Laura Bowman

From: official information
Sent: Monday, 7 March 2022 12:53 pm
To: [redacted]
Cc: official information
Subject: Final Response: LGOIMA 22030 [redacted] - Extension of 21396 / "terms of engagement" for NPS-UDC and UD / Further Clarification
Attachments: Macroeconomic Model Memo_Redacted.pdf; Infrastructure timing map - draft.pdf

Kia Ora,

I refer to your **information request below**, Hamilton City Council is able to provide the following response.

1. Page 2 refers to coloured items that the different parties have to provide. Future Proof Partners were required to provide (in blue page 3 table 1 PB3 (b)) – the actual and likely availability of development infrastructure and other infrastructure in the short, medium and long term as set under PA1. **Please provide the information that Future Proof Partners provided to ME.**

   Hamilton City Council does not hold a copy of the final map of infrastructure timings, therefore this aspect is being refused as per S 17(g) of LGOIMA. However, we do hold a draft map and have attached this for your perusal. Reminder – this map represents a draft and the capacity identified was subject to further refinement to remove capacity for local roads, parks and other considerations that may further reduce capacity.

2. Page 4 stage 1 refers to the "WISE economic module" and the existing "macroeconomic model" . **Please provide both these items.**

   The WISE model can be downloaded on a trial basis here. Further information on the WISE model can also be accessed through the creating futures website here. The macroeconomic model was not developed by Hamilton City Council and is the intellectual property of Market Economics (ME). Therefore, we are refusing this aspect of your request as per S 7(2)(b) of LGOIMA. However we have attached a technical memo providing an overview of the model including key inputs and assumptions.

3. Page 12 (4) refers to infrastructure "A tag for each CAU as to when it will be fully serviced by infrastructure" **Please provide the information "tag".**

   This can be found on the attached document, also referred to in response 1.

4. Document PSP00001013/2021 commencement date 10.9.2021. In Phase 2 – Assessment of Final land use scenario it refers to " it will also exclude areas subject to qualified matters. This information will be provided to Market Economics. **Please provide all the information that relates to "qualified matters" as it is not clear what this means.**

   Qualifying matters are outlined in section 3.32 of the National Policy Statement – Urban Development. The Council is currently working to identify qualifying matters for the city as part of Plan Change 12. Early information for Plan Change 12 has been released on Council's website. All information relating to Plan Change 12 can be found at this link It's our place, Hamilton Kirikiriroa - Hamilton City Council

You have the right to seek an investigation and review by the Ombudsman of this decision. Information about how to make a complaint is available at www.ombudsman.parliament.nz or freephone 0800 802 602.

Kind Regards,

Official Information Team
Legal Services & Risk | People and Organisational Performance
Email: officialinformation@hcc.govt.nz

Hamilton City Council
Te kaunihera o Kirikiriroa

From: [redacted]
Sent: Thursday, 3 February 2022 10:47 am
To: official information <officialinformation@hcc.govt.nz>
Subject: RE: Final Response: LGOIMA 21396 [redacted] - "terms of engagement" for NPS-UDC and UD

Good morning, Thank you for providing the "terms of engagement" agreements. There are numerous items that I would like you to provide. They all relate to the terms of agreement as provided. The first requests relate to the 28/3/2017 document.
(1) Page 2 refers to coloured items that the different parties have to provide. Future Proof Partners were required to provide (in blue page 3 table 1 PB3 (b)) " the actual and likely availability of development infrastructure and other infrastructure in the short, medium and long term as set under PA1. " Please provide the information that Future Proof Partners provided to ME. This is also referred to on page 9.
(2) Page 4 stage 1 refers to the "WISE economic module" and the existing "macroeconomic model" . Please provide both these items. This is also referred to on page 12 (5)
(3) Page 12 (4) refers to infrastructure –"A tag for each CAU as to when it will be fully serviced by infrastructure" Please provide the information "tag".
(4) Document PSP00001013/2021 commencement date 10.9.2021. In Phase 2 – Assessment of Final land use scenario it refers to " it will also exclude areas subject to qualified matters. This information will be provided to Market Economics. " Please provide all the information that relates to " qualified matters" as it is not clear what this means.
Kind Regards

[redacted]

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From: official information <officialinformation@hcc.govt.nz>
Sent: Wednesday, 2 February 2022 10:18 AM
To: [redacted]
Cc: official information <officialinformation@hcc.govt.nz>
Subject: Final Response: LGOIMA 21396 - [redacted] "terms of engagement" for NPS-UDC and UD

Kia Ora,

I refer to your **information request below**, Hamilton City Council is able to provide the following response.

Since 2016, Market Economics have undertaken several specific projects that are related to the NPS-UD and UDC requirements, specifically the Housing and Business Capacity Assessments (HBA) and additional modelling of the impact of the NPS-UD Policy 3 intensification requirements and medium density residential standards (MDRS). The scopes of work for these projects are attached.

This work is contracted through the Waikato Local Authority Shared Services (WLASS) Professional Services Panel of which Hamilton City Council and Future Proof have contractual agreements **through**.

WLASS is a company owned by twelve Councils including the Future Proof Councils of Hamilton City, Waikato and Waipa District and Waikato Region. The company was established in 2005 to promote shared services between local authorities across the Waikato region.

WLASS has entered into master agreements with a range of skilled consultants, including Market Economics. The panel was established in July 2019 and is in place for five years. This contract reduces time and cost associated with engaging consultants with pre-negotiated fees and a more efficient engagement process, including when working with Market Economics.

Neither Hamilton City Council or Future Proof have a general agreement for Market Economics to provide broad advice on the NPS-UD or NPS-UDC. Therefore, your request is being refused as per S 17(e) of LGOIMA – this does not exist.

You have the right to seek an investigation and review by the Ombudsman of this decision. Information about how to make a complaint is available at www.ombudsman.parliament.nz or freephone 0800 802 602.

Kind Regards,

Tatiyana | Official Information & Legal Support Advisor
Legal Services & Risk | People and Organisational Performance
Email: officialinformation@hcc.govt.nz

Hamilton City Council
Te kaunihera o Kirikiriroa

Hamilton City Council | **Private Bag 3010** | **Hamilton 3240** | **www.hamilton.govt.nz**
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From: [redacted]
Sent: Monday, 13 December 2021 9:52 am
To: official information <officialinformation@hcc.govt.nz>
Subject: HCC / Future Proof/ Terms of engagement with Market Economics

Good morning, HCC / Future Proof have an arrangement with Market Economics to provide advise on economic and other matters.

HCC / Future Proof engaged Market Economic to provide specific advise in regards to the National Policy Standards UDC and UD.

This request is initially specific to the" terms of engagement" for NPS – UDC and UD.

Please provide a copy of these "terms of engagement" for the period 2016 to 2021 with all amendment (if any)

If the "terms of engagement" are wider that that under NPS – UDC and UD request, please provide that document and any amendments.

Kind Regards

[redacted]

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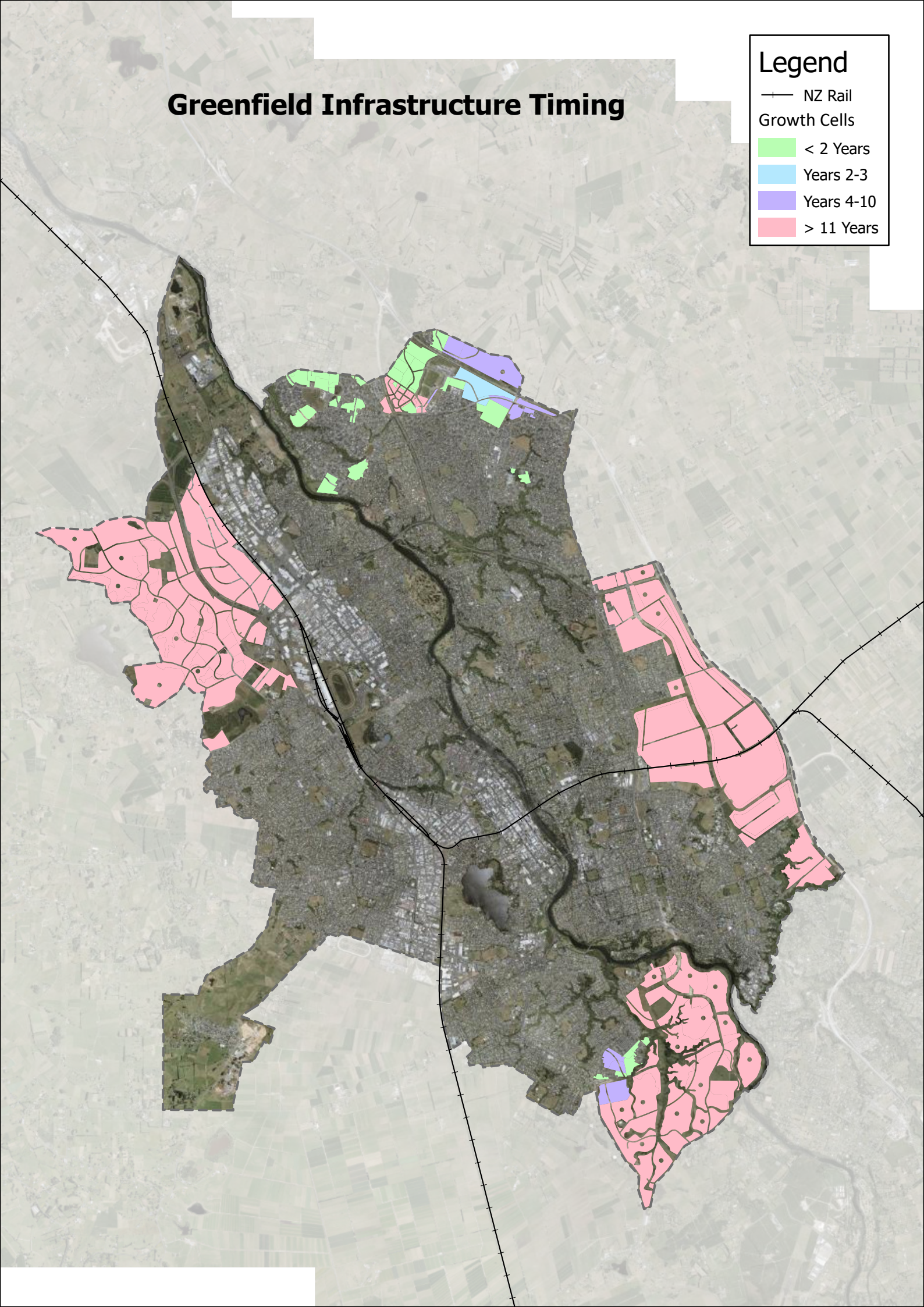
Greenfield Infrastructure Timing



Memo

Date: 25th February 2022

To: Amy Trigg

From: [redacted]

Re: LGOIMA Response –Macro Economic Model

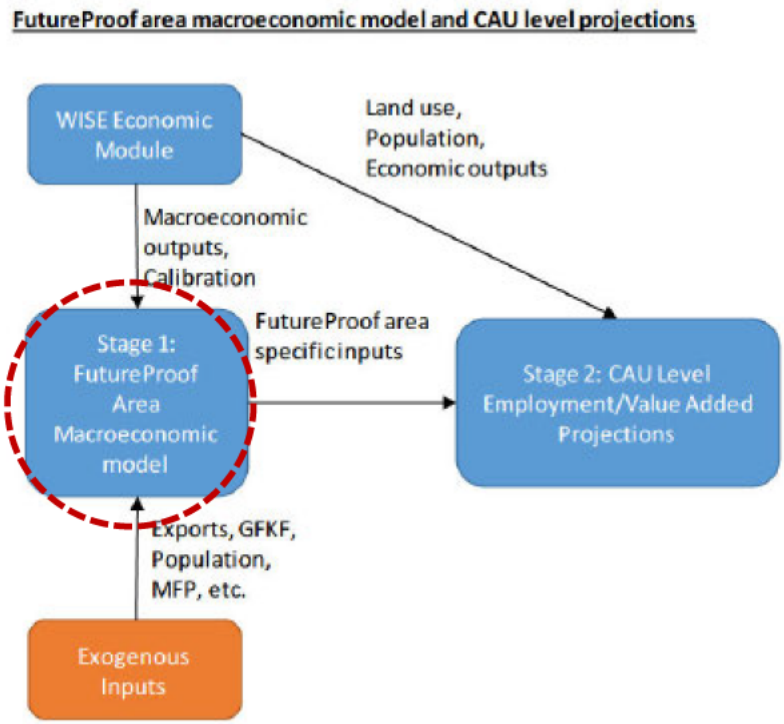
Hi Amy

As I understand it, Hamilton City Council have received a LGOIMA which is asking for the macroeconomic model from the 2017 HBA, as described in the following diagram taken from the scope of work. This model was created by M.E for the purpose of developing the initial HBA and it is managed by M.E. In other words, the model itself was not handed over to Hamilton City – rather outputs from the model were used in the sufficiency assessments required under the NPS-UDC and also helped inform Hamilton's Development Contributions policy development.

As I understand it the LGOIMA requests some detail about both the inputs and assumptions that underpin the model and its basic operation.

Within the context of a suite of modelling approaches used by Hamilton City, Future Proof Partners and Waikato Regional Council, the model sits between WISE (Waikato Integrated Scenario Explorer) and is used to generate localised CAU level outputs of employment (and Value Added).

Figure 1: Macroeconomic Model Position in Framework



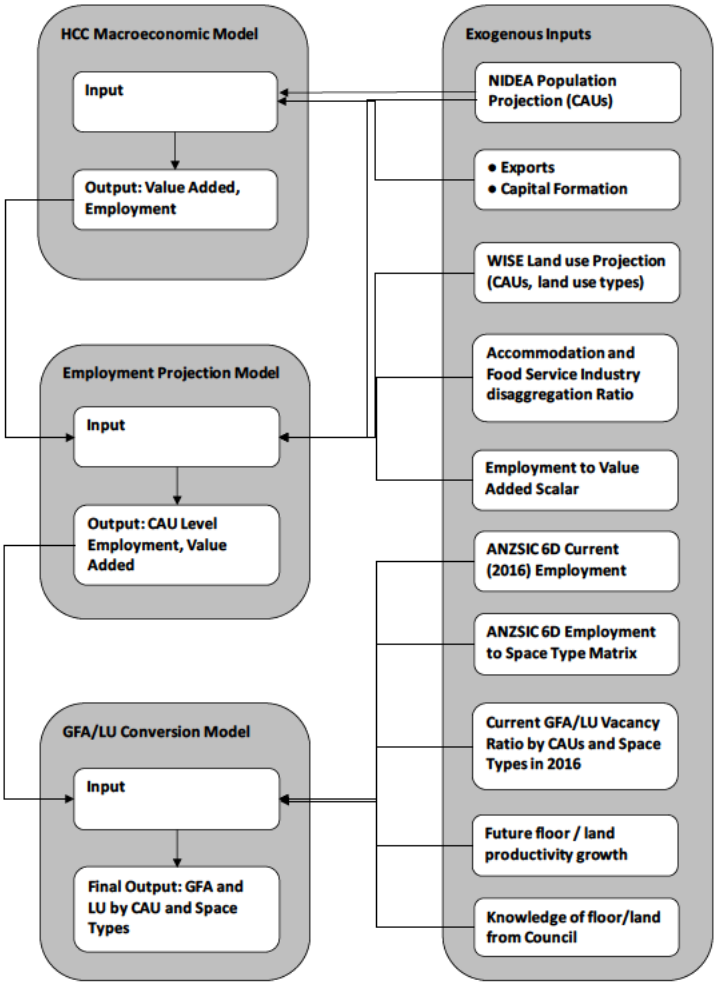
Overview

The Macroeconomic model is one part of a wider suite of models that forms the Non-Residential Demand Projection Framework developed by M.E to calculate future non-residential demand within the Hamilton City Council boundaries

The framework contained three sequentially dependent models, Hamilton City Council Macroeconomic model, Employment Projection Model, and Gross Floor Area and Land Use Projection Model. Although dependent, the models can be used independently. For example, Hamilton City Council Macroeconomic model maybe used stand-alone for Economic Impact Assessments. The models use various exogenous inputs, notably NIDEA population projections are used in both macroeconomic and employment projection model. Figure 2 shows the sequential dependence between the models and major exogenous inputs.

It is important to note that, the Hamilton City Council Macroeconomic model (HCCM) and Employment Projection Model are based on the work M.E had previously undertaken for the Waikato Regional Council. The major difference between the two is that the previous work covered the wider region and reported outcomes at a coarser level of detail (Territorial Authority level) while the HCC Macroeconomic Model covers Hamilton City Council boundaries only and generates output at a local level. To ensure consistency with the wider regional view, all of the local models are calibrated to match the previous regional council work.

Figure 2: Structure of the Non-Residential Demand Projection Framework



Model Inputs

The HCCM model is used as either a stand-alone model or it is linked to the Employment Projection Model to produce CAU level employment and value added projections.

The HCCM is a Multi-Regional Input-Output (IO) projection model made up of the following regions; Hamilton, the rest of Waikato region and rest of New Zealand. The IO table used in the model is based on Statistics New Zealand (SNZ) National Accounts Input-Output Tables Year Ended March 2007. Subsequently, all dollar values used in the model are based on the financial year ending 31 March 2007.

The model includes economic activities resulting from 48 industry types located in the three regions. The model is 'open' in the sense that the economic activities within a single region affect and are affected by the other two regions (inter-regional trade flows) as well as international trade (import and export) activities.

The main purpose of the model is for economic projections, where the projections are driven by changes in;

- Population growth and change;
- Investment – this takes the form of gross fixed capital formation;
- Export performance and change, and
- Change in inventories held by economic sectors.

In addition to providing projections, the model can be used for Economic Impact Assessments (EIA). The model reports business as usual (BAU) projections, Type 1 impacts (direct and indirect, these capture the upstream additional activity required to support growth or change in a sector or in the economy overall) and Type 2 impacts (these are the Type 1 impacts and any induced impacts, such as increased consumer spending). The model reports these effects and impacts in terms of changes to Gross Output, Value Added and Employment. Figure 3 shows the structure and data linkages within the HCCM.

Model Description

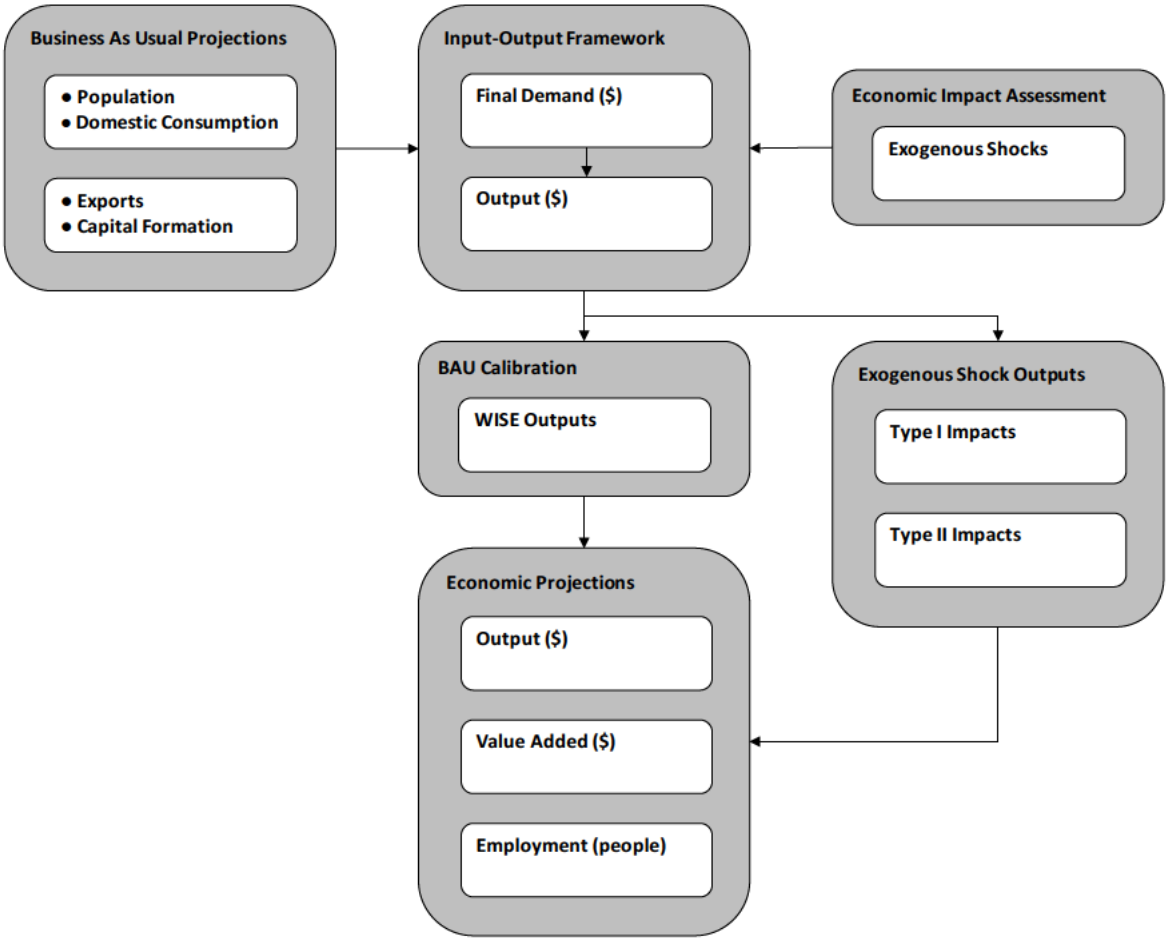
The main purpose of the HCCM economic projection model is to estimate future economic indicators for each of the 48 economic industries within Hamilton City Council. The model is constructed in 'R' programming language and designed to be an ancillary model into the HCC DC Growth Model.

Input-Output Framework

The core of the HCCM is based on an Input-Output framework. This focuses on the linkages between economic demand and production (output) activities. Specifically, the model calculates changes in production as result of changes in demand that arise as a results of population change (or export growth etc).

The model also includes spatial economic linkages. The Input-Output table used is multi-regional, capturing the impacts of demand changes on HCC, as well as on the rest of Waikato region and rest of national economies. The framework assumes that each industry in an input-output table produces only one output. Subsequently, the assumption implies all businesses that constitute an industry use the same product mix in the production of this one output. Also, the framework assumes that the economy exhibits constant returns to scale, where the ratio of change in production output, or demand, is the same as the ratio of change in input (i.e they are linear).

Figure 3: Structure of the Hamilton City Macroeconomic Model



There are two major processes within the model using the Input-Output. First, projections of commodity and service demand for each industry is calculated. These demands are driven by within-region demand, mostly from households and investment, and exports to other regions in New Zealand and overseas. Details of the demand projection calculation is described in the next section.

Next, future production requirements of each industry are calculated based on projections of future final demands from the first step. In this step, matrix calculations are performed to derive a production requirement matrix (Leontief inverse matrix). Along with the new demands, the matrix is used to calculate the new level of production activities.

It is important to note the following limitations of the Input-Output framework:

- **Constant production technology**. The framework assumes that the relative way in which goods and services are produced in the base year will hold through time. This means that, in relative terms, the 'recipe' for how goods and services are produced today, remains constant across time, as also does the pattern of sales to industry and consumers. This assumption is reasonable for the short to medium term, say 5 to 10 years, but as we move further away from the base year it becomes more questionable.
- **Price changes are not modelled**. Although the model captures the impacts of changes in demand it is not an equilibrium model, and thus prices do not adjust as constraints

are imposed. Therefore, all dollar values reported are in constant dollar terms for the financial year ending March 2007.

Business as Usual Demand Projections

As noted above, the main output of the HCCM is a BAU economic projection and is driven by the BAU commodity and service demands. In the Input-Output framework these demands are called 'final demands'.

Within the HCCM the final demands are made up of five categories: household consumption, international exports, inter-regional exports, gross fixed capital formation (GFKF), and changes in inventory. The process for deriving future BAU estimates for each category is as follows:

a) **Household Consumption**: The household consumption final demand is made up of four sub-consumption categories, 'Households', 'Private non-profit institutions servings households', 'Central Government' and 'Local Government'. The future estimates of the sub-categories are primarily driven by change in future population. The HCCM uses NIDEA's 5-year age sex cohort population projections. It is assumed that each person within the region consumes a constant mix of goods and services. Thus, any population growth for the area will result in a proportional increase in the amount of goods and services consumed within each sub-categories.

   In addition, the model includes the implications of changing demographic structure on household consumption. For all sub-categories, the future demands by each cohorts are adjusted by a cohort-specific consumption scalar. These scalars define the ratio of spending by an average person across all cohorts, to the spending of an average person within the subject cohort.

   The summed values across all cohorts and sub-categories for a given year are then normalized to $2007million. Resulting value for a particular year provides an estimate of the growth in total household consumption from the base year.

b) **International Exports**: are overseas demand for goods and services produced by an area and is an exogenous input to the model. HCCM includes BAU projections of international exports and the future projections for each industry is generated by applying long-run average growth rates to the base year international export values as obtained from the Multi-Regional Input-Output Table (MRIO) .

   The growth rates were generated using a number of different statistical methods. Selection of the time series techniques applied depended on the availability of the data and underlying production structure of the industry output being analysed. For example, long-run growth rates for agricultural industries were estimated based on long-run projections of physical stocks and land availability constraints. Conversely, industries with less physical constraints, such as services, were estimated based on long-run national export trends. The data utilised in these time series analyses were derived from SNZ's Overseas Trade Exports – Trade, Merchandise: Monthly Estimates of all Harmonised System Items 1989–2014.

c) **Inter-regional Exports**: The inter-regional exports are demands for good and services produced within a study area by areas outside the study area – but within New Zealand. In other words, trades between study areas within the HCCM affects demand for the production activities of each area. The demands are endogenous to the HCCM as the

outside area's demands are dependent on their own household consumption, international exports, GFKF and changes in inventory demands. That is, increases in production activity of an area increases the inter-regional imports demand for other area's goods and services.

d) **Gross Fixed Capital Formation (GFKF)**: Future increases in investment demands are represented as a change in GFKF. This is an exogenous input into the model. Future GFKF projections for each industry are generated by applying long-run average growth rates to the base year GFKF values as obtained from the MRIO. These growth rates were determined by econometric time-series analysis. The data utilised in the time-series analysis of GFKF are derived from SNZ's National Accounts gross fixed capital formation by industry time series.

e) **Changes in Inventory**: Changes in inventory are an endogenous variable within the model, where it's future projections are weighted average of future values of other final demand categories. Within the national accounts framework, the changes in inventory is an accounting balancing item and records changes in financial inventory stocks. Note: for many industries changes in inventory are very small compared with international exports, inter-regional exports, and GFKF.

Calibration - Business As Usual

To calculate future BAU output projections, BAU demand projections are matrix multiplied to the Input-Output framework. Resulting output projections are generated for every BAU demand projection year by 48 industries and study areas within the HCCM.

The main assumption of the Input-Output framework used in the HCCM is that it only considers production requirements based on future demand. Although in reality, the future production/outputs will be affected by supply constraints, modern economies consists of relatively elastic industries, such as services, that are less susceptible to supply constraints. However, primary industries, such as agriculture, heavily depends on availability of natural resources (e.g. land and water) and demand driven Input-Output framework cannot capture these constraints.

To address this issue, the HCCM is calibrated against the Waikato Integrated Scenario Explorer (WISE). Although the WISE is based on the Input-Output framework, it includes both demand and supply drivers of economic production activities. Importantly, WISE deals with spatial land constraints within the Waikato region over time by including spatial geo-physical, regulatory and socio-demographic as well as land productivity information.

As the relationship between the HCCM outputs and WISE outputs are dynamic, where differences between two outputs depends on the level of HCCM output, mathematical functions describing the relationship between two outputs were constructed. The function is:

$$Y_i^{WISE} = f(Y_i^{HCCM})$$

where, Y_i^{WISE} is a WISE output for an industry *i*, Y_i^{HCCM} is a HCCM output for an industry *i.*

The data for fitting the function were generated by running the WISE and HCCM model for selected years with both low and medium NIDEA population projections. Each data point is represented as a single year for a given population projection and includes output for both WISE and HCCM.

Five mathematical functions were tested for the best fit of the data: (i) upper bounded exponential function; (ii) lower bounded exponential function; (iii) linear function; (iv) quadratic function; and (v)

polynomial function. Each of the functions were tested for best fit using an exploratory analysis and goodness of fit R2 statistic. The function with the best fit were selected and used as a function describing the relationship between the two outputs.

Once the HCCM outputs were adjusted using the selected functions, a set of scalars were applied to the adjusted output to match the HCCM output exactly to the WISE output. This ensures that the initial BAU outputs of the HCCM are consistent with the WISE BAU outputs given a same set of NIDEA population projections. Option to use the scalars can be selected by the user.

Exogenous Shock

Another main function of the HCCM is assessing economic impacts of various policies and economic shocks. A demand driven exogenous shocks to the economy can be modelled by applying direct shocks to the final demands. Within the HCCM the exogenous shocks are applied after the BAU output calibration as the shocks are assumed to be an unpredictable impact to the current economic forecast.

The HCCM reports two outputs impacts resulting from exogenous shocks, Type 1 and Type 2 impacts. Type 1 impacts includes direct and indirect impacts to the economy. Indirect impacts are upstream supply-chain impacts where changes in production of a directly affected industry, as a result of the direct impact, affects other industries supplying the directly affected industry. Type 2 impacts includes direct, indirect and induced impacts to the economy. Induced impacts are income effects where additional production increases income of households and, subsequently, increase household consumption.

It is important to note that the exogenous shocks are not subjected to the supply constraints as the shocks are not adjusted by the calibration function. The calibration function implicitly takes account of numerous supply constraints within the WISE model. As the exogenous shocks are assumed to meet these limitations, either through a priori analysis or policy process, applying the calibration function to the shocks will resulting in the double counting of the supply constraints. Therefore, the researcher conducting the EIA using the HCCM must careful take account of the implications of limited resources.

Employment and Value Added Projections

BAU Employment and Value Added projections are calculated from the calibrated outputs. In the HCCM outputs are assumed to have a linear relationship with the primary inputs, where value added is assumed to change in same magnitude as change in production. Employment is assumed to have a non-linear relationship where future employment is subjected to changes in multi-factor productivity as well as change in output.

For each industry, value added is calculated by taking the output projection and multiplying it by a scalar that defines the constant relationship between the output and value added in the base year 2007. The reported value added is in $2007million.

Employment is measured in Modified Employment Counts[1] (MECs) for each industry and is based on Statistics New Zealand 2013 Business Frame. Unlike output and value added, the base year for the employment is 2013. Subsequently the employment projection is estimated by: (i) calculate the output growth rates for future years from 2013; (ii) adjust the growth rates by applying multi-factor

[1] SNZ's Annual Enterprise Survey contains data on employment counts (ECs) by meshblock at a 6-digit ANZSIC industry level. M.E has created modified employment counts (MECs) based on this data, which unlike standard ECs, include estimates of the numbers of working proprietors for each industry type

productivity growth for corresponding future years; and (iii) multiply 2013 employment by the adjusted growth rates from (ii).

Total exogenous shock T1 and T2 projections for output is calculated by summing the BAU calibrated output with T1 or T2 output impacts. Total exogenous shock employment and value added is calculated using the same process as the BAU using the total exogenous shock output values instead of BAU outputs.

Similar to the HCCM outputs, value added and employment values were adjusted using a set of scalars to match the HCCM values exactly to the WISE values. Option to use the scalars can be selected by the user.

Reporting Outputs

For all study areas, the HCCM reports Gross Output, value added and employment values for all future years by BAU, T1 and T2 impacts. Figure 4 illustrates the structure of the reporting table produced by the HCCM.

Figure 4: The HCCM Reporting Table

		BAU			T1 Impacts			T2 Impacts		
Study Area	Industry	Output ($\$_{2007}$mil)	Value added ($\$_{2007}$mil)	Employment (MECs)	Output ($\$_{2007}$mil)	Value added ($\$_{2007}$mil)	Employment (MECs)	Output ($\$_{2007}$mil)	Value added ($\$_{2007}$mil)	Employment (MECs)
Hamilton City Council	Industry 1 ⋮ Industry 48	BAU projections			T1 Impacts			T2 Impacts		
Rest of Waikato Region	Industry 1 ⋮ Industry 48									
Rest of New Zealand	Industry 1 ⋮ Industry 48									

Links

The HCCM links with the NIDEA population projection time series and Employment Projection Model (refer to Figure 5).

Figure 5: Links between the HCCM and Other Models

Type	Model Component	Data Passed	Comments
Inputs	NIDEA - Population	Population (# people)	Population data is a primary input into the HCCM to calculate future household commodity and service demands.
Outputs	Employment Projection Model	Employment (# people), Value Added ($\$_{2007}$Mil)	HCCM provides top-down TA level employment and value added projections. The projections are used to scale the econometric projections calculated in the Employment Projection Model.