

**City of Joondalup**  
**Review of 20 Year Strategic Model**

**18 May 2016**

Strictly private and confidential



Christine Robinson  
Manager Executive and Risk Services  
Municipality of the City of Joondalup  
PO Box 21  
Joondalup WA 6919

18 May 2016

Dear Christine,

**Re: City of Joondalup – Independent Review of 20 Year Strategic Model**

We are pleased to attach our report (the Report) prepared in accordance with our proposal dated 13 January 2016 and your acceptance dated 10 February 2016 in relation to the review of the Municipality of the City of Joondalup's (CoJ) 20 year strategic plan financial model (the Model). This engagement has been performed under CUA23706 effective November 2014.

Should you have any queries regarding the report, please feel free to contact me on 9365 7278.

Yours sincerely



**Andrew Foster**  
Partner  
Deloitte Touche Tohmatsu

---

# Contents



1. Executive summary
2. Assessment of Adherence to Standards
3. Best Practice Modelling Review
4. Data Collection and Control Review
5. Model Logic Review

## **Appendices**

- A. Assessment of Adherence to Standards
- B. Best Practice Modelling Review
- C. Data Collection and Control Review
- D. Model Logic Review
- E. Report Limitations

01

---

# Executive Summary

# 1.1 – Introduction

Our review of the CoJ models encompassed FAST Standard compliance, consistency with best practice, a review of mathematical logic, and process controls in relation to validity of source input data.

## Introduction

In order to assist in the future planning for provision of services, CoJ has developed a financial model to forecast future funding requirements.

The 20 year financial model (the Model) forecasts CoJ's financial position for the development of infrastructure and delivery of services. CoJ sought to engage an appropriately qualified and independent party to conduct a review of the Model. This Report relates to our review of the Model.

## Scope of Services

As part of the model development process Deloitte has been engaged to conduct a review of the Model, specifically to address:

- Consistency with relevant standards, guidelines and good practice in Australia and internationally
- Adherence to financial modelling best practice
- The robustness of the financial modelling processes, including review of the checks carried out on the results of the Model, and
- The approach to collection and review of data.

## Purpose of this Report

This report details our findings in relation to the Model relating to:

- Adherence to the FAST standards for development of financial models
- Consistency with best practice modelling principles
- The processes and controls in place to manage the collection, assessment and use of source input data in the Model
- A review of the mathematical logic of selected worksheets in the Model.

A list of recommended action items, based on our model logic and best practice reviews of the Model, is also provided for CoJ to consider in relation to improving the Model.

These findings and recommendations provide the basis for CoJ to assess the current performance of the Model and determine any actions items required to address any deficiencies in the Model.

We note that a cell by cell test of the mathematical and logical integrity was not conducted as part of this engagement and does not constitute either a reasonable assurance (audit) or limited assurance (review) engagement in accordance with the Auditing and Assurance Standards Board standards. Consequently no assurance on the Model is provided.

## Overview of Work Performed

Our review was conducted in four segments. Our findings are presented on a “by exception” basis. Our commentary, findings and recommendations relate only to instances where we have observed either a divergence from the relevant standard, best practice principle or model logic methodology.

### Adherence to FAST standards

The Model was assessed for its adherence to the FAST standards for developing financial models. The assessment was performed on an exceptions basis, where for example, one or more exceptions to the Standard were observed, these were denoted as non-compliant.

### Consistency with best practice modelling principles

Deloitte Business Modelling Centre of Excellence adopts a framework of best practice principles in relation to development, review and ongoing management of financial models.

The Model was assessed for consistency with these standards with commentary provided for each standard along with a measure of the level of consistency and risk.

### Data process and control review

Inputs within the Model were identified and matched back to source documentation. Discussions were also held with CoJ management to understand the process for gathering, reviewing and validating input data. We have provided a risk rating for each source document which reflects the ability of the user to validate the information that is used from the document.

### Model logic review

Calculations on selected worksheets within the Model were reviewed for mathematical accuracy, consistency and appropriateness.

An analytical review was also conducted on key Model outputs, having regard to trends of forecast calculations.

# 1.2 – Summary of Key Findings

The model is 65% compliant with the FAST modelling standard and we observed 55 out of 98 instances of high or good consistency with best practice principles. We noted 21 model logic exceptions during our review. A summary of our key findings is provided below.

## FAST Standard Compliance

Compliance was greatest for Workbook Design. Compliance was notably lower in the other three areas, especially with regard to Excel Features Used in Modelling, where less than half of FAST standards were fully complied with. Refer to Appendix A for the full list of FAST standards and compliance.

### Modelling Standard Compliance Summary

FAST Standard Group	(%) Compliance
1.0 Workbook Design	82%
2.0 Worksheet Design	70%
3.0 The Line Item	57%
4.0 Excel Features Used in Modelling	43%

## Best Practice Review

The Model was reviewed and compared to best practice principles for the development of financial models. Observations were made as to the consistency of the model with the Best Practice Principles.

Each principle is categorised as High, Good, Fair, Poor or Not Applicable based on our observations. Each principle was also assessed for the level of risk to the model if the principle is not complied with. We note that this assessment is not specific to the Model.

### Summary of Results

Criteria	# of Observations	High Risk	Med Risk	Low Risk
High	37	7	12	18
Good	22	3	7	12
Fair	27	2	14	11
Poor	5	1	2	2
Not Applicable	7	1	2	4
<b>TOTAL</b>	<b>98</b>	<b>14</b>	<b>37</b>	<b>47</b>

We note that the best practice principles relate to our observations in relation to the Model only. During our review we were provided with additional documentation by CoJ which supported a number of best practice principles.

Whilst the additional documentation supported the model and its usage, the best practice review was specifically focussed on the model and therefore where additional document was provided we have noted this in our findings.

## Data Collection and Control Review

We reviewed 12 worksheets within the model with assumptions where data sources were cross checked and cross referenced. Within those 12 worksheets were 60 respective data sources for assumptions, the control review found 7 data source types to be low risk and 53 to be medium risk.

Low Risk Items – These are defined as Independent items external to the City of Joondalup or assumptions subject to a higher level of scrutiny and therefore received a low risk rating as a data source based only on the type of document.

Medium Risk Items – These are defined as assumptions sourced from internal documents and previous model versions and were considered a higher risk item based only on the type of document.

Our detailed findings in relation to the validation of input source data is contained in Appendix C.1.

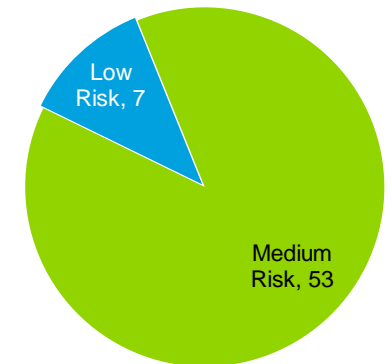
## Model Logic Review

The Model contains a total of 63 worksheets and 44,608 unique formulae. Our review of the model covered 7 key calculation sheets as discussed in Section 5.1.

These worksheets above contain 18,438 unique formulae. From the review of selected areas within these worksheets 21 exceptions were observed. These are summarised in section 5.2 and provided in detail in Appendix D.1.

The exceptions relate to general calculations, use of the arrays, manual adjustments to calculations, summary outputs, hard coded values, links to blank cells and the use of the macros.

Data Source Risk Summary



# 1.3 – Key Findings & Exceptions

A summary of our key findings in relation to the exceptions observed in the Model is provided below

CoJ Review Requirement	Key Deloitte Findings
<b>Adherence to a financial modelling standard (FAST)</b>	<ul style="list-style-type: none"> <li>Overall compliance with the FAST Standard was around 65% (on a weighted-average basis). Workbook design was the most compliant area, whereas the use of Excel features used in modelling was least compliant, in particular the use of Excel names.</li> </ul>
<b>Consistency with financial modelling best practice</b>	<ul style="list-style-type: none"> <li><b>Documentation:</b> The current specification information contained within the Model is insufficient to allow operation of the Model by a new user who is unfamiliar with the layout and structure of the Model.</li> <li><b>Structure:</b> Array functions have been used extensively which significantly increases the model calculation time. The Model contains several instances of circularities, which have been addressed through the use of macros. We note that some of these circularities are caused by the use of array calculations themselves and with alternative calculations the circularities could potentially be eliminated.</li> <li><b>Verification:</b> The Model has been reviewed by the model owner however there is no evidence that an internal peer review has been conducted during the model development process. We note that Deloitte has also conducted a logic review of specific elements of the Model, as part of this Report</li> <li><b>Output Validation:</b> The Documentation worksheet notes <i>“Although there is some risk &amp; sensitivity (in the Model) it should be improved. Monte Carlo simulation should be carried out to test the probability of the ratio projections”</i>. We have not observed any Monte Carlo simulation in the Model</li> <li><b>Data &amp; Assumptions:</b> There is limited evidence contained within the Model that identifies and supports the cross-referencing of input data with source documentation. Deloitte have been provided with additional documentation that supports such input data, however in terms of the best practice consistency provision of the external documentation was noted in our findings. Further to this, we note that Deloitte have undertaken a separate data assumption validation exercise, as set out in Section 4.</li> </ul>
<b>Approach to collection and review of data</b>	<ul style="list-style-type: none"> <li>We understand that part of the data review process is to validate source data with business unit managers and directors. Discussions with the model developer found that the source data was corroborated and approved by relevant business unit leaders.. Any inconsistencies raised during this review were raised and resolved with the Model owner.</li> </ul>
<b>Testing the robustness and logic of the financial modelling processes</b>	<ul style="list-style-type: none"> <li>Our review has resulted in 21 comments in our findings register. These comments relate to calculation errors , use of hardcoded values in formulae, inconsistencies in application of formulae and use of the array function. The comments are provided in Appendix D.1.</li> <li>Reserve funding is “ring fenced” for allocation to specific capital projects. To accommodate this allocation in the Model, replication of funding calculations is required which increases file size and calculation time as the calculations use arrays as part of the formulae.</li> <li>Summary outputs are duplicated which increases file size and calculation time.</li> <li>The “Funding_Macro” macro contains several processes which are necessary to prevent circularities in the Model, however we observed that if these arrays were refined or calculations restructured, the requirement for the macro could be removed.</li> </ul>

# 1.4 – Recommendations

A recommendations in relation to the Model are outlined below

CoJ Review Requirement	Recommendations
Adherence to a financial modelling standard (FAST)	<ul style="list-style-type: none"> <li>Review the FAST Standard compliance appendix (Appendix A) and update the Model as appropriate.</li> </ul>
Consistency with financial modelling best practice	<ul style="list-style-type: none"> <li>Develop a detailed specification document and user guide to assist new users with understanding and operation of the Model</li> <li>Develop and implement a plan for internal review and QA testing of the Model, including regular peer review with testing criteria documented within the Model.</li> </ul>
Approach to collection and review of data	<ul style="list-style-type: none"> <li>A number of inputs are sourced from other Excel workbooks. These checking of other workbooks was outside the scope of the review and as such have not been assessed in this process. A review should be conducted to ensure that output data of these other source workbooks are accurate and fit for purpose.</li> <li>Update assumption book in the Model to include relevant source document version, date provided, data owner and current input value.</li> </ul>
Testing the robustness and logic of the financial modelling processes	<ul style="list-style-type: none"> <li>Review and amend calculations which are returning incorrect results. Consider peer review during the model development process to assist with validation of model inputs, calculations and outputs.</li> <li>Remove manual hard coded adjustments from calculations. If these adjustments are still required include them as separate input values to increase transparency in calculations.</li> <li>Where practical, amend calculations containing array functions to reduce formula size and complexity and improve the operation and calculation time of the Model. Amending these formulae may also remove the requirement for a macro to be run to solve reserve and loan balances.</li> <li>To reduce file size and calculation time remove duplicate summary output and link dependent cells to source calculations.</li> <li>Ensure that supporting documentation for the workbook contains details relating to any adjustments made to calculation methodology, reconciliations between calculated values and use of hard codes within formulae.</li> <li>Update the Model to remove hard coded values and links to blank cells from formulae. Where hard coded values are still required include them as stand alone input assumptions.</li> <li>For future versions of the Model use a model comparison tool to identify changes to calculations compared to the current version. Perform a review to validate updated calculations.</li> <li>Review the structure and use of array functions in the Model to remove the requirement to solve reserve and loan balances through the use of a macro.</li> </ul>



# 02

---

## Adherence to a Financial Modelling Standard (FAST)

# 2.1 – Methodology and Approach

The Model has been assessed for adherence to the FAST standards for development of financial models

## City of Joondalup Review Requirement

**Adherence to financial modelling best practice (e.g. FAST Standard) or other applicable standards, principles or best practice.**

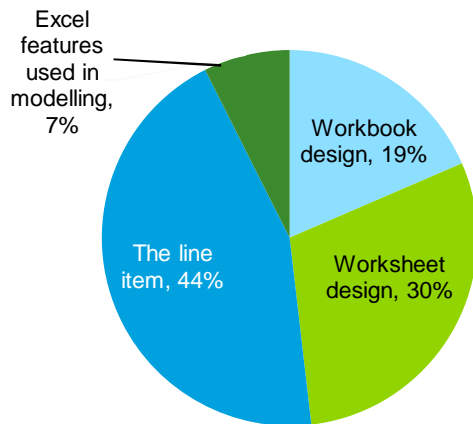
### The FAST Standard

The FAST modelling Standard, established by the FAST Standard Organisation, is a set of rules for the structure and design of spreadsheet based financial models. The FAST acronym stands for Flexible, Accurate, Standard and Transparent, which is the basis for sound model development according to the Organisation.

The FAST Standard addresses a number of areas in relation to model development:

- Workbook design: Organisation, layout and structure of workbooks and worksheets
- Formula consistency: One formula consistently applied across each row, clarity in formula construction and labelling conventions
- Data validation: Using error checks to ensure calculations are valid.

The relative weighting of each major chapter of the Standard is shown in the chart below.



### The FAST Chapters

The first chapter of the FAST Standard, Workbook Design, addresses the design of the workbook. The standards in this chapter cover consistency of structure and layout of the entire workbook. Model design must cater to both the creators and users of the Model.

Chapter 2, Worksheet Design, covers the layout of the worksheet as a whole, calculation blocks, headers, and specific types of worksheets (i.e. control, input and presentation worksheets).

Chapter 3, The Line Item, focuses on the clarity and consistency of formulae, labelling of line items, links and flags. This chapter weighs the most heavily in the Standard, as it is important for each line item to be correct in order for the Model to be accurate.

Standards in Chapter 4, Excel Features Used in Modelling, address the use of certain Excel functions, formatting, naming, data validation and the use of macros.

### Why Follow the FAST Standard?

Following the FAST Standard will assist in the creation of a well-designed model, and serve as a platform for common style that ensures models are more easily understood by other parties.

Adherence to the standards provides a level of comfort that the Model has been developed in a robust manner which reduces the likelihood of errors, allows the Model to be easily understood by all users, is easily replicable (if required) and enables outputs to be validated.

We note that in the Documentation worksheet CoJ comments that *“it must be emphasised that the FAST standards are not necessarily the perfect set of standards and it is not expected that any CoJ model would comply 100% with the FAST... The FAST guidelines provide a useful barometer of items that should be considered, and also make the modeller consider whether non compliant items are justified”*.

## 2.1 – Methodology and Approach

The Model has been assessed for adherence to the FAST standards for development of financial models

### Approach to FAST Adherence Analysis

Analysis of adherence to the FAST Standard involved an objective assessment of the Model to determine whether it fully met each and every standard. Where there was a single instance of non-compliance to a standard in the Model, it was considered to not adhere to that standard. Only standards that were complied with in every instance were considered to be met. Possible results for the adherence analysis for each standard were “Yes”, “No” and not applicable (“n/a”).

### Approach

The following steps were undertaken as part of our best practice review of the Model

Step	Task
1	Conduct FAST Standard adherence analysis.
2	Populate the FAST Standard compliance table.
3	Create a compliance overview table by Standard group.

### Summary of Results

FAST Standard Group	(%) Compliance
1.0 Workbook Design	82%
2.0 Worksheet Design	70%
3.0 The Line Item	57%
4.0 Excel Features Used in Modelling	43%

Compliance was greatest for Workbook Design. Compliance was notably lower in the other three areas, especially with regard to Excel Features Used in Modelling, where less than half of FAST standards were fully complied with. Refer to Appendix A for the full list of FAST standards and compliance.

## 2.2 – FAST Adherence Results

Our findings from the review of the Model for adherence to the FAST modelling standards are summarised below. Further detail is provided in Appendix A.1.

FAST Standard Group	(%) Compliance
<b>1.0 Workbook Design</b>	<b>82%</b>
<p>Workbook Design addresses the design of the workbook. The standards in this chapter cover consistency of structure and layout of the entire workbook. Model design must cater to both the creators and users of the Model.</p> <p>The CoJ Strategy Model had 82% compliance with this chapter, with non compliance in workbook design principles and sheet organisation. The Model did not use font colour to distinguish between imports and exports, and contained worksheets with both calculations and presentation, which led to low compliance in these areas.</p>	
<b>1.01</b> General Workbook Design Principles	80%
<b>1.02</b> Sheet Organisation	80%
<b>1.03</b> Multiple Workbook Models	100%
<b>2.0 Worksheet Design</b>	<b>70%</b>
<p>Worksheet Design covers the layout of the worksheet as a whole, calculation blocks, headers, and specific types of worksheets (i.e. control, input and presentation worksheets).</p> <p>The CoJ Strategy Model had 70% compliance with this chapter overall, with full compliance in control sheets, but especially low compliance in input sheets. A lack of an instructions/comments column on input worksheets led to low compliance in the input sheets section.</p>	
<b>2.01</b> Universal Design Layout Principles	67%
<b>2.02</b> Calculation Blocks	83%
<b>2.03</b> Header Design	50%
<b>2.04</b> Input Sheets	33%
<b>2.05</b> Presentation	86%
<b>2.06</b> Control Sheets	100%

FAST Standard Group (cont.)	(%) Compliance
<b>3.0 The Line Item</b>	<b>57%</b>
<p>The Line Item focuses on the clarity and consistency of formulae, labelling of line items, links and flags. This chapter weighs the most heavily in the Standard, as it is important for each line item to be correct in order for the Model to be accurate.</p> <p>The CoJ Strategy Model had 57% compliance with this chapter overall, with very low compliance in multiple workbook models, formula clarity and links. Daisy chains are present, where links are linked to other links. There are also a large number of IF functions used, including nested IFs, which caused low compliance in the areas mentioned. There was full compliance with timing flags and PPFs.</p>	
<b>3.01</b> General Workbook Design Principles	63%
<b>3.02</b> Sheet Organisation	50%
<b>3.03</b> Multiple Workbook Models	45%
<b>3.04</b> Formula Clarity	43%
<b>3.05</b> FAST Labelling Conventions	69%
<b>3.06</b> Links	0%
<b>3.07</b> Timing Flags and PPFs	100%
<b>4.0 Excel Features Used in Modelling</b>	<b>43%</b>
<p>Excel Features Used in Modelling address the use of certain Excel functions, formatting, naming, data validation and the use of macros.</p> <p>The CoJ Strategy Model had low compliance with this chapter overall, with zero compliance in Excel names. This is due to the use of numerous named ranges, which are listed in the Documentation worksheet.</p>	
<b>4.01</b> Excel Functions	50%
<b>4.02</b> Formatting Features	50%
<b>4.03</b> Excel Names	0%

Note: Excludes n/a standards and exceptions to standards

03

---

# Best Practice Output Review

## 3.1 – Methodology & Approach

We have assessed the Model against a suite of best practice principles covering various components of efficient financial model development

### City of Joondalup Review Requirement

**Consistency with relevant standards, guidelines and good practice in Australia and internationally.**

#### The Best Practice Principles

A best practice approach is a series of quality assurance principles and actions to ensure that model development, implementation and application are the highest achievable, commensurate with the intended purpose.

A comprehensive set of principles have been collated from a selection of good modelling practices and refined over a number of years by the Deloitte Business Modelling Centre of Excellence. To ensure a holistic set of best practice principles have been utilised we have included elements of existing standards, existing QA frameworks and learnings from the Centre of Excellence’s extensive modelling experience.

#### Best Practice Principles Segments

The principles are categorised into five main segments, each representing a distinct area of the best practice principles.



**Documentation** – The Model is clear and comprehensive



**Structure** – The Model workbook is transparent



**Verification** – The Model contains error free calculations



**Validation** – The workbook outputs are logical



**Data / Assumptions** – The workbook sources are sensible

### Methodology and Approach

The following steps were undertaken as part of our best practice review of the Model

Step	Task
1	Compile applicable Best Practice Principles.
2	Populate the best practice framework with commentary from review conducted in step 1.
3	Finalise key observations by importance.

#### Assessment of Best Practice Principles

The Model was assessed for consistency to best practice principles across the 5 key segments. We have classified each principle based on two criteria:

- 1. Consistency:** How consistent is the Model with the given principle? The level of consistency was measured against the scoring matrix as contained in appendix B.2.
- 2. Risk:** What is the level of risk to the Model, having regard to a material impact on the Model’s calculated outputs?

If the model is not consistent with best practice, we note that this is only an assessment of the risk of inconsistency, not the risk associated with our assessment of the Model’s adherence to the principles.

We note that the best practice principles relate to our observations in relation to the Model only. During our review we were provided with other documentation which addresses some best practice principles. This documentation was outside the scope of this review and was not considered when assessing the consistency of the Model with the specific principles however we have noted where this documentation exists.

A summary of our key observations in relation to consistency with best practice principles is provided in Section 3.2 and in Appendix C.1.

## 3.2 – Key Findings

The key findings have been listed below.

1

### DOCUMENTATION

The model owner has created a significant amount of documentation to assist a new user familiarise themselves with the Model. However, the documentation is not intuitive to a new user and could potentially be structured in a more logical manner to ensure significant user training is not required to use the Model.

2

### STRUCTURE

The key area of improvement is the re-structuring of formulae to consider alternative calculations to replace array functions. The array functions significantly increase the calculation processing time. Changing the formulae will make them significantly more robust and easier to review.

3

### VERIFICATION

We note that there is no internal defined peer review process adopted within CoJ to ensure that the Model is working as intended. A lack of regular systematic review could potentially compromise the integrity of the outputs.

4

### OUTPUT VALIDATION

Some sensitivity testing has taken place within the Model, however there does not appear to be any sensitivity testing conducted on an “extreme” basis to ensure that the Model does not break when an anomalous condition occurs.

5

### DATA & ASSUMPTIONS

We note there are several areas in the model to record data and assumptions, however these areas lack key metrics to identify specific data sources, dates and owners. We note there are additional documentation exists outside the review to support best practice principles and have marked these accordingly.

## 3.3 – Summary Findings

A high level summary of our findings is provided below

### Best Practice Review

The Model was reviewed and compared to best practice principles for the development of financial models. These principles are split into five broad categories:

**Documentation** – The Model is clear and comprehensive

**Structure** – The Model workbook is transparent

**Verification** – The Model contains error free calculations

**Validation** – The workbook outputs are logical

**Data / Assumptions** – The workbook sources are sensible

Each principle is categorised as High, Good, Fair, Poor or Not Applicable based on our observations. Each principle was also assessed for the level of risk to the model if the principle is not complied with. We note that this assessment is not specific to the Model.

The level of consistency was measured against the scoring matrix as contained in appendix B.2.

A summary of the breakdown of our findings is shown in the table below.

### Summary of Results

Criteria	# of Observations	High Risk	Med Risk	Low Risk
High	37	7	12	18
Good	22	3	7	12
Fair	27	2	14	11
Poor	5	1	2	2
Not Applicable	7	1	2	4
<b>TOTAL</b>	<b>98</b>	<b>14</b>	<b>37</b>	<b>47</b>



## 3.4 – Key Best Practice Observations

Our key findings in relation to consistency with best practice modelling standards are summarised below. The full list is detailed in Appendix B.2.

	Best Practice Approach	Key Findings	Key Risks	Risk Rating	Consistency Rating
<b>3</b> <i>Verification</i>					
3.1.1	<ul style="list-style-type: none"> <li>All formulae across a row should be consistent. There should be one unique formula at the starting point of each row/column, which is applied across the relevant time period or calculation.</li> <li>Ensure all formulae refer to the correct cell and that formulae have been validly copied down and across.</li> <li>Formulae are capable of being copied down or moved and will retain all references as appropriate</li> <li>Ensure all formulae refer to the correct cell</li> </ul>	<ul style="list-style-type: none"> <li>The Model has been reviewed by the model owner however there is no evidence that a peer review has been conducted. We note that Deloitte has also conducted a logic review of specific elements of the Model, these findings are contained in section 5.2.</li> </ul>	<ul style="list-style-type: none"> <li>Calculation errors may not be identified in the absence of peer review of the Model.</li> <li>In the absence of documentation and audit trails critical information relating to the operation and content of the Model may not be understood by users other than the model owner.</li> </ul>	High	Fair
<b>1</b> <i>Documentation</i>					
1.2.1	<ul style="list-style-type: none"> <li>The Model is supported by a model specification document that builds on the scope of work document, and which explains in greater detail the purpose, objectives, functionality, inputs, key calculations and outputs of the Model.</li> </ul>	<ul style="list-style-type: none"> <li>There is no specific specification document. Specification information is insufficient to allow operation of the Model by an independent user.</li> </ul>	<ul style="list-style-type: none"> <li>Without a detailed explanation of how the Model works, an independent user may not be able to understand how the Model works enough to make changes or updates.</li> </ul>	Medium	Fair

## 3.4 – Key Best Practice Observations

Our key findings in relation to consistency with best practice modelling standards are summarised below. The full list is detailed in Appendix B.2.

	Best Practice Approach	Key Findings	Key Risks	Risk Rating	Consistency Rating
<b>1 Documentation</b>					
1.3.1	<ul style="list-style-type: none"> <li>The Model is supported by a user guide that provides clear instruction to a model user as to how to update the Model.</li> </ul>	<ul style="list-style-type: none"> <li>There is insufficient information contained in the Model to allow an independent user to operate the Model. There is no dedicated user guide outlining input sections, where to change inputs and assumptions, or how to update the Model.</li> </ul>	<ul style="list-style-type: none"> <li>If there is insufficient user documentation, an independent user of the Model may be unable to locate input sections, and hence may be unable to update the Model for changes in assumptions or updated source data.</li> </ul>	Medium	Fair
<b>2 Structure</b>					
2.7.2	<ul style="list-style-type: none"> <li>The code is sufficiently and appropriately commented.</li> </ul>	<ul style="list-style-type: none"> <li>Limited commentary is included in the VBA code, further detail could be provided to enhance the transparency of the VBA module.</li> </ul>	<ul style="list-style-type: none"> <li>Lack of commentary could result in developer issues when new users update the front-end of the Model or attempt to update the VBA code.</li> </ul>	Medium	Fair
2.8.4	<ul style="list-style-type: none"> <li>Unless justified, array formulae should be avoided.</li> </ul>	<ul style="list-style-type: none"> <li>Arrays have been used extensively across the Model and significantly slow down the model calculation time.</li> </ul>	<ul style="list-style-type: none"> <li>An increase in processing time of calculations reduces the efficiency and productivity of the model user.</li> </ul>	Medium	Fair
2.8.7	<ul style="list-style-type: none"> <li>Circular references should be avoided.</li> </ul>	<ul style="list-style-type: none"> <li>The Model contains several instances of circularities, which have been addressed through the use of Macros. We note that some of these circularities are caused by the use of arrays in some formulae.</li> </ul>	<ul style="list-style-type: none"> <li>Circular references could potentially cause the Model to break if the file size gets too large.</li> </ul>	Medium	Fair
<b>4 Output Validation</b>					
4.3.1	<ul style="list-style-type: none"> <li>Data (especially poor quality data) has been addressed via sensitivity testing and/or Monte Carlo analysis, and the results have been documented.</li> </ul>	<ul style="list-style-type: none"> <li>The Documentation worksheet notes “Although there is some risk &amp; sensitivity (in the Model) it should be improved. Monte Carlo simulation should be carried out to test the probability of the ratio projections”. We have not observed any Monte Carlo simulation in the Model.</li> </ul>	<ul style="list-style-type: none"> <li>Input assumptions are not tested for a range of likely outcomes.</li> </ul>	Medium	Fair

## 3.4 – Key Best Practice Observations

Our key findings in relation to consistency with best practice modelling standards are summarised below. The full list is detailed in Appendix B.2.

	Best Practice Approach	Key Findings	Key Risks	Risk Rating	Consistency Rating
<b>5</b> <i>Data &amp; Assumptions</i>					
5.2.1	<ul style="list-style-type: none"> <li>There is evidence that the model input data/assumptions have been cross-checked back to source data or primary reference.</li> </ul>	<ul style="list-style-type: none"> <li>There is limited evidence of cross-checking data or assumptions back to data sources. We note that Deloitte have undertaken a data assumption validation exercise, as set out in Section 4. Management has advised there are a number of external sourced documents that are used to review/update the Model.</li> </ul>	<ul style="list-style-type: none"> <li>Data/assumptions that have not been cross-checked back to their source may have errors or may not be accurate and hence may lead to incorrect model outputs.</li> </ul>	Medium	Fair
5.1.1	<ul style="list-style-type: none"> <li>The Model contains an assumptions worksheet, that is referenced to source files and has a record of appropriate sign-off with relevant stakeholders.</li> </ul>	<ul style="list-style-type: none"> <li>There is an assumptions worksheet contained in the workbook. However, the worksheet does not cover all hardcoded input assumptions, nor does it include references to source files. There is limited evidence of a sign-off or review process for assumptions. Management has advised there are a number of external sourced documents that are used to review/update the Model.</li> </ul>	<ul style="list-style-type: none"> <li>Without reference to source files for data, it can be difficult to trace and verify assumptions and other inputs. Lack of a record of data sign-off can lead to the risk that data is not coming from appropriate or verified sources.</li> </ul>	Medium	Fair
<b>1</b> <i>Documentation</i>					
1.8.1	<ul style="list-style-type: none"> <li>A quality assurance plan has been adopted that adequately addresses and defines the review requirements of the Model throughout the model development process.</li> </ul>	<ul style="list-style-type: none"> <li>There is limited evidence of peer review and no clear documentation for QA. We note that the Model is operated by a single user. Management has advised there are a number of process documents and checklists that are used to review/update the model.</li> </ul>	<ul style="list-style-type: none"> <li>Without clear documentation of QA processes, checks and recommendations, the Model may include errors or may not be of as high quality as it could be with improvement recommendations.</li> </ul>	Low	Fair
1.4.1	<ul style="list-style-type: none"> <li>The model development process includes a change control process with adequate documentation detailing the nature of the change request, change made and testing of the change.</li> </ul>	<ul style="list-style-type: none"> <li>Documentation of changes made to the Model is provided with the Model, however, there is no evidence of a change request process or testing of changes requested/made.</li> </ul>	<ul style="list-style-type: none"> <li>A lack of change request log could potentially result in version control issues with a possibility that certain change requests are not captured and incorporated in future iterations.</li> </ul>	Low	Fair

## 3.4 – Key Best Practice Observations

Our key findings in relation to consistency with best practice modelling standards are summarised below. The full list is detailed in Appendix B.2.

	Best Practice Approach	Key Findings	Key Risks	Risk Rating	Consistency Rating
<b>1</b> <i>Documentation</i>					
1.6.1	<ul style="list-style-type: none"> <li>There is clear evidence that the data and assumptions used in the Model have been approved and signed off in accordance with internal approval guidelines.</li> </ul>	<ul style="list-style-type: none"> <li>There is limited evidence contained in the model that each assumption has been signed off nor evidence of the process for sign-off.</li> <li>We note that data is sourced from various documents, and consultation and review of data is conducted with business unit managers.</li> <li>Management has also advised that there are a number of external process documents and checklists that are used to support the review and update of assumptions contained in the model.</li> </ul>	<ul style="list-style-type: none"> <li>If data inputs cannot be reconciled to data sources, it may be difficult to track changes in assumptions. Data that is not reviewed by a person or body other than the model creator may lead to errors in model results and outputs.</li> </ul>	Low	Fair
1.7.1	<ul style="list-style-type: none"> <li>The Model complies with a data protection policy for managing sensitive and confidential data.</li> </ul>	<ul style="list-style-type: none"> <li>The Model employs worksheet protection and cell protection. However, worksheets and cells can be unprotected without a password.</li> </ul>	<ul style="list-style-type: none"> <li>If sensitive or confidential data is included in the Model without appropriate protection, there is a risk of confidential or sensitive data being accessed by those it should not be.</li> </ul>	Low	Fair
<b>2</b> <i>Structure</i>					
2.6.3	<ul style="list-style-type: none"> <li>Complex formulae are sufficiently explained.</li> </ul>	<ul style="list-style-type: none"> <li>No explanations of complex formulae (e.g. arrays) are provided in the Model. References are made to some calculations in the Documentation worksheet</li> </ul>	<ul style="list-style-type: none"> <li>Complex formulae make it difficult for new model users to use, update or review a model.</li> </ul>	Low	Fair

## 3.4 – Key Best Practice Observations

Our key findings in relation to consistency with best practice modelling standards are summarised below. The full list is detailed in Appendix B.2.

	Best Practice Approach	Key Findings	Key Risks	Risk Rating	Consistency Rating
<b>2</b> <i>Structure (cont)</i>					
2.1.1	<ul style="list-style-type: none"> <li>The Model contains a visual schematic of the model worksheets, showing a clear distinction between the inputs, calculations, outputs and ancillary worksheets along with inter-worksheet dependencies (or calculation logic flow)</li> </ul>	<ul style="list-style-type: none"> <li>There is not a clear distinction between inputs, calculations and outputs, and multiple names to present a single category. Simplification of contents page would enhance transparency. There is a Schematic worksheet but it only addresses the high level operation of the workbook and interrelationships between inputs and outputs.</li> <li>The Model provides an outline of the worksheet categories and how individual worksheets fall into each category. The Model also provides detail on the colour coding convention used to identify each worksheet category and a map outlining data flow.</li> </ul>	<ul style="list-style-type: none"> <li>The lack of a clear map of the Model and a lack of distinction between inputs and outputs could result in a significant time investment for a new user to take ownership and familiarise themselves with the Model. Not adhering to best practice model structure principles could result in potential IP loss when model owners are changed.</li> </ul>	Low	Fair
<b>4</b> <i>Output Validation</i>					
4.5.1	<ul style="list-style-type: none"> <li>The Model should be able to be replicated by independently (e.g. offline) re-performing key calculations on sections of the Model.</li> </ul>	<ul style="list-style-type: none"> <li>The Documentation worksheet along with supporting documents (e.g. 20 Year Strategic Financial Plan, Department of Local Government Financial Ratios) provides detailed explanations of key calculations which can be used to reconstruct calculations. We note that there is no evidence that any calculations have been replicated outside of the Model.</li> </ul>	<ul style="list-style-type: none"> <li>Results may differ between the Model and calculations performed in external workbooks.</li> </ul>	Low	Poor

# 04

---

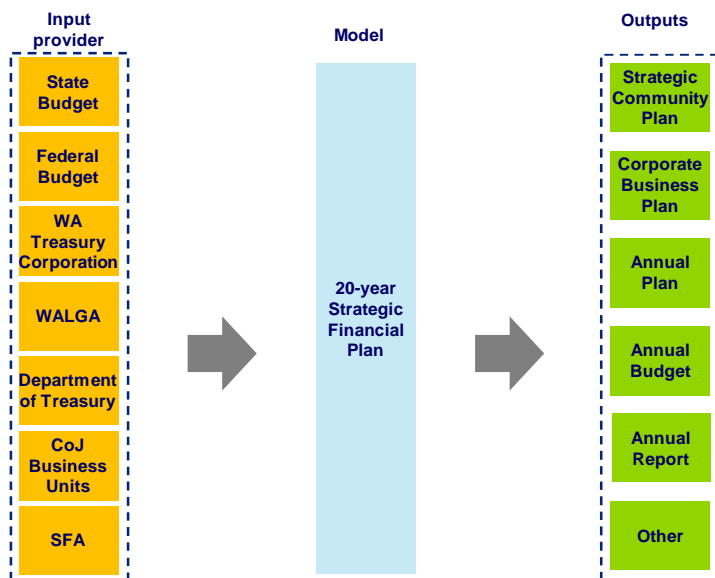
## Data collection, transfer and control

# 4.1 – Approach and Findings

We have reviewed the process for data collection, validation and use within the Model

**City of Joondalup Review Requirement**

*Approach to collection and review of data is appropriate.*



## Methodology

In consultation with City of Joondalup, we reviewed the processes and controls as they are applied to:

- Collection of data
- Accuracy of automated and manual data inputs into the Model
- Use of data within the Model
- Maintenance of source data and documentation for subsequent review

## Overview

Input data for the Model is obtained from a combination of source data providers including government budgets, prior strategic plans and internal City of Joondalup business units.

## Approach & Findings

All input data was extracted from the Model. Each value was checked back to the relevant source document. We note that in some instances clarification was sought from City of Joondalup as to the source of inputs.

We have provided a risk rating for each source document which reflects the ability of the user to validate the information that is used from the document. This rating is based on the source of the documentation only. Internal CoJ documents (including Excel workbooks) are considered medium risk while documents which are publicly available have been rated low risk.

The collection and use of source data is controlled by the model owner. A listing of source documents was provided for our review along with the documents themselves.

As highlighted in the Process worksheet, the Model is reviewed prior to finalisation. We understand from discussions with City of Joondalup that, where appropriate, part of the review process is to validate source data with business unit managers and directors. However we found no evidence of a formal sign off process that has been implemented as part of the data validation process.

We note that the hard coded values reviewed as part of this review do not constitute all of the hard coded values contained in the Model. These items are discussed in more detail in Section

Our detailed findings in relation to the validation of input source data is contained in Appendix C.1.

## 4.2 – Recommendations

Our recommendations based on our data process and control review are set out below

### 1. Review Source Excel Files

A number of inputs are sourced from other Excel workbooks. These workbooks were not within the scope of this engagement and have not been reviewed by Deloitte. A review should be conducted to ensure that output data is accurate and fit for purpose

### 2. Formalise Data Review Process

Implement a documented review process for input data received from other business units to ensure that the correct data is incorporated into the Model.

### 3. Document Data Sources in Workbook

Include a worksheet in the workbook which documents all the sources of input data, including relevant versions.



05

---

# Model logic review

# 5.1 – Methodology & Approach

A high level review was conducted on key worksheets within the Model. Key calculations and ratios were tested to validate methodology and appropriateness of outputs.

## City of Joondalup Review Requirement

**Assess the robustness of the financial modelling process including a review of the checks carried out on results of the Models.**

### Model Overview

The Model contains 63 worksheets and a total of 44,608 unique formula. The Model’s primary objective, as outlined in the Documentation worksheet, is to develop projections and ratios for inclusion in the City of Joondalup’s “20 Year Strategic Plan”. The projections include calculations of revenue, operating cost, capital expenditure and debt funding.

### Model Logic Review

A review of calculation logic was conducted on the following worksheets:

- *Projects\_exc.Esc,*
- *Projects\_inc.Esc,*
- *Funding\_Projects,*
- *Funding\_Reserves,*
- *Calcs\_Interest,*
- *Calcs\_Depn*
- *Calcs\_Loan*

A review of calculations was performed on these worksheets. Where a calculation was repeated multiple times (e.g. for each project) a comparison was conducted to ensure that subsequent calculations were consistent with the section tested.

### 20\_Yr\_Plan, 20\_Yr\_Plan(2), Key Ratios

A review of calculations was performed on these worksheets. Formulae were evaluated to ensure that their operation and results were consistent with the intended purpose

The worksheets above contained 18,438 unique formulae. From the review of select areas within these worksheets 21 exceptions were observed. These are summarised in section 5.2 and provided in detail in Appendix D.1

A full list is provided in Appendix D.2. We note that given the number of formulae contained within the worksheet, we were unable to complete the diagnostic analysis for the Funding\_Projects worksheet due to in-house diagnostic software limitations. Our findings do not include references to this worksheet.

Hard coded values and references to blank cells within formulae were also identified along with inconsistent application of formulae across rows and down columns (where applicable).

### Analytical Review

An analytical review of results and outputs was conducted, having regard to the following key ratios:

- **Net Municipal Closing Funds,**
- **Operating Surplus Ratio,**
- **Rates % Increase,**
- **Asset Sustainability Ratio,**
- **Debt Service Cover Ratio**

Model outputs were assessed for reasonableness and adherence to target ranges where appropriate. High level observations were also made regarding worksheet layout and structure.

A summary of key findings and observations is provided in Section 5.2.

### Methodology & Limitations

Given the number of worksheets and unique formula within the Model, it was not practical or efficient to conduct a mathematical and logical integrity review of all unique formula in the Model. On this basis the review was not conducted in accordance the Standard on Related Services ASRS 4400 Agree-Upon Procedures. Accordingly this review does not constitute either a reasonable assurance review (audit) or limited assurance (review) engagement in accordance with the Auditing and Assurance Standards Board (AUASB) and consequently no assurance is provided.

We note that during the review process a number of clarifications regarding the operation of the Model were provided by CoJ. These comments have been incorporated into our findings register.

## 5.2 – Key observations for calculation logic & analytical review

Our review analysed key calculations and outputs within the Model and identified areas for further review and action. A summary of our key findings is below based on 21 observed exceptions. A detailed findings register is provided in Appendix D.1.

### General Calculations

We have observed instances where formulae are applied incorrectly and where outputs have not been correctly linked within the Model. These are set out in Appendix D.1.

### Manual Model Adjustments

We have observed instances in the Model where a manual change has been made to a calculation, using a hard coded value, to accommodate a specific model scenario. These adjustments over-ride the underlying calculation logic and can lead to error if the model scenario was to change or be updated.

### Array Formulae

The Model contains in excess of 1,000 unique calculations that have been constructed using an array as part of the formula. These calculations increase the size of the Model and significantly slow the speed at which the Model recalculates. This can impact on model performance and lead to long calculation times.

In many of these cases the same result can be obtained using the SUMIFS() formula. An example of this has been provided in comment 13 of the findings register.

### Forecast Methodology & Approach

A decision has been taken by City of Joondalup to split funding reserves up to “ring-fence” funds and make them available only to specific projects. Funding can also be provided to a project from multiple sources. The allocation of this funding is calculated in the Funding\_Projects worksheet.

In order to accommodate this allocation methodology each project is allocated 5 reserves which can be drawn upon. This results in 500 individual draw down calculations which increases file size and slows calculation time.

We note that within each reserve, funding is allocated to projects in a sequential order (i.e. project #1 receives funds before project #2 where both are eligible for funding from that reserve). City of Joondalup has advised that this allocation is managed manually in rows 12-111 of the Projects\_Control and is an iterative process, with funding allocations reviewed on a regular basis.

### Output Summaries

The Funding\_Projects worksheet contains sections which summarise calculations in preceding rows. In some instances there is more than one source for these calculations (i.e. the same data is provided in 2 different sections, though the format may be different). In order to reduce the number of calculations required the summary in rows 8,194 to 8,240 could be amended to reference the data in Section 2 of the worksheet.

This change would have the impact of reducing the size of the Model, reducing calculation time and simplifying the review process.

## 5.2 – Key observations for calculation logic & analytical review

Our review analysed key calculations and outputs within the Model and identified areas for further review and action. A summary of our key findings is below. A detailed findings register is provided in Appendix D.1.

### Hard Codes, Blank Cells References and Formula Inconsistencies

Our diagnostic assessment of the Model has identified all cells which contain hard coded values or contain references to blank cells within the formulae. Instances where these items have a material impact on the calculations within the Model have been identified in the findings register.

The assessment also identified formulae which are inconsistent with the preceding formula in a row or column, where the calculations are intended to perform the same process.

A full listing of hard coded values, blank cell references and inconsistent application of formulae is provided in Appendix D.2.

### Reconciliations

As part of our analytical review we assessed whether outputs and totals were consistent across sections and worksheets within the Model. It was noted that in some circumstances values with the same label were inconsistent between worksheets. CoJ advised that this was due to individual worksheets calculating totals based on different parts of the same underlying data.

Reconciliations have been provided by CoJ which we have reviewed and performed separate calculations upon to validate.

### Funding Macro

The funding macro solves various reserve and loan balances for each year in the Model. Each balance and year is calculated separately with the Model recalculating between each process.

The macro is required as there are induced circularities in the Model. We have observed that these circularities have been caused by the structure of the calculations themselves and use of arrays in many of the formulae. If these formulae were modified some, or all, of the processes run by the macro could be eliminated and decrease model solve time.

The function of the macro is discussed in more detail in comment 21 of the findings register.

## 5.3 – Recommendations

Our recommendations based on our logic and analytical review are set out below

### 1. Correct Calculation Errors

Review and amend calculations which are returning incorrect results. Consider peer review process to assist with validation of model inputs, calculations and outputs.

### 2. Remove Manual Adjustments

Remove manual hard coded adjustments from calculations. If these adjustments are still required include them as separate input values to increase transparency in calculations.

### 3. Simplify formulae

Where practical, amend calculations containing array functions to reduce formula size and complexity and improve the operation and calculation time of the Model. Amending these formulae may also remove the requirement for a macro to be run to solve reserve and loan balances.

### 4. Remove Duplicate Summaries

To reduce file size and calculation time remove duplicate summary output and link dependent cells to source calculations.

### 5. Update Workbook Documentation

Ensure that supporting documentation for the workbook contains details relating to any adjustments made to calculation methodology, reconciliations between calculated values and use of hard codes within formulae.

### 6. Review Hard Codes and Blank Cell References

Update Model to remove hard coded values and links to blank cells from formulae. Where hard coded values are still required include them as stand alone input assumptions.

### 7. Version Comparison Testing & formulae Review

For future versions of the Model use a model comparison tool to identify changes to calculations compared to the current version. Perform a review to validate updated calculations.

### 8. Review Funding Macro

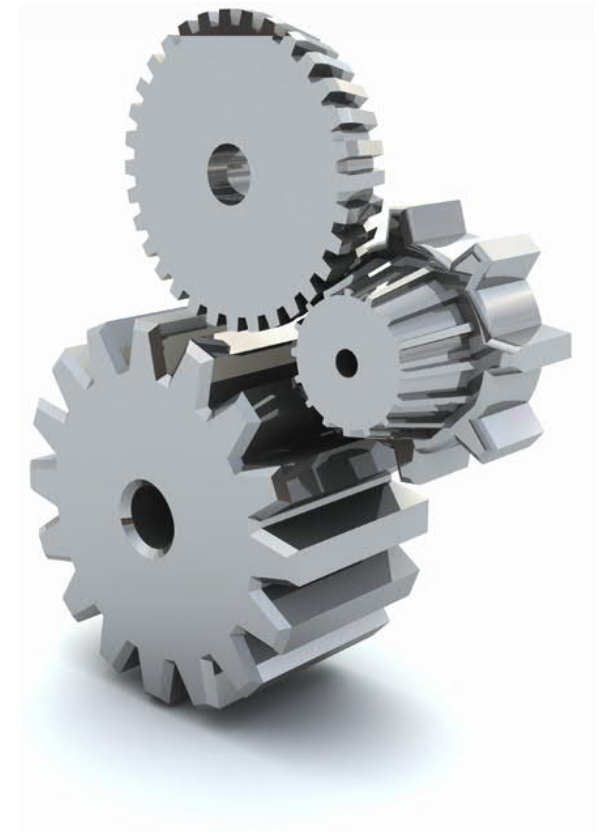
Review the structure and use of array formulae in the Model to remove the requirement to solve reserve and loan balances through the use of a macro.

## City of Joondalup

# Review of Joondalup Performing Arts and Cultural Facility (JPACF) Model

18 May 2016

Strictly private and confidential





Deloitte Touche Tohmatsu  
ABN 74 490 121 060

Tower 2 Brookfield Place  
123 St Georges Tce  
Perth WA 6000  
GPO Box A46  
Perth WA 6837 Australia

Tel: +61 8 9365 7000  
Fax: +61 8 9365 7001  
[www.deloitte.com.au](http://www.deloitte.com.au)

Christine Robinson  
Manager Executive and Risk Services  
Municipality of the City of Joondalup  
PO Box 21  
Joondalup WA 6919

18 May 2016

Dear Christine,

**Re: City of Joondalup – Independent Review of Joondalup Performing Arts and Cultural Facility Model**

We are pleased to attach our report (the Report) prepared in accordance with our proposal dated 13 January 2016 and your acceptance dated 10 February 2016 in relation to the review of the Municipality of the City of Joondalup's (CoJ) Joondalup Performing Arts and Cultural Facility (JPACF) model (the Model). This engagement has been performed under CUA23706 effective November 2014.

Should you have any queries regarding the report, please feel free to contact me on 9365 7278.

Yours sincerely

A handwritten signature in black ink, appearing to read "Andrew Foster", written over a white background.

**Andrew Foster**  
Partner  
Deloitte Touche Tohmatsu

---

# Contents



1. Executive summary
2. Assessment of Adherence to Standards
3. Best Practice Modelling Review
4. Data Collection and Control Review
5. Model Logic Review

## **Appendices**

- A. Assessment of Adherence to Standards
- B. Best Practice Modelling Review
- C. Data Collection and Control Review
- D. Model Logic Review
- E. Report Limitations



01

---

# Executive Summary

# 1.1 – Introduction

Our review has encompassed adherence FAST modelling standards, consistency with best practice standards, review of mathematical logic and process controls in relation to validity of source input data.

## Introduction

In order to assist in the evaluation of proposed capital projects, CoJ has developed financial model to forecast cash flows for each project.

Using a template model as a basis, CoJ have developed a model which forecasts discounted cash flows for the development of the Joondalup Performing Arts and Cultural Facility (JPACF) (the Model). CoJ sought to engage an appropriately qualified and independent party to conduct a review of the Model. We note that both the JPACF and the underlying template model have been provided for review as part of the engagement. This Report relates to our review of the Model.

## Scope of Services

As part of the model development process Deloitte has been engaged to conduct a review of the Model, specifically to address:

- Consistency with relevant standards, guidelines and good practice in Australia and internationally
- Adherence to financial modelling best practice
- The robustness of the financial modelling processes, including review of the checks carried out on the results of the Models, and
- The approach to collection and review of data.

## Purpose of this Report

This report summarises our findings in relation to the Model relating to:

- Adherence to the FAST standards for development of financial models
- Consistency with best practice modelling principles
- The processes and controls in place to manage the collection, assessment and use of source input data in the Model
- A review of the mathematical logic of selected worksheets in the Model.

A list of recommended action items, based on our model logic and best practice reviews of the Model, is also provided for CoJ to consider in relation to improving the Model.

These findings and recommendations provide the basis for CoJ to assess the current performance of the Model and determine any actions items required to address any deficiencies in the Model.

We note that a cell by cell test of the mathematical and logical integrity was not conducted as part of this engagement and does not constitute either a reasonable assurance (audit) or limited assurance (review) engagement in accordance with the Auditing and Assurance Standards Board standards. Consequently no assurance on the Model is provided.

## Overview of Work Performed

Our review was conducted in four segments. Our findings are presented on a “by exception” basis. Our commentary, findings and recommendations relate only to instances where we have observed either a divergence from the relevant standard, best practice principle or model logic methodology.

### Adherence to FAST standards

The Model was assessed for its adherence to the FAST standards for developing financial models. The assessment was performed on an exceptions basis, where for example, one or more exceptions to the Standard were observed, these were denoted as non-compliant.

### Consistency with best practice modelling principles

Deloitte Business Modelling Centre of Excellence adopts a framework of best practice principles in relation to development, review and ongoing management of financial models.

The Model was assessed for consistency with these standards with commentary provided for each standard along with a measure of the level of consistency and risk rating.

### Data process and control review

Inputs within the Model were identified and matched back to source documentation. Discussions were also held with CoJ management to understand the process for gathering, reviewing and validating input data. We have provided a risk rating for each source document which reflects the ability of the user to validate the information that is used from the document.

### Model logic review

Calculations on selected worksheets within the Model were reviewed for mathematical accuracy, consistency and appropriateness.

An analytical review was also conducted on key model outputs, having regard to trends of forecast calculations.

# 1.2 – Summary of Key Findings

The model is 80% compliant with the FAST modelling standard and we observed 59 out of 98 instances of high or good consistency with best practice principles. We noted 15 model logic exceptions during our review. A summary of our key findings is provided below.

## FAST Standard Compliance

Compliance was greatest for Workbook Design. Compliance was notably lower in the other three areas, especially with regard to Excel Features Used in Modelling, where just over half of FAST standards were fully complied with. Refer to Appendix A for the full list of FAST standards and compliance.

### Modelling Standard Compliance Summary

FAST Standard Group	(%) Compliance
1.0 Workbook Design	88%
2.0 Worksheet Design	83%
3.0 The Line Item	78%
4.0 Excel Features Used in Modelling	57%

## Best Practice Review

The Model was reviewed and compared to best practice principles for the development of financial models. Observations were made as to the consistency of the model with the Best Practice Principles.

Each principle is categorised as High, Good, Fair, Poor or Not Applicable based on our observations. Each principle was also assessed for the level of risk to the model if the principle is not complied with. We note that this assessment is not specific to the Model.

### Summary of Results

Criteria	# of Observations	High Risk	Med Risk	Low Risk
High	40	8	14	18
Good	19	2	7	10
Fair	27	2	14	11
Poor	4	1	-	3
Not Applicable	8	1	2	5
<b>TOTAL</b>	<b>98</b>	<b>14</b>	<b>37</b>	<b>47</b>

We note that the best practice principles relate to our observations in relation to the Model only. During our review we were provided with additional documentation by CoJ which supported a number of best practice principles.

Whilst the additional documentation supported the model and its usage, the best practice review was specifically focussed on the model and therefore where additional document was provided we have noted this in our findings.

## Data Collection and Control Review

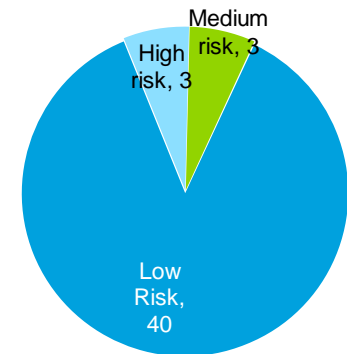
We reviewed 9 worksheets within the model with assumptions where data sources were cross checked and cross referenced. Within those 9 worksheets were 46 respective data sources for assumptions, the control review found 3 data source types to be high risk, 3 to be medium risk and 40 to be low risk.

Low Risk Items – These are defined as Independent items external to the City of Joondalup or assumptions subject to a higher level of scrutiny and therefore received a low risk rating as a data source based only on the type of document.

Medium Risk Items – These are defined as assumptions sourced from internal documents and previous model versions and were considered a higher risk item based only on the type of document.

High Risk Items – These are defined as internal estimates with input from relevant business units and are not linked to an underlying source document.

### Data Source Risk Summary



Our detailed findings in relation to the validation of input source data is contained in Appendix C.1.

## Model Logic Review

The Model contains a total of 33 worksheets and 9,319 unique formulae. Our review of the model covered 3 key calculation sheets as discussed in Section 5.1.

These worksheets above contain 1,634 unique formulae. From the review of selected areas within these worksheets 15 exceptions were observed. These are summarised in section 5.2 and provided in detail in Appendix D.1.

The exceptions relate to general calculations, use of the arrays, manual adjustments to calculations, summary outputs, hard coded values, links to blank cells and the use of the macros.

# 1.3 – Key Findings and Exceptions

Our report is presented on a “by exception basis”. A summary of our key findings in relation to the exceptions observed in the Model is provided below

CoJ Review Requirement	Key Deloitte Findings
Adherence to a financial modelling standard (FAST)	<ul style="list-style-type: none"> <li>Overall compliance with the FAST Standard was around 80% (on a weighted-average basis). Workbook design was the most compliant area, whereas the use of Excel features was least compliant.</li> </ul>
Adherence to financial modelling best practice	<ul style="list-style-type: none"> <li><b>Documentation:</b> The current specification information contained within the Model is insufficient to allow operation of the Model by a new user who is unfamiliar with the layout and structure of the Model.</li> <li><b>Structure:</b> Arrays have been used in the Model and increase the model calculation time.</li> <li><b>Verification:</b> The Model has been reviewed by the model owner however there is no evidence that an internal peer review has been conducted during the model development process. We note that Deloitte has also conducted a logic review of specific elements of the Model, these findings are contained in section 5.</li> <li><b>Output Validation:</b> The Risk worksheet contains analysis of the impact of changes to key input assumptions that are seen as being at risk along with an estimate of the required increase in operating subsidy to offset the downside risk. We note however that this worksheet is not dynamic and contains hard coded values.</li> <li><b>Data &amp; Assumptions:</b> There is limited evidence within the Model of cross-referencing of input data with source documentation. Deloitte have been provided with additional documentation which forms part of this review process however this documentation was outside the scope of our review. We note that Deloitte have undertaken a data assumption validation exercise, as set out in Section 4.</li> </ul>
Approach to collection and review of data	<ul style="list-style-type: none"> <li>We understand that part of the data review process is to validate source data with business unit managers and directors. Discussions with the model developer found that the source data was corroborated and approved by relevant business unit leaders. Any inconsistencies raised during this review were raised and resolved with the Model owner.</li> </ul>
Testing the robustness and logic of the financial modelling processes	<ul style="list-style-type: none"> <li>Our review has resulted in 15 comments in our findings register. These comments relate to calculation errors, use of hardcoded values in formulae, inconsistencies in application of formulae and use of the array function. The comments are provided in Appendix D.1.</li> <li>The Model contains in excess of 500 unique calculations that have been constructed using an array as part of the formula. The use of arrays increases the size of the Model and slows the speed at which the Model recalculates</li> <li>We have observed instances in the Model where a manual change has been made to a calculation, using a hard coded value, to accommodate a specific model scenario. These adjustments override calculation methodologies and can lead to error if the model scenario was to be changed or updated</li> <li>The outputs of the Model have been tested against the input assumptions contained within the Model. The reconciliation exercise has not yielded any additional queries or findings</li> </ul>

# 1.4 – Recommendations

A recommendations in relation to the Model are outlined below

CoJ Review Requirement	Recommendations
<b>Adherence to a financial modelling standard (FAST)</b>	<ul style="list-style-type: none"> <li>Review the FAST Standard compliance appendix (Appendix A) and update the Model as appropriate.</li> </ul>
<b>Consistency with Best Practice principles</b>	<ul style="list-style-type: none"> <li>Develop a specification document and user guide to assist users with understanding and operating the Model</li> <li>Develop a plan for regular internal review and QA testing of the Model, including formal sign off of Model input assumptions</li> </ul>
<b>Approach to collection and review of data</b>	<ul style="list-style-type: none"> <li>A number of inputs are sourced from other Excel workbooks. These workbooks were not within the scope of this engagement and have not been reviewed by Deloitte. A review should be conducted to ensure that output data is accurate and fit for purpose.</li> <li>Include a worksheet in the workbook which documents all the sources of input data, including relevant versions.</li> </ul>
<b>Testing the robustness and logic of the financial modelling processes</b>	<ul style="list-style-type: none"> <li>Remove manual adjustments from calculations. If these adjustments are still required include them as separate input values to increase transparency in calculations</li> <li>Where practical, amend calculations containing array functions to reduce formula size and complexity and improve the operation and calculation time of the Model</li> <li>For future versions of the Model use a model comparison tool to identify changes to calculations compared to the current version. Perform a review to validate updated calculations</li> <li>Update Model to remove hard coded values and links to blank cells from formulae. Where hard coded values are still required include them as stand alone input assumptions</li> </ul>

# 02

---

## Adherence to a Financial Modelling Standard (FAST)

# 2.1 – Methodology and Approach

The Model has been assessed for adherence to the FAST standards for development of financial models

## City of Joondalup Review Requirement

**Adherence to financial modelling best practice (e.g. FAST Standard) or other applicable standards, principles or best practice.**

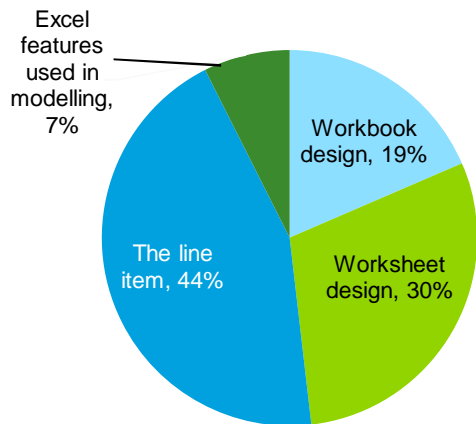
### The FAST Standard

The FAST modelling Standard, established by the FAST Standard Organisation, is a set of rules for the structure and design of spreadsheet based financial models. The FAST acronym stands for Flexible, Accurate, Standard and Transparent, which is the basis for sound model development according to the Organisation.

The FAST Standard addresses a number of areas in relation to model development:

- Workbook design: Organisation, layout and structure of workbooks and worksheets
- Formula consistency: One formula consistently applied across each row, clarity in formula construction and labelling conventions
- Data validation: Using error checks to ensure calculations are valid.

The relative weighting of each major chapter of the Standard is shown in the chart below.



### The FAST Chapters

The first chapter of the FAST Standard, Workbook Design, addresses the design of the workbook. The standards in this chapter cover consistency of structure and layout of the entire workbook. Model design must cater to both the creators and users of the Model.

Chapter 2, Worksheet Design, covers the layout of the worksheet as a whole, calculation blocks, headers, and specific types of worksheets (i.e. control, input and presentation sheets).

Chapter 3, The Line Item, focuses on the clarity and consistency of formulae, labelling of line items, links and flags. This chapter weighs the most heavily in the Standard, as it is important for each line item to be correct in order for the Model to be accurate.

Standards in Chapter 4, Excel Features Used in Modelling, address the use of certain Excel functions, formatting, naming, data validation and the use of macros.

### Why Follow the FAST Standard?

Following the FAST Standard will assist in the creation of a well-designed model, and serve as a platform for common style that ensures models are more easily understood by other parties.

Adherence to the standards provides a level of comfort that the Model has been developed in a robust manner which reduces the likelihood of errors, allows the Model to be easily understood by all users, is easily replicable (if required) and enables outputs to be validated.

We note that in the Documentation worksheet CoJ comments that *“The model is not intended to comply with any particular standard... The SFA has his own Best Practice guidelines”*.

## 2.1 – Methodology and Approach

The Model has been assessed for adherence to the FAST standards for development of financial models

### Approach to FAST Adherence Analysis

Analysis of adherence to the FAST Standard involved an objective assessment of the Model to determine whether it fully met each and every standard. Where there was a single instance of non-compliance to a standard in the Model, it was considered to not adhere to that standard. Only standards that were complied with in every instance were considered to be met. Possible results for the adherence analysis for each standard were “Yes”, “No” and not applicable (“n/a”).

### Approach

The following steps were undertaken as part of our best practice review of the Model

Step	Task
1	Conduct FAST Standard adherence analysis.
2	Populate the FAST Standard compliance table.
3	Create a compliance overview table by Standard group.

### Summary of Results

FAST Standard Group	(%) Compliance
1.0 Workbook Design	88%
2.0 Worksheet Design	83%
3.0 The Line Item	78%
4.0 Excel Features Used in Modelling	57%

Compliance was greatest for Workbook Design. Compliance was slightly lower in Worksheet Design and The Line Item, and notably lower in Excel Features Used in Modelling, where just over half of FAST standards were fully complied with. Refer to Appendix A for the full list of FAST standards and compliance.



## 2.2 – FAST Adherence Results

Our findings from the review of the Model for adherence to the FAST modelling standards are summarised below. Further detail is provided in Appendix A.1.

FAST Standard Group	(%) Compliance
<b>1.0 Workbook Design</b>	<b>88%</b>
<p>Workbook Design addresses the design of the workbook. The standards in this chapter cover consistency of structure and layout of the entire workbook. Model design must cater to both the creators and users of the Model.</p> <p>The Model had 88% compliance with this chapter, with non compliance in workbook design principles and sheet organisation. The Model did not use font colour to distinguish between imports and exports, and did not contain a separate worksheet for flags and factors, which led to low compliance in these areas.</p>	
1.01 General Workbook Design Principles	90%
1.02 Sheet Organisation	80%
1.03 Multiple Workbook Models	100%
<b>2.0 Worksheet Design</b>	<b>83%</b>
<p>Worksheet Design covers the layout of the worksheet as a whole, calculation blocks, headers, and specific types of worksheets (i.e. control, input and presentation sheets).</p> <p>The Model had 83% compliance with this chapter overall, with lowest compliance in header design and input sheets. For example, low compliance with header design is due to multiple timelines on the By_Year worksheet and lack of column counters. A lack of an instructions/comments column on input sheets led to low compliance in this section.</p>	
2.01 Universal Design Layout Principles	88%
2.02 Calculation Blocks	83%
2.03 Header Design	67%
2.04 Input Sheets	67%
2.05 Presentation	100%
2.06 Control Sheets	100%

FAST Standard Group (cont.)	(%) Compliance
<b>3.0 The Line Item</b>	<b>78%</b>
<p>The Line Item focuses on the clarity and consistency of formulae, labelling of line items, links and flags. This chapter weighs the most heavily in the Standard, as it is important for each line item to be correct in order for the Model to be accurate.</p> <p>The Model had 78% compliance with this chapter overall, with full compliance in sheet organisation and FAST labelling conventions, and lowest compliance in multiple workbook models. Daisy chains are present, where links are linked to other links. There are also a large number of IF functions used, including nested IFs, which caused low compliance in multiple workbook models.</p>	
3.01 General Workbook Design Principles	88%
3.02 Sheet Organisation	100%
3.03 Multiple Workbook Models	50%
3.04 Formula Clarity	75%
3.05 FAST Labelling Conventions	100%
3.06 Links	67%
3.07 Timing Flags and PPFs	75%
<b>4.0 Excel Features Used in Modelling</b>	<b>57%</b>
<p>Excel Features Used in Modelling address the use of certain Excel functions, formatting, naming, data validation and the use of macros.</p> <p>The Model had just over 50% compliance with this chapter overall, with zero compliance in Excel names. This is due to the use of numerous named ranges, which are listed in the Documentation worksheet.</p>	
4.01 Excel Functions	75%
4.02 Formatting Features	50%
4.03 Excel Names	0%

Note: Excludes n/a standards and exceptions to standards

03

---

# Best Practice Output Review

## 3.1 – Methodology & Approach

We have assessed the Model against a suite of best practice principles covering various components of efficient financial model development

### City of Joondalup Review Requirement

***Consistency with relevant standards, guidelines and good practice in Australia and internationally.***

#### The Best Practice Principles

A best practice approach is a series of quality assurance principles and actions to ensure that model development, implementation and application are the highest achievable, commensurate with the intended purpose.

A comprehensive set of principles have been collated from a selection of good modelling practices and refined over a number of years by the Deloitte Business Modelling Centre of Excellence. To ensure a holistic set of best practice principles have been utilised we have included elements of existing standards, existing QA frameworks and learnings from the Centre of Excellence’s extensive modelling experience.

#### Best Practice Principles Segments

The principles are categorised into five main segments, each representing a distinct area of the best practice principles.



**Documentation** – The Model is clear and comprehensive



**Structure** – The Model workbook is transparent



**Verification** – The Model contains error free calculations



**Validation** – The workbook outputs are logical



**Data / Assumptions** – The workbook sources are sensible

### Methodology and Approach

The following steps were undertaken as part of our best practice review of the Model

Step	Task
1	Compile applicable Best Practice Principles.
2	Populate the best practice framework with commentary from review conducted in step 1.
3	Finalise key observations by importance.

#### Assessment of Best Practice Principles

The Model was assessed for adherence to best practice principles across the 5 key segments. We have classified each principle based on two criteria:

- 1. Consistency:** How consistent is the Model with the given principle? The level of consistency was measured against the scoring matrix as contained in appendix B.2.
- 2. Risk:** What is the level of risk to the Model, having regard to a material impact on the Model’s calculated outputs?

If the model is not consistent with best practice, we note that this is only an assessment of the risk of inconsistency, not the risk associated with our assessment of the Model’s adherence to the principles.

We note that the best practice principles relate to our observations in relation to the Model only. During our review we were provided with other documentation which addresses some best practice principles. This documentation is outside the scope of this review and was not considered when assessing the consistency of the Model with the specific principles however we have noted where this documentation exists.

A summary of our key observations in relation to adherence to best practice principles is provided in Section 3.2. Further details are provided in Appendix C.1.

## 3.2 – Key Findings

The key findings have been listed below.

1

### DOCUMENTATION

The model owner has created a significant amount of documentation to assist a new user familiarise themselves with the Model. However, the documentation is not intuitive to a new user and could potentially be structured in a more logical manner to ensure significant user training is not required to use the Model.

2

### STRUCTURE

The key area of improvement is the re-structuring of formulae to consider alternative calculations to replace array functions. The array functions significantly increase the calculation processing time. Changing the formulae will make them significantly more robust and easier to review.

3

### VERIFICATION

We note that there is no internal defined peer review process adopted within CoJ to ensure that the Model is working as intended. A lack of regular systematic review could potentially compromise the integrity of the outputs.

4

### OUTPUT VALIDATION

Some sensitivity testing has taken place within the Model, however there does not appear to be any sensitivity testing conducted on an “extreme” basis to ensure that the Model does not break when an anomalous condition occurs.

5

### DATA & ASSUMPTIONS

We note there are several areas in the model to record data and assumptions, however these areas lack key metrics to identify specific data sources, dates and owners. We note there are additional documentation exists outside the review to support best practice principles and have marked these accordingly.

## 3.3 – Summary Findings

A high level summary of our findings is provided below

### Best Practice Review

The Model was reviewed and compared to best practice principles for the development of financial models. These principles are split into five broad categories:

**Documentation** – The Model is clear and comprehensive

**Structure** – The Model workbook is transparent

**Verification** – The Model contains error free calculations

**Validation** – The workbook outputs are logical

**Data / Assumptions** – The workbook sources are sensible

Each principle is categorised as High, Good, Fair, Poor or Not Applicable based on our observations. Each principle was also assessed for the level of risk to the model if the principle is not complied with. We note that this assessment is not specific to the Model.

The level of consistency was measured against the scoring matrix as contained in appendix B.2.

A summary of the breakdown of our findings is shown in the table below.

### Summary of Results

Criteria	# of Observations	High Risk	Med Risk	Low Risk
High	40	8	14	18
Good	19	2	7	10
Fair	27	2	14	11
Poor	4	1	-	3
Not Applicable	8	1	2	5
<b>TOTAL</b>	<b>98</b>	<b>14</b>	<b>37</b>	<b>47</b>

## 3.2 – Key Best Practice Observations

Our key findings in relation to consistency with best practice modelling standards are summarised below. The full list is detailed in Appendix B.2.

	Best Practice Approach	Key Findings	Key Risks	Risk Rating	Consistency Rating
<b>3 Verification</b>					
3.1.1	<ul style="list-style-type: none"> <li>All formulae across a row should be consistent. There should be one unique formula at the starting point of each row/column, which is applied across the relevant time period or calculation.</li> <li>Ensure all formulae refer to the correct cell and that formulae have been validly copied down and across.</li> <li>Formulae are capable of being copied down or moved and will retain all references as appropriate</li> <li>Ensure all refer to the correct cell and worksheet.</li> </ul>	<ul style="list-style-type: none"> <li>The Model has been reviewed by the Model owner however there is no evidence that a peer review has been conducted. We note that Deloitte has also conducted a logic review of specific elements of the Model, these findings are contained in section 5.</li> </ul>	<ul style="list-style-type: none"> <li>Calculation errors may not be identified in the absence of peer review of the Model.</li> <li>In the absence of documentation and audit trails critical information relating to the operation and content of the Model may not be understood by users other than the model owner.</li> </ul>	High	Fair
<b>1 Documentation</b>					
1.2.1	<ul style="list-style-type: none"> <li>The Model is supported by a model specification document that builds on the scope of work document, and which explains in greater detail the purpose, objectives, functionality, inputs, key calculations and outputs of the Model.</li> </ul>	<ul style="list-style-type: none"> <li>There is no specific specification document. Specification information within the Model is insufficient to allow operation of the Model by an independent user.</li> </ul>	<ul style="list-style-type: none"> <li>Without a detailed explanation of how the Model works, an independent user may not be able to understand how the Model works enough to make changes or updates.</li> </ul>	Medium	Fair
<b>5 Data &amp; Assumptions</b>					
5.2.2	<ul style="list-style-type: none"> <li>There is evidence that the model input data/assumptions have been cross-checked back to source data or primary reference.</li> </ul>	<ul style="list-style-type: none"> <li>There is limited evidence of cross-checking data or assumptions back to data sources. We note that Deloitte have undertaken a data assumption validation exercise, as set out in Section 4.</li> </ul>	<ul style="list-style-type: none"> <li>Data/assumptions that have not been cross-checked back to their source may have errors or may not be accurate and hence may lead to incorrect model outputs.</li> </ul>	Medium	Fair

## 3.2 – Key Best Practice Observations

Our key findings in relation to consistency with best practice modelling standards are summarised below. The full list is detailed in Appendix B.2.

	Best Practice Approach	Key Findings	Key Risks	Risk Rating	Consistency Rating
<b>5</b> <i>Data &amp; Assumptions</i>					
5.1.1	<ul style="list-style-type: none"> <li>The Model contains an assumptions worksheet, that is referenced to source files and has a record of appropriate sign-off with relevant stakeholders.</li> </ul>	<ul style="list-style-type: none"> <li>There are multiple worksheets in the Model which contain input assumptions. However, they do not include references to source files. There is no evidence of a sign-off or review process for assumptions.</li> </ul>	<ul style="list-style-type: none"> <li>Without reference to source files for data, it can be difficult to trace and verify assumptions and other inputs. Lack of a record of data sign-off can lead to the risk that data is not coming from appropriate or verified sources.</li> </ul>	Medium	Fair
<b>1</b> <i>Documentation</i>					
1.1.2	<ul style="list-style-type: none"> <li>There is evidence of a scope of work document review and approval process with appropriate sign-off.</li> </ul>	<ul style="list-style-type: none"> <li>There is no evidence in the Model of the process for review and sign off of model inputs or outputs. Management has advised there are a number of process documents and checklists that are used to review/update the model.</li> </ul>	<ul style="list-style-type: none"> <li>Absence of a scoping document may cause confusion as to the purpose of the Model and accordingly the Model may not be developed to be fit for purpose</li> </ul>	Low	Fair
1.6.1	<ul style="list-style-type: none"> <li>There is clear evidence that the data and assumptions used in the Model have been approved and signed off in accordance with internal approval guidelines.</li> </ul>	<ul style="list-style-type: none"> <li>There is limited evidence contained in the model that each assumption has been signed off nor evidence of the process for sign-off. We note that data is sourced from various documents, and consultation and review of data is conducted with business unit managers.</li> </ul>	<ul style="list-style-type: none"> <li>If data inputs cannot be reconciled to data sources, it may be difficult to track changes in assumptions. Data that is not reviewed by a person or body other than the model creator may lead to errors in model results and outputs.</li> </ul>	Low	Fair

## 3.2 – Key Best Practice Observations

Our key findings in relation to consistency with best practice modelling standards are summarised below. The full list is detailed in Appendix B.2.

	Best Practice Approach	Key Findings	Key Risks	Risk Rating	Consistency Rating
<b>1 Documentation</b>					
1.8.1	<ul style="list-style-type: none"> <li>A quality assurance plan has been adopted that adequately addresses and defines the review requirements of the Model throughout the model development process.</li> </ul>	<ul style="list-style-type: none"> <li>There is limited evidence of peer review and no clear documentation for QA in the Model. We note that the Model is operated by a single user. Management has advised there are a number of process documents and checklists that are used to review/update the model.</li> </ul>	<ul style="list-style-type: none"> <li>Without clear documentation of QA processes, checks and recommendations, the Model may include errors or may not be of as high quality as it could be with improvement recommendations.</li> </ul>	Low	Fair
<b>2 Structure</b>					
2.5.4	<ul style="list-style-type: none"> <li>Use well-defined and consistent format styles, which should be used throughout the Model. There should be no unused or inconsistent use of styles.</li> </ul>	<ul style="list-style-type: none"> <li>There are 442 format styles in the workbook, of which 23 were in use. Removing unused styles reduces model processing time and size.</li> </ul>	<ul style="list-style-type: none"> <li>Superfluous formats and styles can slow the operation of the Model and lead to corrupted files.</li> </ul>	Low	Fair
2.8.2	<ul style="list-style-type: none"> <li>Unless justified, array formulae should be avoided.</li> </ul>	<ul style="list-style-type: none"> <li>Arrays have been used in the Model and slow down the model calculation time.</li> </ul>	<ul style="list-style-type: none"> <li>An increase in processing time of calculations reduces the efficiency and productivity of the model user.</li> </ul>	Low	Fair
2.8.6	<ul style="list-style-type: none"> <li>Formulae should not contain hardcoded values (except for 1,0). Separate hardcodes from formulae and format as inputs.</li> </ul>	<ul style="list-style-type: none"> <li>Several instances of hard codes have been identified. All instances of hard codes have been identified by Deloitte and are listed in D.3.</li> </ul>	<ul style="list-style-type: none"> <li>Formulae may not operate as intended if an alternate scenario is run that does not require the use of a hardcoded value.</li> </ul>	Low	Fair
2.8.7	<ul style="list-style-type: none"> <li>Formulae should not refer to blank cells or redundant cells with no dependents.</li> </ul>	<ul style="list-style-type: none"> <li>Several instances of blank cells have been identified. All instances of blank cells have been identified by Deloitte and are listed in D.3</li> </ul>	<ul style="list-style-type: none"> <li>Calculations may not work as intended.</li> </ul>	Low	Fair



## 3.2 – Key Best Practice Observations

Our key findings in relation to consistency with best practice modelling standards are summarised below. The full list is detailed in Appendix B.2.

	Best Practice Approach	Key Findings	Key Risks	Risk Rating	Consistency Rating
<b>4</b>	<b>Output Validation</b>				
4.5.1	<ul style="list-style-type: none"> <li>The Model should be able to be replicated by independently (e.g. offline) re-performing key calculations on sections of the Model.</li> </ul>	<ul style="list-style-type: none"> <li>There is no evidence that any calculations have been replicated outside of the Model.</li> </ul>	<ul style="list-style-type: none"> <li>Results may differ between the Model and calculations performed in external workbooks.</li> </ul>	Low	Poor

# 04

---

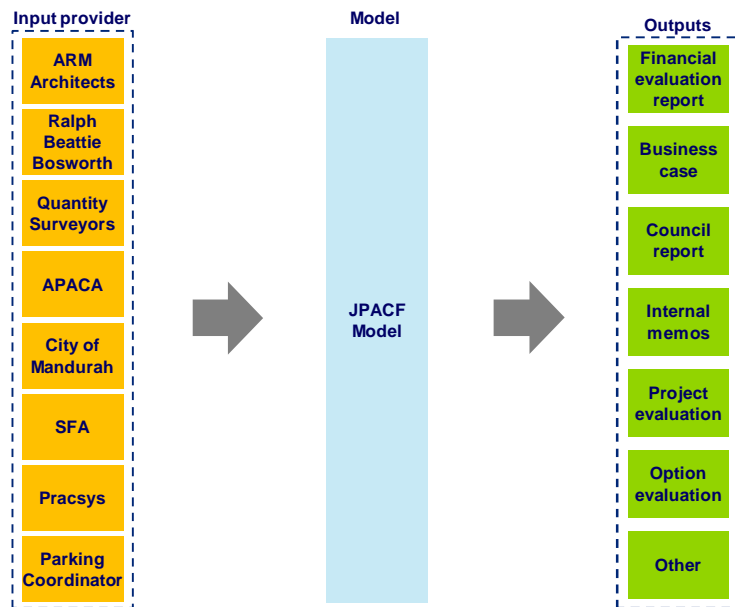
## Data collection, transfer and control

# 4.1 – Approach and Findings

We have reviewed the process for data collection, validation and use within the Model

**City of Joondalup Review Requirement**

*Approach to collection and review of data is appropriate.*



## Methodology

In consultation with City of Joondalup, we reviewed the processes and controls as they are applied to:

- Collection of data
- Accuracy of automated and manual data inputs into the Model
- Use of data within the Model
- Maintenance of source data and documentation for subsequent review

## Overview

Input data for the Model is obtained from a combination of source data providers including architects, community associations and the City of Joondalup Senior Financial Advisor.

## Approach & Findings

All input data was extracted from the Model. Each value was checked back to the relevant source document. We note that in some instances clarification was sought from CoJ as to the source of inputs.

We have provided a risk rating for each source document which reflects the ability of the user to validate the information that is used from the document.

The collection and use of source data is controlled by the model owner. A listing of source documents was provided for our review along with the documents themselves.

We understand from discussions with City of Joondalup that, where appropriate, part of the review process is to validate source data with business unit managers and directors. However we found no evidence of a formal sign off process that has been implemented as part of the data validation process.

We note that the hard coded values reviewed as part of this review do not constitute all of the hard coded values contained in the Model. These items are discussed in more detail in Section 5.

Our detailed findings in relation to the validation of input source data is contained in Appendix C.1.

# 4.2 – Recommendations

Our recommendations based on our data process and control review are set out below

## 1. Review Source Excel Files

A number of inputs are sourced from other Excel workbooks. These workbooks were not within the scope of this engagement and have not been reviewed by Deloitte. A review should be conducted to ensure that output data is accurate and fit for purpose

## 2. Formalise Data Review Process

Implement a documented review process for input data received from other business units to ensure that the correct data is incorporated into the Model.

## 3. Document Data Sources in Workbook

Include a worksheet in the workbook which documents all the sources of input data, including relevant versions.

05

---

## Model logic review

# 5.1 – Methodology & Approach

A high level review was conducted on key worksheets within the Model. Key calculations and ratios were tested to validate methodology and appropriateness of outputs.

## City of Joondalup Review Requirement

**Assess the robustness of the financial modelling process including a review of the checks carried out on results of the Models.**

### Model overview

The Model contains 33 worksheets and a total of 9,319 unique formula. The Model is designed to calculate the incremental cash flows to the City of Joondalup for a project. Any cash flows that relate to costs/income not owned by the City should be excluded. The projections include calculations of revenue, operating cost, capital expenditure and debt funding.

### Model Logic Review

A review of calculation logic was conducted on the following worksheets:

- Option01\*
- By Option
- By Year

A review of calculations was performed on these worksheets. Where a calculation was repeated multiple times (e.g. for each project) a comparison was conducted to ensure that subsequent calculations were consistent with the section tested.

The worksheets above contained 1,634 unique formulae. From the review of these worksheets 15 exceptions were observed. These are summarised in section 5.2 and provided in detail in Appendix D.1

Hard coded values and references to blank cells within formulae were also identified along with inconsistent application of formulae across rows and down columns (where applicable). A full list is provided in Appendix D.2.

### Analytical Review

An analytical review of results and outputs was conducted, having regard to the following key ratios:

- Capital investment (today's dollars)
- Borrowings, including repayment profile
- Operating losses (including depreciation and interest)
- Operating subsidy
- Net Present Cost
- Total Net Cash flows

Model outputs were assessed for reasonableness and adherence to target ranges where appropriate. High level observations were also made regarding worksheet layout and structure.

A summary of key findings and observations is provided in Section 5.2.

### Methodology & Limitations

Given the number of worksheets and unique formula within the Model, it was not practical or efficient to conduct a mathematical and logical integrity review of all unique formula in the Model. On this basis the review was not conducted in accordance the Standard on Related Services ASRS 4400 Agree-Upon Procedures. Accordingly this review does not constitute either a reasonable assurance review (audit) or limited assurance (review) engagement in accordance with the Auditing and Assurance Standards Board (AUASB) and consequently no assurance is provided.

We note that during the review process a number of clarifications regarding the operation of the Model were provided by CoJ. These comments have been incorporated into our findings register.

\*Worksheet "Option01" was initially scoped as part of Deloitte's proposal. However "Option03" was reviewed as "Option01" is a "Do Nothing" scenario and was agreed upon with CoJ. A comparative review has been conducted between "Option01" and "Option03" to ensure that the formulae between the two worksheets are consistent.

## 5.2 – Key observations for calculation logic & analytical review

Our review analysed key calculations and outputs within the Model and identified areas for further review and action. A summary of our key findings is below. A detailed findings register is provided in Appendix D.1.

### Calculation complexity

The Model contains in excess of 1,000 unique calculations that have been constructed using an array as part of the formula. While these calculations are performing as intended (i.e. returning the correctly calculated values) the use of arrays increases the size of the Model and slows the speed at which the Model recalculates.

The performance of the Model does not appear to be impacted by the use of arrays however if the Model is further developed and could lead to long calculation times.

In many of these cases the same result can be obtained using the SUMIFS() formula. An example of this has been provided in comment 14 of the findings register.

### Loan Balance Calculations

The calculation of loan balances in the Option03 worksheet do not follow a logical flow in terms of recognition of drawdowns, interest and payments. All values are calculated as negative values, implying that all values decrease the underlying loan balance.

Examples of this are provided in comments 11-12 of the findings register.

### Reconciliations

As part of our analytical review we assessed whether outputs and totals were consistent across sections and worksheets within the Model. The outputs of the Project Evaluation Model have been tested against the input assumptions contained within the Model. The reconciliation exercise has not yielded any additional queries or findings.

### Analytical review

As part of our analytical review we assessed whether outputs and totals were consistent across sections and worksheets within the Model.

We note that the Capital Renewal Costs as part of the Asset Replacement Program appears to significantly in real terms. These real costs are then escalated based on a Capital Cost escalation rate of 3.50%. As a result, there is a significant operating cash deficit, when assets are expected to be replaced, including in the final year of the model life. CoJ have confirmed that this assumption is correct.

### Manual Model Adjustments

We have observed instances in the Model where a manual change has been made to a calculation, using a hard coded value, to accommodate a specific model scenario. These adjustments override calculation methodologies and can lead to error if the model scenario was to be changed or updated.

An example of this has been provided in comment 13 of the findings register.

## 5.2 – Key observations for calculation logic & analytical review

Our review analysed key calculations and outputs within the Model and identified areas for further review and action. A summary of our key findings is below. A detailed findings register is provided in Appendix D.1.

### Hard Codes, Blank Cell References and Formula Inconsistencies

Our diagnostic assessment of the Model has identified all cells which contain hard coded values or contain references to blank cells within the formulae. Instances where these items have a material impact of the calculations within the Model have been identified in the findings register.

The assessment also identified formulae which are inconsistent with the preceding formula in a row or column, where the calculations are intended to perform the same process.

A full listing of hard coded values, blank cell references and inconsistent application of formulae is provided in Appendix D.2.



## 5.3 – Recommendations

Our recommendations based on our logic and analytical review are set out below

### 1. Remove Manual Adjustments

Remove manual adjustments from calculations. If these adjustments are still required include them as separate input values to increase transparency in calculations

### 2. Simplify Formula

Where practical, amend calculations containing array functions to reduce formula size and complexity and improve the operation and calculation time of the Model.

### 3. Update Sign Conventions

Update the sign conventions in the calculation of loan balances to improve transparency. Cash inflows should be positive and cash outflows should be negative.

### 4. Version Comparison Testing & formulae Review

For future versions of the Model use a model comparison tool to identify changes to calculations compared to the current version. Perform a review to validate updated calculations.

### 5. Review Hard Codes and Blank Cell References

Update Model to remove hard coded values and links to blank cells from formulae. Where hard coded values are still required include them as stand alone input assumptions.