjustment series for the month during which tenders closed, published on the Waka Kotahi website.

3. The index shall be the Waka Kotahi reseals index (costs excluding bitumen) published on the Waka Kotahi website

   OR

   The index shall be << another index named here>>.

4. Cost fluctuation provisions shall be applied from the commencement of the contract period.

   << OR Cost fluctuation shall be applied from the commencement of the contract period except that for months 1 to 12 of the contract period CI shall be deemed = $Nil.>>

5. Cost fluctuations are calculated on a monthly basis.

6. For the purpose of calculating the cost fluctuation adjustment in Clause 2, any daywork, prime cost sums, variations and other payment items which are based on actual cost, or current prices and any advances shall be excluded from the value of work completed.

7. The contractor shall not be entitled to claim cost fluctuation adjustment for work completed after the due date for completion greater than that which would apply had the work been completed on the due date for completion.

8. The index values to be used in the calculation of the cost fluctuation in Clause 2 shall be those first published by Waka Kotahi for the appropriate quarter.

9. Where the index for the quarter has not yet been published, interim payments will be made on the basis of the index for the most recent quarter for which an index is available. A correction to the interim payment will be made following the publication of the applicable index and will be processed with subsequent progress payments.

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[4]. Waka Kotahi publishes two bitumen price adjustment series, the EXISTING contracts bitumen price adjustment series, used where the contract has a tender close date prior to 1 September 2023 and the NEW contracts bitumen price adjustment series, used where the tender close date is on or after 1 September 2023. Refer Appendix 5 – Calculation of the Waka Kotahi bitumen price adjustment series.

10. If at any time any of the Statistics New Zealand indexes which are inputs into the Waka Kotahi index(es) referred to in Clause 2 or later clauses are no longer published, or if the basis of any index is materially changed, the adjustment shall thereafter be calculated by using such other input index, or in such other manner as will fairly reflect the changes as previously measured by that index.

11. If at any time any of the inputs into the Waka Kotahi bitumen price adjustment series referred to in Clause 2 or later clauses are no longer published, or if the basis of the Waka Kotahi bitumen price adjustment series is materially changed, the adjustment shall thereafter be calculated by using such other inputs, or in such other manner as will fairly reflect the changes as previously measured by the Waka Kotahi bitumen price adjustment series.

Model schedule case 3: C = CB

Where a contract includes supply of a significant volume of bitumen and has a short term, of say 12 months or less, then providing for cost fluctuation adjustment for bitumen supply alone may be appropriate.

The text of the model schedule follows:

Schedule – cost fluctuation adjustment

1. The provisions of this schedule shall apply when provided for in the Special Conditions.

2. Subject to the remainder of this schedule, the amounts payable by the principal, to the contractor under the contract shall be adjusted up or down by amounts calculated in accordance with the following formula:

   C = Volume × (Bit – Bit')

   Where

   C = cost fluctuation adjustment for the month under consideration

   Volume = volume of residual bitumen binder applied during the month under consideration (litres) taken from the payment schedule. Residual bitumen is the non-volatile fraction of the bitumen binder that remains in service after evaporation. Volume is measured at 15 degrees Celsius

   Bit[5] = value of the Waka Kotahi bitumen price adjustment series for the month under consideration, published on the Waka Kotahi website

   Bit' = value of the Waka Kotahi bitumen price adjustment series for the month during which tenders closed, published on the Waka Kotahi website.

3. Cost fluctuation provisions shall be applied from the commencement of the contract period.

4. Cost fluctuations are calculated on a monthly basis.

5. The contractor shall not be entitled to claim cost fluctuation adjustment for work completed after the due date for completion greater than that which would apply had the work been completed on the due date for completion.

6. If at any time any of the inputs into the Waka Kotahi bitumen price adjustment series referred to in Clause 2 or later clauses are no longer published, or if the basis of the Waka Kotahi bitumen price adjustment series is materially changed, the adjustment shall thereafter be

[5]. Waka Kotahi publishes two bitumen price adjustment series, the EXISTING contracts bitumen price adjustment series, used where the contract has a tender close date prior to 1 September 2023 and the NEW contracts bitumen price adjustment series, used where the tender close date is on or after 1 September 2023. Refer Appendix 5 – Calculation of the Waka Kotahi bitumen price adjustment series.

calculated by using such other inputs, or in such other manner as will fairly reflect the changes as previously measured by the Waka Kotahi bitumen price adjustment series.

APPENDIX 3 – MODEL COST FLUCTUATION ADJUSTMENT SCHEDULE TO CONDITIONS OF CONTRACT USING TWO INDEXES

The following is an edited version of Appendix 2. It refers to the two indexes as Index(A) and Index(B).

Two indexes may be used when the costs incurred to deliver work are not of a single type – for example a construction contract could include structures plus other 'general' road construction. Index(A) would be the Waka Kotahi structures index (costs excluding bitumen) and Index(B) the Waka Kotahi construction index (costs excluding bitumen).

Two options are described reflecting different approaches to the use of two indexes. In **Option A** it is envisaged that a fixed percentage of the 'Value' will be indexed using Index(A) and a different fixed percentage will be indexed using Index(B). In **Option B** it is envisaged that a schedule will be used for the purpose of making progress claims and that the schedule will be divided between items to be indexed using Index(A) and items to be indexed using Index(B). Common items, for example any preliminary and general items, may be divided on some agreed percentage split basis.

Approved organisations are encouraged to use the model schedule presented here, without alteration, to help ensure efficient application of contract price adjustment for cost fluctuation. The model schedule is written so as to be consistent with the method as set out in this document and with use of the web-based Adjuster tool.

It has been written as a schedule to *NZS 3910 Conditions of contract for building and civil engineering construction* and terminology has been chosen to align with that standard. Section 12 *Payments* of NZS3910 includes contract requirements in relation to cost fluctuations. Section 12.8 *Cost fluctuations* provides for use of either the provisions of *Appendix A* or as 'otherwise provided for in the Special Conditions'. When this schedule is used with NZS3910 it will need to be referred to in the Special Conditions of contract. The same provisions are found in section 12 in NZS3915, NZS3916 and NZS3917.

The formula for calculating contract price adjustment is fully described in section 3. It takes the general form:

$$C = CI + CB$$

Where:

C = contract price adjustment

CI = index-based part

CB = bitumen volume-based part

In this case $CI = CI_A + CI_B$ reflecting the fact that two indexes are to be used.

Where the schedule text needs to be tailored to the actual contract it is shaded in yellow. Further alteration of the text will not normally be required.

Model schedules

The text of the two model schedules follow:

Option A

Schedule – cost fluctuation adjustment

1. The provisions of this schedule shall apply when provided for in the Special Conditions.

2. Subject to the remainder of this schedule, the amounts payable by the principal, to the contractor under the contract shall be adjusted up or down by amounts calculated in accordance with the following formula:

   $C = (CI_A + CI_B) + CB$

   where

   C = cost fluctuation adjustment for the month under consideration

   CI_A = [Value × (P_A/100) × (I_A/I_A' – 1)]

   CI_B = [Value × (P_B/100) × (I_B/I_B' – 1))]

   CB = [Volume × (Bit – Bit')]

   and

   Value = value of work completed during the month under consideration taken from the payment schedule but without deduction for retentions and excluding the cost fluctuation adjustment

   P_A = the proportion of value to be indexed using Index(A). It is fixed for the duration of the contract and has a value of Y% <<specify the value of Y% >>

   P_B = the proportion of value to be indexed using Index(B). It is fixed for the duration of the contract and has a value of Z% <<specify the value of Z% >>

   I_A/I_A' = the value of Index(A) defined in Clause 3 for the month under consideration divided by the value of Index(A) for the month during which tenders closed

   I_B/I_B' = the value of Index(B) defined in Clause 3 for the month under consideration divided by the value of Index(B) for the month during which tenders closed

   Volume = volume of residual bitumen binder applied during the month under consideration (litres) taken from the payment schedule. Residual bitumen is the non-volatile fraction of the bitumen binder that remains in service after evaporation. Volume is measured at 15 degrees Celsius

   Bit[6] = value of the Waka Kotahi bitumen price adjustment series for the month under consideration, published on the Waka Kotahi website

   Bit' = value of the Waka Kotahi bitumen price adjustment series for the month during which tenders closed, published on the Waka Kotahi website.

3. Index(A) shall the << index named here>> and Index(B) shall the << index named here>>. Both indexes are published on the Waka Kotahi website.

4. Cost fluctuation provisions shall be applied from the commencement of the contract period.

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[6]. Waka Kotahi publishes two bitumen price adjustment series, the EXISTING contracts bitumen price adjustment series, used where the contract has a tender close date prior to 1 September 2023 and the NEW contracts bitumen price adjustment series, used where the tender close date is on or after 1 September 2023. Refer Appendix 5 – Calculation of the Waka Kotahi bitumen price adjustment series.

<< OR Cost fluctuation shall be applied from the commencement of the contract period except that for months 1 to 12 of the contract period both CI_A and CI_B shall be deemed = $Nil.>>

5. Cost fluctuations are calculated on a monthly basis.

6. For the purpose of calculating the cost fluctuation adjustment in Clause 2, any daywork, prime cost sums, variations and other payment items which are based on actual cost, or current prices and any advances shall be excluded from the value of work completed.

7. The contractor shall not be entitled to claim cost fluctuation adjustment for work completed after the due date for completion greater than that which would apply had the work been completed on the due date for completion.

8. The index values to be used in the calculation of the cost fluctuation in Clause 2 shall be those first published by Waka Kotahi for the appropriate quarter.

9. Where the index for the quarter has not yet been published, interim payments will be made on the basis of the index for the most recent quarter for which an index is available. A correction to the interim payment will be made following the publication of the applicable index and will be processed with subsequent progress payments.

10. If at any time any of the Statistics New Zealand indexes which are inputs into the Waka Kotahi index(es) referred to in Clause 2 or later clauses are no longer published, or if the basis of any index is materially changed, the adjustment shall thereafter be calculated by using such other input index, or in such other manner as will fairly reflect the changes as previously measured by that index.

11. If at any time any of the inputs into the Waka Kotahi bitumen price adjustment series referred to in Clause 2 or later clauses are no longer published, or if the basis of the Waka Kotahi bitumen price adjustment series is materially changed, the adjustment shall thereafter be calculated by using such other inputs, or in such other manner as will fairly reflect the changes as previously measured by the Waka Kotahi bitumen price adjustment series.

Option B

Schedule – cost fluctuation adjustment

1. The provisions of this schedule shall apply when provided for in the Special Conditions.

2. Subject to the remainder of this schedule, the amounts payable by the principal, to the contractor under the contract shall be adjusted up or down by amounts calculated in accordance with the following formula:

$$C = (CI_A + CI_B) + CB$$

where

C = cost fluctuation adjustment for the month under consideration

CI_A = $[\text{Value}(A) \times (P_A/100) \times (I_A/I_A' - 1)]$

CI_B = $[\text{Value}(B) \times (P_B/100) \times (I_B/I_B' - 1))]$

CB = $[\text{Volume} \times (\text{Bit} - \text{Bit}')]$

and

Value(A) = value of work completed during the month under consideration for those items in the payment schedule that are to be indexed using Index(A) but without deduction for retentions and excluding the cost fluctuation adjustment

Value(B) = value of work completed during the month under consideration for those items in the payment schedule that are to be indexed using Index(B) but without deduction for retentions and excluding the cost fluctuation adjustment

P_A = the proportion of Value(A) to be indexed using Index(A). It is fixed for the duration of the contract and has a value of Y% <<specify the value of Y% >>

P_B = the proportion of Value(B) to be indexed using Index(B). It is fixed for the duration of the contract and has a value of Z% <<specify the value of Z% >>

I_A/I_A' = the value of Index(A) defined in Clause 3 for the month under consideration divided by the value of Index(A) for the month during which tenders closed

I_B/I_B' = the value of Index(B) defined in Clause 3 for the month under consideration divided by the value of Index(B) for the month during which tenders closed

Volume = volume of residual bitumen binder applied during the month under consideration (litres) taken from the payment schedule. Residual bitumen is the non-volatile fraction of the bitumen binder that remains in service after evaporation. Volume is measured at 15 degrees Celsius

Bit[7] = value of the Waka Kotahi bitumen price adjustment series for the month under consideration, published on the Waka Kotahi website

Bit' = value of the Waka Kotahi bitumen price adjustment series for the month during which tenders closed, published on the Waka Kotahi website.

3. Index(A) shall the << index named here>> and Index(B) shall the << index named here>>. Both indexes are published on the Waka Kotahi website.

4. Cost fluctuation provisions shall be applied from the commencement of the contract period.

   << OR Cost fluctuation shall be applied from the commencement of the contract period except that for months 1 to 12 of the contract period both CI_A and CI_B shall be deemed = $Nil.>>

5. Cost fluctuations are calculated on a monthly basis.

6. For the purpose of calculating the cost fluctuation adjustment in Clause 2, any daywork, prime cost sums, variations and other payment items which are based on actual cost, or current prices and any advances shall be excluded from the value of work completed.

7. The contractor shall not be entitled to claim cost fluctuation adjustment for work completed after the due date for completion greater than that which would apply had the work been completed on the due date for completion.

8. The index values to be used in the calculation of the cost fluctuation in Clause 2 shall be those first published by Waka Kotahi for the appropriate quarter.

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[7]. Waka Kotahi publishes two bitumen price adjustment series, the EXISTING contracts bitumen price adjustment series, used where the contract has a tender close date prior to 1 September 2023 and the NEW contracts bitumen price adjustment series, used where the tender close date is on or after 1 September 2023. Refer Appendix 5 – Calculation of the Waka Kotahi bitumen price adjustment series.

9. Where the index for the quarter has not yet been published, interim payments will be made on the basis of the index for the most recent quarter for which an index is available. A correction to the interim payment will be made following the publication of the applicable index and will be processed with subsequent progress payments.

10. If at any time any of the Statistics New Zealand indexes which are inputs into the Waka Kotahi index(es) referred to in Clause 2 or later clauses are no longer published, or if the basis of any index is materially changed, the adjustment shall thereafter be calculated by using such other input index, or in such other manner as will fairly reflect the changes as previously measured by that index.

11. If at any time any of the inputs into the Waka Kotahi bitumen price adjustment series referred to in Clause 2 or later clauses are no longer published, or if the basis of the Waka Kotahi bitumen price adjustment series is materially changed, the adjustment shall thereafter be calculated by using such other inputs, or in such other manner as will fairly reflect the changes as previously measured by the Waka Kotahi bitumen price adjustment series.

Note: Users of the above model schedule need to be aware that the definitions of Value(A) and Value(B) imply that by some means the schedule of prices will be divided between those items to be indexed using Index(A) and those items to be indexed using Index(B). One way to do that would be to include in the contract documents two lists, which show how the price schedule items will be divided. How costs that may be common, for example P&G costs, are to be treated also needs to be addressed in the contract documents.

APPENDIX 4 – INFRASTRUCTURE INDEXES PUBLISHED BY WAKA KOTAHI

Eight infrastructure indexes are published on the Waka Kotahi website with other infrastructure procurement tools.

Waka Kotahi index values for a particular quarter are usually published within 10 weeks of the end of the quarter. For example, the value applicable to works delivered in the quarter ending 30 September will usually be published early in December.

The eight published indexes are listed in the table below.

Waka Kotahi index	Typically used with	Frequency of calculation and index base date	Comment
Maintenance index	Local road infrastructure maintenance contracts	Quarterly – September 2016	One of the original 1991 series of indexes. No longer used for state highways contracts
Construction other than structures index (costs excluding bitumen)	Construction contracts other than contracts for structures	Quarterly – December 2014	Introduced in 2019 to be used with the bitumen volume-based method. Designed as a replacement for the 1991 Construction index. The input indexes for labour, staff, materials plus plant & site overheads are not 'standard' Statistics NZ indexes but 'special' indexes built for this index.
Construction index	Construction contracts let prior to the introduction of the *Construction other than structures index (costs excluding bitumen)*	Quarterly – September 2016	One of the original 1991 series of indexes. Values for this index will cease to be published once the older contracts using it have ended.
Structures index (costs excluding bitumen)	Bridge and other structures construction contracts	Quarterly – December 2014	Introduced in 2019 to be used with the bitumen volume-based method. Designed as a replacement for the 1991 Bridge index. The input indexes for labour, staff, materials plus plant & site overheads are not 'standard' Statistics NZ indexes but 'special' indexes built for this index.

Waka Kotahi index	Typically used with	Frequency of calculation and index base date	Comment
Bridge index	Bridge construction contracts let prior to the introduction of the *Structures index (costs excluding bitumen)*	Quarterly – September 2016	One of the original 1991 series of indexes. Values for this index will cease to be published once the older contracts using it have ended.
Professional services index	Professional services contracts	Quarterly – December 2022	Updated in 2023. Index values from March 2023 on have been calculated using an updated formula, which replaced the original 1991 series formula
Network outcomes index (costs excluding bitumen)	State highways network outcomes contracts and local road contracts which include renewals and use the bitumen volume-based method of contract price adjustment	Quarterly – December 2009	Introduced in 2012. Designed specifically for the network outcomes contracts. The input indexes for labour, plant and materials are not 'standard' Statistics NZ indexes but 'special' indexes built for this index.
Reseals index (costs excluding bitumen)	Reseals contracts which use the bitumen volume-based method of contract price adjustment	Quarterly – September 2001	Introduced in 2012 but based on the 1991 reseals index and revised to work with the bitumen volume-based method

The above indexes are calculated by Waka Kotahi from Statistics NZ indexes. Some of the Statistics NZ input indexes are 'standard' publicly available indexes and others are 'special' indexes maintained for Waka Kotahi by Statistics NZ.

A Waka Kotahi index value for a particular quarter is calculated by combining input indexes values using the following general formula:

$$I_q = con \times (w_1 \times C_1/C'_1 + \ldots + w_n \times C_n/C'_n)$$

Where I_q is the index value for a particular quarter, 'con' is a constant, usually 1,000, w_i is the weight applied to the input index value, C_i is the Statistics NZ input index value for the particular quarter, and C'_i is the Statistics NZ input index value for the base quarter.

The following table lists the input indexes and the weights applied, for each of the above eight Waka Kotahi indexes.

Input index	1991 Maintenance index	1991 Construction index	1991 Bridge index	Professional services index	Network outcomes index (costs excluding bitumen)	Reseals index (costs excluding bitumen)	Construction other than structures index (costs excluding bitumen	Structures index (costs excluding bitumen)
Construction PPIQ.SQNEE0000	0.20	0.20	0.10			0.33		
Transport storage and ... PPIQ.SQNII0000	0.05	0.05	0.05			0.08		
Road transport PPIQ.SQNII1100	0.05	0.05						
Fuel & oil (all farms fuel index) FPIQ.SEH15	0.10	0.10	0.20					
Labour cost index LCIQ.SG53Z9	0.50	0.40	0.30			0.25		
Non-metallic mineral product … PPIQ.SQNCC6100	0.10	0.20	0.35			0.33		
Waka Kotahi labour PPIQ.SPZNZT03					0.45			
Waka Kotahi plant PPIQ.SPZNZT04					0.25			
Waka Kotahi materials PPIQ.SPZNZT05					0.30			
Waka Kotahi labour PPIQ.SPZNZT11							0.20	0.15
Waka Kotahi staff PPIQ.SPZNZT12							0.15	0.10
Waka Kotahi materials PPIQ.SPZNZT18							0.30	
Waka Kotahi plant equipment & overheads PPIQ.SPZNZT19							0.35	
Waka Kotahi materials PPIQ.SPZNZT13								0.55
Waka Kotahi plant equipment & overheads PPIQ.SPZNZT14								0.20
Professional services labour[8]				0.75				
Professional services overheads[9]				0.25				

[8] The professional services labour cost index (LCI) is the Stats NZ index - Private Sector and Industry Group (ANZSIC06)(Base: June 2009 qtr (=1000)) (Qrtly-Mar/Jun/Sep/Dec) - Salary and Ordinary Time Wage Rates - Professional, Scientific and Technical Services

[9] The professional services overheads index is the Stats NZ producer price index (PPI) - Inputs (ANZSIC06) - NZSIOC level 4, Base: Dec. 2010 quarter (=1000) (Qrtly-Mar/Jun/Sep/Dec) - Scientific, Architectural and Engineering Services

APPENDIX 5 – CALCULATION OF THE WAKA KOTAHI BITUMEN PRICE ADJUSTMENT SERIES

Waka Kotahi bitumen price adjustment series values are calculated and published monthly on the Waka Kotahi Open data portal. At the same time they are entered into 'lookup' tables in the Adjuster.

Waka Kotahi currently publishes two bitumen price adjustment series, one referred to as the EXISTING contracts bitumen price adjustment series and the other as the NEW contracts bitumen price adjustment series. The EXISTING contracts series is used where the contract has a tender close date prior to 1 September 2023, and the NEW contracts series where the contract has a tender close date on or after 1 September 2023.

Formulae for the current bitumen price adjustment series

A file note recording in detail how both the above monthly series values will be calculated was shared with the industry group with which Waka Kotahi engaged as the series formulae were built. What follows summarises the content of the file note. It is available on request - refer Waka Kotahi InfoHub file nickname 57788052.

The formulae for The EXISTING contracts bitumen price adjustment series is:

> Series value for a given month = (Average Argus Singapore bitumen price for the previous 2 months + 1.15 X Average Argus bitumen freight price, Singapore-east Australia for the previous 2 months) all converted to NZD + $225 (indexed) + a constant.

Points to note include:

- The units are $/litre of residual bitumen
- The value for a given month applies to bitumen supplied during the calendar month
- The month used in all formula inputs is the month to the 25th – for example the USD/NZD exchange rate is the average of the daily rates as published by the Reserve Bank NZ to the 25th
- The formula lags the Argus prices and by using a two-month rolling average removes some volatility
- The inclusion of the $225 indexed amount is intended to cover other costs incurred by a bitumen importer including overhead costs required to land bitumen in New Zealand.
- The addition of a constant is necessary to allow this Argus price-based series to continue the previous Z Energy bitumen list price-based series
- Where conversion from tonnes of bitumen to residual litres is required a conversion factor of 960 litres per tonne is assumed.

The EXISTING contracts series will be phased out as contracts with a tender close date prior to 1 September 2023 come to an end.

The formula for the NEW contracts bitumen price adjustment series is:

> Series value for a given month = (Average Argus Singapore bitumen price for the previous 2 months + 1.15 X Average Argus bitumen freight price, Singapore-east Australia for the previous 2 months) all converted to NZD

The Argus bitumen price plus freight plus the NZD/USD exchange rate are thus the only cost elements covered – the NEW contracts series formula is focussed on those bitumen supply side issues that are known to be volatile and generally outside the control of NZ bitumen importers.

The EXISTING contracts series formula includes other elements of cost because it replaces the Z Energy list price-based formula, which included other costs.

No ‘constant’ is included in the NEW contracts series formula – given that this is to be used on ‘new’, contracts with a tender close date on or after 1 September 2023, the issue of ‘cross over’ from the Z Energy list price-based formula to the new formula does not arise.

Previous formulae for the bitumen price adjustment series

Up until October 2019, bitumen price adjustment series values were calculated from the average monthly spot price for Singapore HSFO 180, published by Platts Asia-Pacific (in USD per tonne), and the USD/NZD exchange rate.

The Platts Singapore HSFO price had been a reasonable surrogate for the price of bitumen but ceased to be so when the IMO (the International Maritime Organisation) changed certain rules governing discharges to atmosphere, which had an impact on the HSFO 180 market. From November 2019 to the end of June 2023 the monthly bitumen price adjustment series value followed the Z Energy bitumen list price. A further change became necessary when Z Energy ceased importing bitumen.

APPENDIX 6 – WORKED EXAMPLE – USING THE BITUMEN VOLUME-BASED METHOD

This worked example applies the formula presented in section 3. It uses the bitumen volume-based method, it is a C = CI + CB case.

The table below presents two lines from an example priced schedule of quantities for a reseals contract under which price adjustments are to be made. The nominated index is the Waka Kotahi reseals index (costs excluding bitumen).

Description	Unit	Quantity	Rate	Amount
Sprayed bitumen reseals (including the cost of bitumen) – grade X chip	m^2	50,000	6.50	325,000
Sprayed bitumen reseals (including the cost of bitumen) – grade Y chip	m^2	30,000	7.00	210,000

A monthly price adjustment is made based on the value of work completed plus the volume of residual bitumen supplied during the month. Two adjustment amounts are calculated and summed.

Calculation of the two amounts proceeds as follows.

Note that it is not necessary to have an item (or items) in the schedule of quantities for residual bitumen (litres) but the monthly quantity of residual bitumen applied is required to calculate the amount of the adjustment.

In this example we assume that the contract was priced (tenders closed) in June 2011. The monthly payment calculations (below) are for work completed in March 2012. The calculations assume that 10,000 m^2 of reseals under the first item and 6,000 m^2 under the second item were completed during the month.

The first part of the adjustment calculation uses the Waka Kotahi reseals index (costs excluding bitumen). The value of I/I' is calculated from figures taken from the table of index values published on the Waka Kotahi website with other infrastructure procurement tools.

I/I' = 1443/1424 = 1.0133 where 1443 and 1424 are values for the Waka Kotahi reseals index (costs excluding bitumen) for the months of March 2012 and June 2011 respectively. Assuming, for the purposes of this example, that costs excluding bitumen represent 60% of the total cost (i.e. the value of 'P' is 60%) then the amount of this first part of the adjustment is equal to the value of work completed during the month multiplied by ((60/100) × (1.0133 – 1)). Calculations are summarised in the table below.

Description	Unit	Quantity	Rate	Amount	I/I'	Adjustment	Adjusted amount
Sprayed bitumen reseals (including the cost of bitumen) – grade X chip	m^2	10,000	6.50	65,000	1.0133	520.37	65,520.37
Sprayed bitumen reseals (including the cost of bitumen) grade Y chip	m^2	6,000	7.00	42,000	1.0133	336.24	42,336.24
Totals				**107,000**		**856.61**	**107,856.61**

The second part of the cost fluctuation adjustment (for bitumen supply) is calculated as shown below. The amount of the adjustment depends solely on the volume of bitumen applied plus the relevant Waka Kotahi bitumen price adjustment series values. It is independent of the contractor's tendered rates, the cost to the contractor of bitumen supply and how the cost of bitumen supply is included in the tender schedule.

The adjustment for bitumen cost fluctuation = residual bitumen volume applied (litres) × dollar adjustment/litre. The dollar adjustment/litre (for this example) would be \$0.0648 = \$0.9141 – \$0.8493 where the figures of \$0.9141 and \$0.8493 are from the Waka Kotahi bitumen price adjustment series for the months of March 2012 and June 2011 respectively published on the Waka Kotahi website with other infrastructure procurement tools. Assuming, for the purposes of this example, a residual bitumen spray rate (for both the above schedule items) of 1.25 litres/m^2 then the volume of residual bitumen applied during the month will be (6,000 m^2 + 10,000 m^2) × 1.25 litres/m^2 = 20,000 litres. Calculations are summarised below.

Description	Unit	Quantity	Bitumen cost adjustment rate	Adjustment
Adjustment for bitumen volume applied	litres	20,000	0.0648	1,296.00

The total adjustment for the month of March 2012 (for all costs, bitumen and non-bitumen) would therefore be \$856.61 + \$1,296.00 = \$2,152.61 and the total amount to be paid for the month including adjustment for work completed under the above two schedule items would be \$107,000 + \$2,152.61 = \$109,152.61. Under a typical contract this would be reduced by a 'retention' amount.

APPENDIX 7 – RECORD OF AMENDMENTS

VERSION / AMENDMENT NUMBER	DECRIPTION OF CHANGE	EFFECTIVE DATE	UPDATED BY
Version 1	The bitumen volume-based method of contract price adjustment was introduced in November 2012. Refer general circular 12/04 - https://www.nzta.govt.nz/assets/resources/general-circulars/docs/12-04.pdf The instructions for contract price adjustment for cost fluctuation for infrastructure contracts, including instructions for the bitumen volume-based method of contract price adjustment, were initially included as part of the general circular. These instructions were later published alone and in February 2017 became Version 1 of *Contract price adjustment for cost fluctuation: Infrastructure contracts*. Version 1 also served as the 'help' file for the Adjuster.	February 2017	Bernard Cuttance
Version 2	Advice added on how to adjust the price of a contract using a combination of two indexes. The *Structures (costs excluding bitumen) index,* and the *Construction other than structures (costs excluding bitumen) index* introduced.	January 2019	Bernard Cuttance
Version 3	Description of the formula for the bitumen price adjustment series amended. From November 2019 it was based on the Z Energy list price for bitumen.	February 2021	Bernard Cuttance
Version 3 – Amendment 1	OLD 1991 professional services index updated. Document edited to ensure consistent use of the terms 'cost' and 'price' – consistent with the intent that it describe contract price adjustment for cost fluctuation, and consistent with use of the *Waka Kotahi bitumen price adjustment series* when applying the bitumen volume-based method of contract price adjustment.	May 2023	Bernard Cuttance

VERSION / AMENDMENT NUMBER	DECRIPTION OF CHANGE	EFFECTIVE DATE	UPDATED BY
Version 3 – Amendment 2	Changes made to align with the introduction of the Argus Singapore bitumen price-based bitumen price adjustment series and the introduction of two series to replace the previous single Z Energy bitumen list price-based series – an EXISTING contracts bitumen price adjustment series and a NEW contracts series. Section 4 *Establishing a value for 'P'* expanded and *Appendix 5 - Calculation of the Waka Kotahi bitumen price adjustment series* amended. Changes that were part of this latest amendment are shaded blue.	June 2023	Bernard Cuttance