IN THE MATTER	of the Resource Management Act 1991
AND	
IN THE MATTER	of a submission in respect of the **PROPOSED WAIKATO DISTRICT PLAN** by **AMBURY PROPERTIES LIMITED** pursuant to Clause 6 of Schedule 1 of the Act seeking the rezoning of land at Ohinewai

STATEMENT OF EVIDENCE OF PHILIP BRENT WHEELER

1. INTRODUCTION

1.1 My name is Philip Brent Wheeler. I am a specialist in economics, notably financial economics and the economics associated with resource management.

Qualifications and experience

1.2 I hold a Ph.D from the University of Otago (1980). I am a Certified Securities Analyst member of the Institute of Finance Professionals New Zealand.

1.3 I have been employed in providing economic and financial advice to a variety of industries over the past 25 years. My experience covers assessments for central government, membership of the 1991 Resource Management Bill Review Committee, and preparation of economics effects analyses for a large number of consent applications under the Resource Management Act 1991 ("RMA").

Involvement in the Ohinewai project

1.4 I have, alongside Property Economics, been advising Ambury Properties Limited ("APL") in relation to economic issues relevant to its submission seeking the rezoning of land at Ohinewai.

1.5 I have undertaken economic impact analyses for various configurations of the expansion proposal and am familiar with the objectives of the proposal.

Purpose and scope of evidence

1.6 The purpose of my evidence is to provide:

(a) Peer review commentary on the evidence of Tim Heath (Property Economics Limited in respect of methods and conclusions; and,

(b) To describe and explain the relevance and likely economic effects of structural changes in the retail sector as these relate to the application as well as presenting further assessments of economic effects given this context.

1.7 Specifically, my evidence will address the following:

(a) Approach to dealing with the Covid-19 Pandemic (Section 3);

(b) Peer Review: Property Economics evidence (Section 4);

(c) Overall Economic Effects: Concepts and Approaches (Section 5);

(d) Economic Effects: Multiplier Analysis (Section 6);

(e) Retail Context (Section 7);

(f) Housing Issues and Economic Effects (Section 8);

(g) Capital Investment Perspective – Economic Effects (Section 9);

(h) Cost Benefit Evaluation (Section 10); and,

(i) A brief conclusion (Section 11).

1.8 A summary of my evidence is contained in Section 2.

1.9 My evidence should be read in conjunction with that of Tim Heath and Phil Osborne of Property Economics

Expert Witness Code of Conduct

1.10 I have read the Code of Conduct for Expert Witnesses, contained in the Environment Court Consolidated Practice Note (2014) and I agree to comply with it. I can confirm that the issues addressed in this statement are within my area of expertise and that in preparing my evidence I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed.

2. SUMMARY OF MY EVIDENCE

2.1 It has become necessary in assessing the economic effects of the APL rezoning proposal and in preparing this evidence to consider the potential impact of the recent worldwide Covid-19 Pandemic. I conclude that while uncertainty has increased considerably and timing of economic activity such as development may well be affected, the fundamental economic processes related to this proposed rezoning and development will not alter in substance.

2.2 That said, given the adverse effects of Covid-19 on the world and domestic economy, a significant premium has been created, or has increased, in respect of the beneficial effects of economic growth, investment and the creation of job opportunity.

2.3 I undertook an arms-length peer review of Mr Tim Heath's retail and industrial analysis. This confirmed that the analysis follows conventional well-accepted practice and that the conclusions follow soundly from the analysis in respect of the APL rezoning proposal.

2.4 The approach that I have adopted to assessing the economic effects of the proposal focuses on net benefit, i.e., the existence and likely extent of beneficial effects, having subtracted the likely impact of negative effects. Two approaches are used:

(a) The first focuses on traditional multiplier effects; and,

(b) The second assesses likely capital investment gains to be delivered under the proposal.

2.5 Economic effects are defined in terms of direct, indirect and induced costs while economic costs are defined as opportunity costs. A discussion of various means for estimating such costs suggests that the prime opportunity cost is the current agricultural use of the land and that, since the additional growth estimated (in GDP and jobs) might arise at short term cost to some existing areas; that impact is either inevitable (with or without the APL proposal) or involves a timing rather than net loss issue.

2.6 The potential for simple transfer of existing activity rather than creation of additional beneficial impacts is acknowledged. It is noted, however, that growth and modernisation brings numerous benefits which involve additional rather than transferred benefit. In technical terms, economies of scale and

economies of scope are likely to deliver additional activity and related benefit.

2.7 A discussion of the likely economic macro climate suggests that the key features of the macro settings for the coming decade will be uncertainty, slow growth, low interest rates, and variability of performance with associated efficiency and equity implications with the result that offsetting benefits through growth will improve wellbeing.

2.8 The multiplier analysis employs value added multipliers to avoid double counting, for both GDP and employment count measures of employment. These are derived from input-output data gathered and analysed specifically for the Waikato region as defined by its administrative boundaries.

2.9 Expenditure data provided in part by management and in part derived from statistical databases are used to generate estimates of GDP output and employment count of the Ohinewai development.

2.10 Other benefits are likely to arise (though difficult to quantify) in efficiency gains, application of technology and know-how, and competition or traditional supply side effects. Demand side benefits are likely to include lower prices and a wider range of goods for consumers as well as improved standards of amenity.

2.11 Capacity effects, i.e. the tendency for new development to simply "take up existing slack", are discussed. In this case the likely effects will arise from new development, thus current capacity is not relevant and will not reduce the added benefits development brings.

2.12 Estimated total effects are calculated as being those shown below:

Estimated Output and Multiplier Effects		
Raw Estimates		
	Invest NPV	Expenditure
Factory	$ 126,000	$ 114,660
Retail	$ 85,999	$ 79,549
Light Industrial	$ 446,000	$ 419,240
Housing	$ 315,000	$ 293,580
TOTAL	$ 972,999	$ 907,029
With Multiplers		
Estimated Output	Multiplier	NPV
Factory	1.79	$ 879,831
Retail	1.43	$ 538,500
Light Industrial	1.97	$ 4,722,095
Housing	2.60	$ 2,334,633
TOTAL		$ 8,475,059

2.13 Despite the limitations of the analysis (those limitations involving the assumptions of all multiplier analysis), the benefits are shown to be substantial.

2.14 Estimates of employment effects are summarised in the following table:

Estimated Employment Counts and Multiplier Effects 2021 - 2030		
Raw Estimates		
Employment Counts	EC	Average
Factory	1,000	825
Retail	358	277
Light Industrial	1,150	748
TOTAL	2,508	1,850
With Multiplers		
Employment Counts	Multiplier	Average
Factory	1.5	1,238
Retail	1.17	325
Light Industrial	2.01	1,502
TOTAL		3,065

2.15 As with GDP the employment effects are shown to be substantial, limitations of the analyses notwithstanding.

2.16 The assessment of economic effects as estimated through the multiplier analysis may be summarised as follows:

(a) Output (GDP) Impacts – contribution to the Region of $8,475.1 million expressed as a net present value over the decade starting in 2021; and,

(b) Employment Impacts – contribution to the Region of 3,065 positions, on average, over the decade starting in 2021.

(c) Investment – the investment of just on one (1) billion dollars expressed as a net present value over the decade starting in 2021.

2.17 The significant changes in the retail sector are then discussed, noting the continuous and compounding change which is occurring and which may have been accelerated by the impacts of Covid-19 interventions. Of relevance is the need to recognise the constant change in spatial characteristics, consumer behaviour and preferences and, as a consequence, the worldwide adjustments in retail supply patterns. The APL proposal is a not atypical response to these alterations.

2.18 A brief analysis of accommodation and housing issues is provided. It is noted that the region provides a diversified portfolio of accommodation options and, most importantly, options for accessing various forms of housing.

2.19 Housing demand and provision is not static and, instead, reflects the constantly changing effects of demography and demographic "passage", the impacts of migration including intra and inter regional migration, altering preferences and accompanying affordability, the myriad instruments of funding through a large number of institutions.

2.20 APL proposes to add to the options available through its support of housing and its potential provision of employment related or similar funding mechanisms. That provision may well be in one or two distinctive segments but these will complement existing options and add to diversity in the portfolio.

2.21 One likely effect of the pandemic has been to increase the pressure for flexibility, to show up the costs of static and outdated modes of configuration, create urgency around the need for variety in availability of funding mechanisms and generate a strong stimulus to re-think the adequacy of traditional approaches. APL has sought to deliver options which have regard to these factors.

2.22 As a supplementary analysis and check on likely effects, a capital investment analysis was used to assess likely impacts of the APL proposal. This has the advantages of an arguably more realistic approach to the limits of forecasting, provides a quite separate and contrasting means for assessing effects and can act as a check on conclusions.

2.23 The analysis proceeds by estimating the cost of capital of the proposal with the cost of capital which would otherwise apply (i.e. absent the proposal) to a market based diversified portfolio of investments and comparing the value added for the relevant investment.

2.24 The results of this analysis are summarised in the following table:

Benchmark Cost of Capital		4.98%
Proposal Cost of Capital		6.73%
Spread		1.75%
Return on Benchmark ($000)	$	44,799
Return on Proposal ($000)	$	60,514
Estimated value add	$	15,715

2.25 The analysis indicates benefits in excess of $15.7m by comparison with investment in a standard diversified portfolio. That comparison assumes that an investment of this size would be made. There is of course no indication that without the proposal such an investment would be made. The $15 million of benefit therefore "sits" on top of the value of the direct investment to the economy.

2.26 A cost benefit analysis was then undertaken. The key cost considered was the value of the current use of the land as a dairy farm. The result showed a net output of $931,000 from the farm and a net present value of some $13.9 million over the same time period as the proposal was evaluated (such value being dependent on the phasing).

2.27 The potential for cost being imposed (over and above what would incurred without the APL proposal at some point) in components of the public infrastructure system (three waters for example). Direct costs are to be paid as per various charging regimes while external costs noted above will arise regardless of APL proposal at some point.

2.28 It was also noted that the potential for costs arising through viability and execution issues are:

(a) No different to those found for any development; and,

(b) Dealt with by means of phased development in APL's project design.

2.29 The net benefit equation is summarised in the following table:

Benefits	Multiplier analysis	$	8,475,059	NPV over a decade ($000)
	Capital investment	$	60,514	Annual ($000)
	Employment		3,065	Average annual
Costs	Multiplier analysis	$	13,860	NPV over 18 years ($000)
	Capital investment	$	44,799	Annual ($000)
	Employment		-	Remain outside the region
Net benefit	Multiplier analysis	$	8,461,199	NPV over a decade ($000)
	Capital investment	$	15,715	Annual ($000)
	Employment		3,065	Average annual

2.30 On both measures of effect the conclusion is that:

(a) There are no material adverse economic effects; and,

(b) There are significant benefits in both GDP and employment.

2.31 I therefore conclude that:

(a) There are no economic effects which would amount to adverse effects likely to arise from the proposal; and that,

(b) There would be a significant adverse economic effect likely to arise from declining the APL proposal.

3. APPROACH TO DEALING WITH THE COVID-19 PANDEMIC

3.1 Since the conception of the proposal which led to the submission on the Proposed Waikato District Plan that is currently being considered, the world has experienced the advent of a major pandemic which is having profound impacts on numerous facets of human activity across the globe, New Zealand, the Waikato region and the district of relevance for the application.

3.2 It is therefore necessary to consider how this event should be treated in analyses of the proposal at all levels of possible impact and in particular how the assessment of social and economic effects should be treated.

3.3 Below I set out the approach I have adopted in this regard.

3.4 I adopt the generally accepted view in respect of a broad swathe of social and economic structures and processes that mean:

(a) The event has led to "extraordinary conditions" of a pervasive and severely intrusive nature resulting in society now living in "extraordinary times"; and thus,

(b) We should expect to be involved in "extraordinary responses" which require adaptations and expectations in the area of all economic structures, processes, and outcomes.

3.5 In economic terms, a considerable premium lies on the restoration and recovery of economic wellbeing in production, distribution and employment. All activity should therefore be considered in the context of this reality.

3.6 The standout and likely enduring characteristic of the pandemic with which New Zealand has been afflicted is the high level of uncertainty which it has generated and which permeates social and economic activity, process and structure throughout the country and the society in which it takes place. While a recession seems inevitable, the depth and duration of that recession, and characteristics of the recovery from it, are highly uncertain.

3.7 It is not possible to quantify with any precision or confidence what the impacts will finally be. Models and forecasts will be unhelpful in this situation due to the uncertainty of scale, scope, and nature of likely effects. Given this, a reasonable approach is to:

(a) Note that expected estimates very likely remain optimal as estimates (since much remains unchanged) but subject to increased uncertainty regarding detail and timing;

(b) Confidence "bands" around estimates have broadened considerably; and,

(c) Timing (which might involve acceleration as much as delay) is the most likely parameter to be affected.

3.8 Given these assumptions – and regardless of their validity, some point of departure is required - it is therefore reasonable to then identify some "themes" which are likely to characterise thinking, strategy, and execution in coming years, at a relatively high level. Those themes include:

(a) Providing for a long-term framework (given infrastructure asset lives, development lead in times and adjustment lags) is prudent;

(b) Employment is commonly the biggest determinant of social, economic and wellbeing outcomes for individuals, families, and communities. Employment and the creation of jobs will be critical to Waikato District and national recovery;

(c) Government seems likely to invest substantially (and has done so already) in the economy at numerous points. In particular, investment in jobs; investment in infrastructure and systems usually take priority e.g. rail, roads, housing, health, and education assets;

(d) A premium on basic protection and survival with wellbeing as a priority (as opposed to higher cost discretionary spend options);

(e) Significant changes in the timeframes for the delivery of a wide range milestones in goods, services, and public administration;

(f) Significant levels of change in the provision of and demand for activity with adaptations in structure, process and accompanying scope and scale; and,

(g) A premium attaching to flexibility, innovation, adaptation, and intelligent opportunism in a relatively harsh social and economic climate.

3.9 These themes are carried through, at least implicitly, in the various analyses of social and economic effects.

4. PEER REVIEW ECONOMIC ANALYSIS / EVIDENCE OF TIM HEATH

4.1 Given the issues raised by economists engaged by the Waikato District Council and a couple of the further submitters in relation to the potential economic effects of the Ohinewai proposal, and the differing position adopted by the further submitters' or Council experts, I was initially engaged to undertake a peer review of the analysis undertaken for APL by Property Economics.

4.2 The purpose of the peer review was to:

(a) Clarify whether the analysis follows conventional (or otherwise justifiable) approaches, methods and use of information such that the conclusions drawn may be relied upon;

(b) Provide an independent view of the conclusions drawn given the information provided and the analyses undertaken; and,

(c) Highlight such areas as might usefully be noted or explored as a means for advancing understanding of the likely economic effects in the context of the application.

4.3 Following my initial analysis and reporting and the substantial investigations involved, the scope of my Peer Review was modified so as to inquire into the validity and robustness of the methods used and conclusions reached by Mr Heath in his evidence.

4.4 The peer review was undertaken on an independent basis at arm's length.

4.5 The key conclusions from this modified peer review analysis were as follows:

(a) I confirm that Mr Heath's approach follows a conventional framework for the analysis of retail and light industrial activity.

(b) That analytical framework is one commonly used in New Zealand in settings such as that applying to the application by APL. That setting includes the relevant land use regulation applicable in this case.

(c) While various alternative approaches might be used (such as the capital investment analysis used in supplementing my evidence), I consider that very similar conclusions would have been (and, in my evidence, are in fact) reached.

(d) I therefore regard Mr Health's conclusions as both reasonable and supportable on the basis of the evidence and analysis he provides.

(e) The key drawback with conventional analyses using floorspace areas and like statistics, is that they tend (by definition since they are drawn from specific points in time) to be somewhat static.

(f) The effect of this drawback is to limit the precision with which some scenarios can be foreseen but not:

(i) The fact of their likely occurrence; or,

4.6 The materiality of their impact. Consequently, I confirm the validity and the conclusions presented in Mr Heath's evidence.

5. OVERALL ECONOMIC EFFECTS: CONCEPTS AND APPROACHES

5.1 This part of my evidence provides an assessment of the overall economic effects of the Ohinewai proposal insofar as these can be estimated based on the material provided in support of the APL submission and by APL management.

5.2 I note that the APL submission and the planning behind it pre-dates the Covid-19 pandemic, the effects of which may involve material alterations especially in respect of timing. Where likely impacts of that event are material and relevant this has been noted. The primary effect has been to introduce a hitherto absent element of uncertainty and to place a premium on value-adding recovery in economic performance and employment.

Purpose

5.3 The purpose of the analysis is to estimate the likely economic effects of the implementation of the Ohinewai Structure Plan, per APL's submission, most notably the broad category of activity falling under the heading of retail.

5.4 Whereas the evidence of Mr Heath and Mr Osborne focusses on the land use components of the proposal, my evidence is concerned with impacts across the entire activity category.

Context

5.5 The consideration of these "economic effects" takes place in the context of:

(a) The need to consider net effects, i.e. the effect once costs of the proposal have been subtracted from the benefits which the proposed activity might confer; and,

(b) The "sustainable management" purpose of the Resource Management Act 1991 (RMA) which is defined in section 5(2) to mean:

> *"…managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural well-being and for their health and safety while—*
>
> *(a) sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and*
>
> *(b) safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and*

(c) avoiding, remedying, or mitigating any adverse effects of activities on the environment."

(c) The requirement in section 32 of the RMA to evaluate whether the objectives of a proposal being evaluated represents te "most appropriate" way to achieve the purpose of the RMA and the objectives of the plan itself.

Nature of the proposed activity

5.6 The details of the proposal as set out in APL's submission and amendments to it are laid out in detail in the evidence of Jonathon Broekhuysen and John Olliver.

5.7 In my evidence I deal with the likely economic effects of the group of activities which encompass:

(a) Earthworks and civil engineering works which support the planned activity;

(b) The new and enlarged "Sleepyhead" manufacturing operation which is a centrepiece of the activity in the proposed new area;

(c) Establishment of a number of new outlets serving the public in various ways – retail, discount factory outlet and neighbourhood services;

(d) A light industrial area to be established for a mix of manufacturing, servicing and like activity;

(e) A rail siding and associated infrastructure which will support both inflow and outflow of goods from the factory; and,

(f) A substantial housing development which will provide for workers and support households supporting employment in the area.

5.8 The development is substantial both in physical terms and capital investment.

5.9 As with any economic effects assessment, the prime question concerns whether or not and the extent to which the benefits of the proposed investment and activity outweigh the costs it is likely to impose – the most significant of which is the opportunity cost of not proceeding.

5.10 For the most part, benefits and costs are to be assessed in terms of:

(a) Dollar GDP output;
(b) Employment counts (EC); and,
(c) Gross pre-tax Household Income[1].

5.11 Primary sources of information (noted in detail below) have been public domain data and, (within the bounds of commercial confidentiality) management knowledge.

5.12 The time frame envisages commencement at the beginning of calendar 2021 with Phase I covering the first three years by which time the majority of the assets will have been established and the activities capitalised.

5.13 Reasonably heavy investment will continue for two or more years with the last additions to the site being complete by around 2029.

Approaches

5.14 I have adopted two slightly different approaches to assessing economic effects:

(a) *Traditional Multiplier Analysis* – which provides answers to the cost benefit question based in direct, indirect, and induced effects generated by multipliers. This has become the typical effect assessment method; and,
(b) *Capital Investment Perspective* – which provides an analysis of the likely returns to the capital invested in this portfolio of proposed activity by comparison with its alternative – investment in a diversified portfolio representing the NZ economy (and this the region).

[1] Household income is not dealt with directly in my evidence because no detailed profile of households or their income as those profiles relate to either direct activity or indirect and induced activity. While broad averages might be employed, their value was deemed to be so general as to be misleading under present conditions of uncertainty. Since the onset of the pandemic Government policy in the income area in some sectors has already been adjusted several times and may again. It is therefore more prudent to focus on output and employment in this instance.

5.15 Each method draws directly from the proposal to provide answers to the net benefit question. The latter, however, arguably provides a more tractable approach in the current environment and may provide an intuitively clearer picture than does traditional multiplier analysis.

5.16 Both methods draw on the same context, assumptions, definitions and data as elaborated in the evidence.

Defining 'Economic Effects'

5.17 In my evidence, the methods consist of applying a series of steps to reach conclusions about the likely economic effects. The steps have been applied as follows:

(a) Defining what is meant by "effects" in as precise a fashion as is reasonably practicable.

(b) Definitions have been drawn from the economic literature and common statistical practices of agencies such as Statistics New Zealand. They consist of:

(i) *Direct effects* – being output ($GDP) from actual activity at the Sleepy Head plant and in its processes (including head office activity);

(ii) *Indirect effects* – being all activity providing inputs to the direct activity including all goods and services; and,

(iii) *Induced effects* – being all economic activity generated by the households of those generating direct and indirect effects (including households of "one" only member).

(c) Such effects may be observed in isolation and in combined form. In each case (direct, indirect, and induced) the effects are exclusive and estimation techniques are designed to exclude double counting of effects.

Evaluation of Opportunity Cost and Its Impact on Gross Effects

5.18 Arguably the greatest flaw which arises in studies of economic effects is where (as is regularly the case) the opportunity cost of a proposal such as that developed by APL is not taken into account.

5.19 The concept is quite simple and acknowledges that in undertaking the subject proposal other possible proposals are foregone and indeed the benefits of existing activity is also foregone.

5.20 Three key criticisms (typically of multiplier based studies) of economic effects studies arising from are:

(a) Many impact analyses produce estimates which seem intuitively (and can be shown empirically) to be simply too large and thus exaggerate impacts[2];

(b) New projects, which it is frequently argued "crowd out" other projects which, had they proceeded, would have produced at least some impact and thus an element of double counting is involved in the estimates[3]; and,

(c) Crowding out and other lost opportunities occasioned by the diversion of resources to the case being studied also account for less than 100% take up of the impacts suggested by raw multiplier and like estimates of effects.

5.21 Attention to and estimation of opportunity cost is a means for dealing with these problems.

5.22 Several studies have examined means for estimating the size of the opportunity costs of benefits delivered by projects. These have taken two primary approaches:

(a) One is to survey those affected outside of the 'new' activity (those selling the goods and services in question prior to the new activity (or level of activity), suppliers of intermediate goods and services and others being households). Impacts on the dollar and FTE effects of the newly delivered benefits are then estimated; and,

(b) A second approach has been to use input output methods to estimate losses on an industry by industry basis to estimate expected losses. Survey data may also be used as a check on these estimates.

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2 The earliest examples were the Think Big projects in NZ which had estimates of up to 400,000 new jobs but which, in the event, appeared to generate perhaps 2,000 new jobs only.

3 Kiwi Build is likely for example according to the Reserve Bank of NZ to produce perhaps a third of the promised houses since around 2/3rds of the construction activity would have occurred in any event (RBNZ, various media, Feb 2019).

5.23 In commonly cited cases, the opportunity costs (as suggested originally by Haveman and Krutilla) of the effects are significant and may be large.

5.24 Hughes, Brown, Miller, and McConnell for example, studying the impacts of new farmers markets found that gross benefits estimated using standard multiplier approaches (such as those used in the studies of aquaculture impacts in NZ and in the present assessment) differed by some 55% for estimates of value added and by 31% for FTE employment[4].

5.25 Elder and Butcher studied the net effect of irrigation projects on the economy of Washington using the input output method and found gross benefits diminished by 34% (value added) once opportunity costs were taken into account[5].

5.26 Examining food hubs, Jablonski, Schmit, and Kay found, using survey methods that a drop of 11% occurred when opportunity cost was netted from gross estimates of the benefits of these projects[6]. Haveman and Krutilla, in their original study reported opportunity costs up to as high as 100% (and thus no net gain).

5.27 Anecdotal evidence in NZ (from event impacts such as sports fixtures through to early 'Think Big' work) and studies such as the historical analysis of pre-event assertion relative to observed outcome undertaken by Farley suggest equally large impacts of opportunity cost[7].

5.28 A reasonable conclusion is that opportunity costs arising through reallocation of resources and displacement of existing activity along with district and regional 'leakage' reduce gross benefit by a significant amount and should be taken into account.

Allowing for Opportunity Cost in This Evidence

5.29 To deal with these problems in this evidence, an analysis of the current use as a dairy farm was undertaken. This the use most likely to continue under current zoning. That use is therefore the most likely plausible alternative.

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4 David W. Hughes, Cheryl Brown, Stacy Miller, and Tom McConnell, *Evaluating the Economic Impact of Farmers' Markets Using an Opportunity Cost Framework* Journal of Agricultural and Applied Economics, 40,1(April 2008):253–265# 2008 Southern Agricultural Economics Association.

5 Elder, E.E., and W.R. Butcher. "Including the Economic Impact of Cost Paying in Regional Input-Output Analysis." Western Journal of Agricultural Economics 14(1989):78–84.

6 B.B.R. Jablonski, T.M. Schmit, and D. Kay, *Assessing the Economic Impacts of Food Hubs to Regional Economies: a framework including opportunity cost* Working Paper Charles H. Dyson School of Applied Economics and Management Cornell University, Ithaca, New York 14853-7801 USA, Feb 2015.

7 Farley, P. *Irrigation Scheming - a history of government irrigation in New Zealand* See https://www.odt.co.nz/business/farming/story-irrigation-told-book 2013.

5.30 In the case of the capital investment assessment, a benchmark alternative (being the New Zealand sharemarket) is established.

5.31 The three main problems with over-estimation are therefore addressed explicitly by objective means and thus the estimated effects are likely to be the more reliable and less prone to unjustified exaggeration.

Economic Context for Activity

5.32 This requires consideration in two parts being:

(a) Firstly, the macro conditions prevailing in the economy at large; and,

(b) Secondly, specific micro features of the retail sector need to be considered.

5.33 The macroeconomic context in which the analysis takes place should be considered because it sets the opportunities and constraints on successful development as proposed in the application. This involves (but is not restricted to) a consideration of the macro economic environment (for example, interest rates, exchange rates and nationwide growth), structural and change in the relevant sector.

Transfer versus Net Additions to Economic Value

5.34 In addition to the points made above and more generally, a principle which should acknowledged and that is not well captured in many studies of economic effects is the fact that upon a new development being commissioned a certain amount of the new activity may simply be existing activity which has been re-distributed from a former location to the new development but largely without change. At the limit, the net addition to economic value is nil.

5.35 There is some scope for a certain amount of such transfer in this case. Typically, however, this is well less than 100% for reasons such as:

(a) Quality improvements to goods and service production often accompany any move;
(b) Distribution improvements and a lowering of costs frequently accompany and transfer from one location to another;
(c) Old and redundant plant may well be replace introducing new technology and improving productivity may take place;
(d) Expansion and expansion options may be enabled by a move from one area to another; and,

(e) Myriad other changes of greater and lesser significance mean that such activity as is transferred generally involves a net value add – that, in the end, is the incentive for moving.

5.36 It is possible that while retail activity can be shown to involve only net additions to value (see evidence of Mr Heath), some of the light manufacturing activity could involve transfer.

5.37 Attempts to estimate the size or timing of any some quantity are fraught with difficulty and precision or certainty are close to impossible to attain. In the present case, the element of light manufacturing which is not generated by the factory and related development seems likely to be small and estimates of its size likely to suggest spurious accuracy.

Macro Effects: Context

5.38 The macro context at present is completely dominated by the Covid-19 Pandemic and its economic fallout. The most significant impact of this is neither decline nor opportunity but uncertainty. That uncertainty extends to both direction and magnitude across most dimensions of macro policy domestically and in relevant offshore markets.

5.39 There is very little certainty associated with any of the standard variables in the "macroeconomic equation". Fiscal variables are changing with speed, monetary policy is not only seeing parameters set at unheard of levels but is seeing a significant re-definition as unorthodox measures are experimented with. Interest and exchange rate behaviour are accordingly volatile.

5.40 What is clear is that:

(a) Whatever path is travelled by the NZ (and therefore the Regional economy), it will involve, for some period of time, falls in output and employment;

(b) A period of structural adjustment as a new economic picture and series of processes within that picture emerge. The shape of the new picture is largely unknown;

(c) Like all regional and district economies, heavily subdued performance is likely to affect all members of the economy with significant efficiency and equity implications for many; and,

(d) It is likely that successful performance will place a premium on adaptability and agility with penalty for the less nimble.

6. ECONOMIC EFFECTS: MULTIPLIER ANALYSIS

6.1 In this section of my evidence, a traditional multiplier analysis is undertaken so as to estimate the effects of the activity as proposed on GDP output and employment in the region. This analysis is used to drive the cost benefit analysis to complete the evaluation of economic effects.

Multipliers

6.2 There are generally two forms of multiplier used in assessing flow on effects of economic activity. These are:

(a) "Output multipliers", which take into account gross expenditure involved in producing outputs; and,

(b) In contrast, "value added" multipliers are also used. Value added multipliers net out any "double counting" which can arise with output multipliers where multiple buyers and sellers of an input (say fuel) are involved.

6.3 Value added multipliers are increasingly the multiplier of choice in studies of this type because of their ability to avoid the double counting problems incurred with output multipliers. Value added multipliers have been used in this report and value added may be equated with GDP.

6.4 Employment multipliers are developed in an identical conceptual framework for Full Time Equivalent (FTE) job creation. Input output tables are again used to provide estimates of the indirect and induced employment effects.

Data

6.5 Data used for input output driven multiplier generally suffers from the problem that it is available only at the national level. The relationships modelled thus strictly only apply at that level.

6.6 My analysis uses data drawn from the Waikato region and thus the relationships modelled are those applying at the regional level. There is typically in regional economies a great inter-regional trade – typically greater than that prevailing between countries. Nonetheless regional patterns frequently differ from their national equivalent and capturing that effect can be important.

6.7 The data that I used in undertaking this analysis originates in data gathered by Statistics NZ for the national economy which is then is adjusted by a set of algorithms devised by Insight Economics based on well accepted parameters. I then draw my multipliers from this raw data set.

Expenditure Driving the Value Add

6.8 APL's management have provided data allowing Identification of the relevant expenditure which is to accompany the proposal. This is in some cases capital investment; in others, operating expenditure, and in some cases both.

6.9 In the case of employment data, this has been drawn from management advice and published sources of retail and other activity. The database of employment to Gross Floor Area maintained by Property Economics has also been drawn from (see evidence of Mr Tim Heath).

Analysis

6.10 Multipliers have been derived which, given expenditure data drawn from the proposal, reflect likely direct, indirect, and induced economic effects.

6.11 The effects reported are those estimated for GDP output in current NZ dollars and what was formerly denoted as full time equivalent (FTE) employment and is presently referred to as Employment Count (EC).

6.12 It is important to note that there are other economic effects – usually of a longer term nature – which are not captured by multiplier analysis. These include:

(a) On the demand side – increased competition leading to improved ranges of goods and services offered, lower average prices over time, consolidation of assets with improved productivity and lower sector wide inventory risk through improved diversification – all of which generally lead to improved provision for consumers across several dimensions; and,

(b) On the supply side – increased competition leading to greater incentives for investment in new starts, more robust risk management through diversification possibilities generated by improved consumer traffic, attraction of a wider range of quality in product offerings, investment in operational efficiencies through economies of scope (breadth of operation) and scale (size of operation), avoidance of duplication and thus more efficient resource use.

6.13 These effects can be difficult to measure and quantify. The multiplier analyses do, however, provide a useful proxy for their likely effects through its identification of output and employment growth.

Capacity Adjustment

6.14 The multiplier analysis produces what may be termed "gross effects" estimates. These reflect the underlying assumptions of the method and some adjustment (and added analysis) is typically required.

6.15 One assumption of concern is that the analyses assume that all businesses in all sectors analysed are running at full capacity "already". That is often not the case.

6.16 Key reasons for this are twofold:

(a) First, businesses usually have spare capacity in production lines, warehousing capacity, rates of production and service provision, underutilised assets and processes which are running at less than 100% capacity; and,

(b) Secondly, most businesses have at least some staff who are able to increase output. For example, a barista may increase the number of coffee units served per hour, a waiter may serve more tables at per hour or a taxi may carry more passengers than previously.

6.17 In each of these cases, the economic effect of proposals such as the applicants would be to simply take up existing capacity without any need for creation of new jobs or through additional investment in capacity.

6.18 Typically, some adjustment is called for. In this case, however, there is no existing capacity. Various plant and buildings may be built to be filled over time as the development is completed but there is no "idle capacity and thus no adjustment is required.

Proposed Activity – Output Effects

6.19 In this section, a multiplier analysis is undertaken to assess the likely dollar output (sometimes referred to as GDP) effects of all activity proposed in the application.

6.20 For the analysis it should be noted that:

(a) In the absence of reliable forecast data, expenditure has been derived from average performance for the activity concerned;

(b) Wherever possible data is expressed in 2020 dollars with net present values used to allow distant expenditure to be seen in today's terms;

(c) The discount rate for NPV calculations is the estimated government bond rate over the period since that represents the "risk free" rate;

(d) Value added multipliers are used and incorporate direct, indirect, and induced components in a final (Type II) multiplier;

(e) For many activities, fine detail is not available and will not be until the project unfolds over its decade or so development;

(f) This is frequently the case in this type of analysis. There are not material differences in the multipliers which would raise concerns;

(g) No explicit adjustment is made for capacity because the majority of the development (especially in early phases) is "greenfields";

(h) At the same time, with productivity an unknown factor, employment take up or 100% expenditure may well not be achieved; and,

(i) At the same time, the estimates should be regarded as offering "orders of magnitude" effects rather than pinpoint accuracy.

6.21 The following table summarises the totals expected over the period both as raw estimates, adjusted for multiplier effects, and as totals. The year by year profiles are shown in **Attachment A**.

6.22 The effect of the multipliers on the different activities are evident in the lower half of the table.

Estimated Output and Multiplier Effects Raw Estimates		
	Invest NPV	Expenditure
Factory	$ 126,000	$ 114,660
Retail	$ 85,999	$ 79,549
Light Industrial	$ 446,000	$ 419,240
Housing	$ 315,000	$ 293,580
TOTAL	$ 972,999	$ 907,029
With Multiplers		
Estimated Output	Multiplier	NPV
Factory	1.79	$ 879,831
Retail	1.43	$ 538,500
Light Industrial	1.97	$ 4,722,095
Housing	2.60	$ 2,334,633
TOTAL		$ 8,475,059

Proposed Activity – Employment Effects

6.23 An analysis of likely employment effects, following an identical logic to that used for output (above) was undertaken.

6.24 In this section, a multiplier analysis is undertaken to assess the employment effects of all activity proposed in the application.

6.25 For the analysis it should be noted that:

(a) In the absence of reliable forecast data, employment data has been derived from averages based on Gross Floor Area ratios and thus represent averages observed in New Zealand. They therefore represent average performance for the activity concerned;

(b) Wherever possible data is expressed as applicable in 2020 reporting;

(c) Multipliers used incorporate direct, indirect, and induced components in a final (Type II) multiplier;

(d) For many activities, fine detail is not available and will not be until the project unfolds over its decade or so of development;

(e) This is frequently the case in this type of analysis. There are not material differences in the multipliers which would raise concerns;

(f) No explicit adjustment is made for capacity because the majority of the development (especially in early phases) is "greenfields" and involves new jobs;

(g) At the same time with productivity an unknown factor, employment take up or 100% expenditure may well not be achieved;

(h) At the same time, the estimates should be regarded as offering "orders of magnitude" effects rather than pinpoint accuracy.

6.26 The following table summarises the totals expected over the period both as raw estimates, adjusted for multiplier effects, and as totals. The year by year profiles are shown in **Attachment B**.

6.27 The effect of the multipliers on the different activities are evident in the lower half of the table.

Estimated Employment Counts and Multiplier Effects 2021 - 2030		
Raw Estimates		
Employment Counts	EC	Average
Factory	1,000	825
Retail	358	277
Light Industrial	1,150	748
TOTAL	2,508	1,850
With Multiplers		
Employment Counts	Multiplier	Average
Factory	1.5	1,238
Retail	1.17	325
Light Industrial	2.01	1,502
TOTAL		3,065

6.28 The averages are generally lower than final equilibrium Employment Count values because less than full complements are employed during the construction phases.

Summary

6.29 The assessment of economic effects as estimated through the multiplier analysis may be summarised as follows:

(a) Output (GDP) Impacts – contribution to the Region of $8,475.1 million expressed as a net present value over the decade starting in 2021; and,

(b) Employment Impacts – contribution to the Region of 3,065 positions, on average, over the decade starting in 2021.

(c) Investment – the investment of just on one (1) billion dollars expressed as a net present value over the decade starting in 2021.

6.30 Given the current and likely future operating climate coupled with the difficulties in making these kinds of estimations, the values reported could vary by a significant amount. A variation of 20% above or below would not necessarily be surprising.

7. RETAIL ECONOMIC EFFECTS: CONTEXT

7.1 The context surrounding any analysis of retail economic effects and proposals such as APL's is particularly important at present because of the forms which output and employment effects described above may take.

7.2 It is therefore helpful to summarise the context in which the timing, extent and nature of change applicable to the "raw" numerical values reported above should be viewed.

7.3 It should be further noted that much of the change being experienced had long commenced before the onset of the Covid-19 Pandemic.

7.4 In addition, the uncertainty generated by these changes has been exacerbated by the Pandemic and its likely effects.

7.5 The significant changes taking place in the sector include:

(a) **The State of Retailing** – the retail sector is in the middle of a significant re-structure related to the extent and form in which "bricks and mortar" dominance is diminishing. Changes include:

(i) The disappearance of the traditional "store" format for the sale of goods;

(ii) The extent to which some outlets survive, others become niche operations, and combinations of the two emerge;

(iii) Transaction forms are changing (pay wave, debit card, disappearance of cheques and cash);

(iv) Encroachment of online retail supplants and displaces existing formats; and,

(v) Internal design changes such as the rise of self-checkout, alterations in layout, vertical integration, and the spatial configuration implications.

Of paramount importance is the need to recognise that change is both widespread and unstoppable. Accompanying this deep seated change are implications for land use planning policy.

(b) **Innovation and Technological Change** – the underlying drivers of the change in retailing are:

(i) The fast moving and extensive introduction of Artificial Intelligence and "big data" dependency;

(ii) Automated management techniques coupled with remote management procedures;

(iii) Increased consumer convenience in choice; and,

(iv) Other expectations such as lowering of product price with improved quality and range of offerings.

As with the changes themselves, these drivers are close to ubiquitous and difficult to stop. At the same time, they bring new and increased infrastructure demands, notably in the areas of communication servicing and capital.

(c) **Rapid and Compounding Change** – is a characteristic of the change being experienced:

(i) The speed of innovation is rapid as is its flip side, asset redundancy or a need for re-purposing;

(ii) Much change occurs through leap frogging, where innovation speed means entire "steps" in evolutionary change are skipped; and,

(iii) Much change is of a "viral nature" and thus spreads rapidly through retail networks and chains and is compound in its effects.

An effect of the speed of change and its deep seated nature is to place a premium on flexible regulation of externalities while rendering static policy techniques unenforceable or irrelevant.

Implications and Conclusions

(d) **Deep Seated Structural Nature of Change.** Much change is far reaching rather than superficial, non-linear with constant quantum moves, has strong path dependencies, upsets former configurations of resource, creates demands for new skills, and requires differing organisational structures.

(e) **Spatial Reappraisal**. The changes in appreciations and significance (including "none") of space, spaces, spatial arrangements, cost of distribution of resources, and collapsing of traditional "catchments"

accompanied by creation of new ones means that flexibility is paramount.

7.6 The economic effects arising from the analyses must therefore be seen in the light of this change with many economic effects offsetting one another and creating new benefits which do not "appear" in traditional considerations.

7.7 Given that rates of change have been fast, innovation is ongoing, and the overall effect is growth, the opportunities offered through the applicant's development and its accompanying effects have the potential to facilitate considerable increases in net wellbeing.

8. HOUSING ISSUES AND ECONOMIC EFFECTS

8.1 A key feature of the APL rezoning proposal lies in the area of housing and accessibility to housing. Below I deal with the context within which this issue and the multiplier results reported should be considered. As with other factors these should be considered against the offsetting costs which might be incurred, most notably, opportunity costs.

8.2 The analysis does not seek to provide an intensive analysis of the issue. That is covered in the evidence of Mr Quigley and instead focusses primarily on providing a framework to consider effects in.

The Significance of Adopting a Broad Rather than Narrow View

8.3 Accommodation such as that proposed by Ambury forms but one of several options in the total housing portfolio. That region wide portfolio comprises options such as "own your own" units across a wide range of segments each with price points, rental options ranging from high cost apartments to low cost short term accommodation, group housing options, pensioner flats, papa kaianga, marae with collective living, gated community housing, rest home and like options and others.

8.4 The point is that the region and its townships possess an integrated portfolio serving numerous individual and group demands. There is no single "housing issue" in this sense. All dimensions of the household formation process generate dynamic processes of change:

(a) buying and selling of units;

(b) migration driven purchase and disposal;

(c) employment related expansion and contraction;

(d) movements from low to high property value (and vice versa); and,

(e) differing lengths of occupation, typically on differing terms and conditions -

with all of this portfolio and these changes financed in numerous, heterogeneous ways.

8.5 Most importantly:

(a) The portfolio is not static;

(b) Nor is it driven by single factors such as simple cost-based supply, construction efficiency and costs, or demand;

(c) Land configuration and development control is but one of numerous aspects of numerous options; and,

(d) A careful and nuanced appreciation is indicated where apparent "cause and effect" are not alighted upon as being necessarily dominant or overriding.

8.6 The effect of APL's proposal is to contribute to the mix by expanding one of the many housing segments. The characteristics of that expansion are designed to reflect the numerous individual and ever altering characteristics of likely present and future users.

New Approaches, Changes Since Covid-19 and Toward Recovery

8.7 Well before the Pandemic struck in N.Z., numerous factors were at work altering the face of housing accessibility issues. These represented changes in a broad range of factors including:

External Changes of Significance

(a) A significantly altered interest regime across both banks and non-bank financial institutions in response to materially altered monetary conditions globally and in NZ. These had resulted in lower interest rates, dropping of the Loan to Value Ratio regulations, re-fashioning of mortgage products, altered pay back regimes, and differing behaviour sets in the markets for accommodation funding; and,

(b) A suite of supply and demand side regulatory changes in rental accommodation markets. These affected terms and conditions of tenure, quality of supply, rates and timing of supply, institutional participation, types, quality and quantity of state participation and other policy changes.

8.8 On the demand side, there were also changes occurring in the way accessibility to housing was being or to be delivered. These included:

Different Policy Instruments

(a) At the external level, the ability of individuals and family like groupings to fund accommodation costs was altering (through benefit changes generally, accommodation allowances specifically, other assistance packages such as health related payments);

(b) Employers too, have the ability to offer various assistance for housing. Examples include provision of guarantees for mortgages, bonus remuneration in the form of housing subsidy and company loans where stable accessibility to housing is an issue in maintain a stable workforce or reducing staff turnover; and,

(c) Outside of government-based mechanisms, lenders, employers, developers, and the construction industry were devising suites of product offering (land and build, etc.), low cost design alternatives (tiny houses, lower cost dwellings), funding vehicles (reverse mortgages, for example), differing settlement options and other approaches.

8.9 The net effect of these moves was compounding, and cumulatively they combined to present a radically different operating environment to the simpler housing "landscape" of the past. Certainly, the institutional setting in which accommodation provision and uptake takes place has moved to one of complexity and nuance rather than simple linear, static relations concerned with land and building quantum and price.

8.10 The advent of Covid-19 has not necessarily altered either the need for changes such as those noted nor the likelihood of their delivery. What it is likely to have done is to accelerate changes begun already while placing a premium on factors such as:

(a) The need to address unmet demand (both type and quantity) across all segments of the portfolio;

(b) The requirement for a flexible approach which recognises the breadth of factors to be considered;

(c) Ensuring that factors of dominance in past eras which are now of lesser relevance or are being overshadowed by more urgent needs, do not dominate decisions; and,

(d) The urgency with which issues need to be addressed.

8.11 In addition, these factors are driven to centre stage by the overwhelming demand to improve the wellbeing of individuals and communities of all types and kinds as demonstrated by the Wellbeing Budget of 2019. The latter has been reinforced by the recently released Budget for 2020-21.

Relationship to Land Use Planning

8.12 It is clear that the operating climate in which all housing activity and the funding of that activity takes place has altered considerably over the past two or more decades. The key impact of the Pandemic has been to accelerate those changes.

8.13 Perhaps most significantly, one likely effect of the Pandemic is that there is urgency and additional stress – significant stress – placing the wellbeing of people and their communities to the fore and ahead of factors which do not contribute directly and urgently to deliverable, realistic (practical and executable) improvements in wellbeing.

8.14 These changes see the role of land use planning becoming much less concerned with traditional configuration models (the hierarchies of central place theory and ecological models of Chicago), traditional zoning as well as orthodox development controls.

8.15 Instead, it becomes dominated by facilitation, removal of static impediments to development, devising alternative means for delivering outcomes, ensuring processes which deliver acceptable quality of provision, all within urgent timeframes which minimise administrative process and cost.

The place of the APL proposal in the mix

8.16 Given this context and the long run objectives of both the resource management documents and the underlying legislation (RMA and Local Government Act) the form of assessment of social and economic effects as that relates to housing accessibility needs to:

(a) Be dominated by the need to generate a net effect which improves wellbeing for individuals and the community;

(b) Place the requirements of existing planning regimes and detail, many of which were devised or reflect thinking from substantially different circumstances, in context;

(c) Focus heavily on outcomes rather than input rules or even output performance in delivering valid results for current and likely future circumstances;

(d) Recognise the broad and varied range of dimensions and in particular the multi-faceted ways in which responses to price and quantity elicit; and,

(e) The dynamic rather than static pattern-oriented processes which drive accessibility to housing in a heterogeneous portfolio.

Conclusion on effects in relation to housing

8.17 Recent decades have seen significant alterations such that crude models of quantity and price expressed as simple housing affordability no longer adequately express the issues to be addressed.

8.18 The Pandemic has accelerated the need for flexibility in planning processes to adjust to present circumstances while keeping the long term in mind. The APL proposal is central to this process.

9. CAPITAL INVESTMENT PERSPECTIVE, COSTS AND BENEFITS

9.1 As noted elsewhere, circumstances have altered drastically since the APL proposal was conceived. The key impact of the Pandemic has been to introduce a hitherto unknown level of uncertainty to a field already distinguished by the severe difficulties which surround precision.

9.2 By its very nature, traditional multiplier analysis tends to give the impression of considerable precision where in fact the numerous quantitative conclusions and forecasts arise largely as a result of:

(a) What can amount to purely "arithmetic" which we then seek to add meaning to. In some cases, this is valid. In others less so;

(b) All of the analysis depends upon relationships which are largely linear. They do not reflect abrupt changes well;

(c) Neither is disruption handled well. The disruptive effects of online retailing for example is difficult to mimic with simple equations.

9.3 Thus, a more generalised approach which is more defensible:

(a) Seeks to establish whether or not value is being added;

(b) Does not make any claims at all about the form such additions to value might take; and,

(c) Remains silent (largely) as to timing across numerous changing variables.

9.4 Consequently, in addition to the traditional analysis of economic effects which I have undertaken (as described above), I have also undertaken an assessment which derives from a portfolio investment perspective. This has the advantage that:

(a) It does not require that attempts be made to provide detailed forecasts of variables about which in truth little is known;

(b) It allows a certain amount of leeway as to timing and phasing when dealing with developments;

(c) The dangers of producing large arrays of numbers which give spurious impressions of precision are reduced significantly;

(d) A relatively high degree of realism is retained in respect of forecasting futures in an uncertain world; and,

(e) It still provides a means for answering the essential "net benefit question".

9.5 The purpose of the analysis is thus to complement the more traditional approach with an assessment which more closely reflects present conditions.

Cost of Capital

9.6 Crucial to the understanding of the economic effects of the proposal is an understanding of cost of capital. In simple terms cost of capital is an opportunity cost and represents the economic value which could be earned by investing the capital committed under the proposal to the commitment of that same level of capital in another opportunity.

9.7 To justify investment in the proposal, that investment must equal or exceed the amount which would be earned in the alternative. Thus, when assessing economic effects from this perspective a comparative analysis is involved with the object being to determine the extent, if any, to which the earnings (or return) of the proposal meets or beats the return which could be expected from the alternative.

Opportunity Cost – a Plausible Benchmark

9.8 Absent the proposal and assuming that the funds were available in an identical quantity to that available to fund the proposal, funds would likely be committed throughout the economy across the diversity of opportunities available.

9.9 This "opportunity" can be proxied through the expected return to a diversified investment in the investment opportunities offered by the New Zealand share market. That proxy is far from perfect but it is well defined, well diversified and represents a very sizable quantum of equity in the country's economy.

9.10 It may therefore be said to offer a reasonable representation of a plausible alternative to the proposal.

9.11 The cost of capital for the NZ equities market therefore provides a benchmark which would need to be met or beaten by the proposal before it could be considered that the economic effects of the proposal were positive. The term "adds value" is sometimes used to represent this state of affairs.

Estimating the Benchmark Cost of Capital

9.12 Estimating the benchmark cost of capital (and indeed any cost of capital) draws on the 70 years of development in financial economics and in particular portfolio theory and the capital asset pricing model[8].

9.13 The most important elements of the cost of capital estimates developed for the benchmark are that:

(a) It represents a fully diversified investment in the NZ sharemarket; and,

(b) The investments in that market and their value arise as a result of a competitive allocation of funds and thus a high level of economic efficiency.

9.14 Cost of capital is calculated in such a manner as to take account of risk and the estimated expected return on equity investments.

9.15 I have:

(a) Used the longstanding work of Armillary Capital to establish the benchmark cost of capital in New Zealand[9]; and,

(b) Adjustments developed by Damodaran[10] to reflect changes in expectations as a result of covid-19.

9.16 These calculations result in a cost of capital for the benchmark of 4.98%.

Proposal cost of capital

9.17 Calculation of the cost of capital for the proposal proceeds in a similar manner. However:

(a) Each of the activities cost of capital is calculated separately;

(b) For each activity risk is taken into account so that the return estimated is a risk adjusted return;

(c) Taxation is not taken into account thus any possible tax advantages of debt (typically nullified by the New Zealand imputation regime at

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8 Bernstein, P. *Capital Ideas*, The Free Press, New York, 1992.

9 https://www.armillary.co.nz/wp-content/uploads/2019/06/2018-ROCE-Report-final.pdf

10 http://aswathdamodaran.blogspot.com/ series of posts on adjustments in the light of covid-19.

the individual level) or other leverage gains are offset by equity risk so as to cancel out;

(d) The "weighting" of each activity in the proposal is taken into account with the added assumption that these remain largely unchanged; and,

(e) A weighted, average proposal cost of capital is therefore calculated.

9.18 Weights and return estimates are shown in **Attachment A**.

Value added

9.19 The following table shows the value added by the APL proposal compared with a general investment in the market.

Benchmark Cost of Capital		4.98%
Proposal Cost of Capital		6.73%
Spread		1.75%
Return on Benchmark ($000)	$	44,799
Return on Proposal ($000)	$	60,514
Estimated value add	$	15,715

9.20 It should be noted that:

(a) The investment sums compared are both net present values and thus represent in today's dollars the varying time sequences in investment applied to both the benchmark and the proposal;

(b) They represent annual returns for the project once a stable level of investment is reached, and thus continue while it remains in that state; and,

(c) There will be, as with any equity investment, years of greater and years of lesser gain and loss but on average the values can be expected to hold over the long term.

Conclusions – Capital Investment Perspective

9.21 The capital investment analysis does not provide detail as to factors such as employment. The underlying assumption is that the myriad factors which contribute to business processes which generate improved wellbeing over a period such as a decade will be numerous, varied, difficult to predict with

useful precision, unexpected but beneficial – providing there is an excess of value available over and above what would otherwise be the case.

9.22 The analysis demonstrates that:

(a) There is a significant level of equity generated by the proposal;

(b) It well exceeds what would otherwise be the case; and,

(c) There is a significant level of "head room" or margin of safety to ensure a net beneficial outcome.

10. COST BENEFIT EVALUATION

10.1 As the final step in assessing the net benefit of the proposal costs and benefits are assembled so as to estimate net benefit. This is set out below.

Benefits

10.2 As noted, benefits have been estimated by two different methods. Both are shown in the cost benefit comparison table below.

Costs

10.3 As also noted, a key issue in determining net benefit is some determination of the likely opportunity cost of the investment. I have analysed this as follows:

(a) The existing use (dairy farming) is analysed since that is the current use for the land and its likely future absent the development.

(b) I have provided an estimate of the economic cost of the loss of the current predominant use of the land (dairy farming) in a standard form using input output methods.

(c) The methods used are identical to those adopted for the activities analysed above. The full analysis is attached as **Attachment C.**

(d) The results show:

(i) An output of $931,000 per annum; and,

(ii) An NPV over 18 years of $13.860m.

10.4 From this estimate it is possible to state with an acceptable degree of confidence that the economic cost of implementing the proposal would total, in Net Present Value (NPV) terms and risk adjusted, some $13.9m or $931,055 per annum.

10.5 The other key factor – employment – should also be taken into account. Employment under the current use is minimal.

10.6 This form of analysis, once incorporated in the cost benefit equation, provides a clear expression (numerically) of what is given up, in the Waikato region, by not adopting the proposal.

Public costs of infrastructure

10.7 It might be argued that the APL proposal is likely to involve costs associated with system wide provision of upgraded infrastructure upgrades and capacity improvements such as providing increased volume, quality and distribution characteristics of treatment, supply and disposal. Two points are of relevance:

(a) Such costs as are tied to the rezoning proposal and specific developments related to that are recovered via the several pricing mechanisms (rating charges, fees for services and compliance charges) available to the parties concerned and paid for by developers; and,

(b) Improvements in capacity and quality which arise as a result of growth and are typically assigned to public funding mechanisms are likely to arise in any event (as discussed in the work of, inter alia, Future Proof and like agencies). They arise through growth as a general phenomenon and are not a particular result of the APL application.

10.8 Such costs then cannot be held to be costs imposed by the APL proposal.

Potential effects of impeded development or business failure

10.9 Some analyses note the possibility of impacts of outcomes where development is slowed relative to that envisaged by a proposal or where business failure arises are sometimes cited as creating adverse effects arising.

10.10 While intuitively sounding plausible two factors ought to be taken into account and apply in the case of APL's proposal:

(a) Best practice in design and project management allows for staged development capable of dealing with changing timeframes. That is the case with any development flowing from the APL application; and,

(b) Any and all development proposals (including those considered under existing provisions) face these uncertainties. There is nothing to suggest that the APL application differs in any material sense.

10.11 Viability concerns should not therefore be considered as a cost in the net benefit equation.

Net Benefit Assessment

10.12 Taking costs and benefits from both the multiplier and the capital investment analyses together, weighing costs and benefits shows the following:

Benefits	Multiplier analysis	$	8,475,059	NPV over a decade ($000)
	Capital investment	$	60,514	Annual ($000)
	Employment		3,065	Average annual
Costs	Multiplier analysis	$	13,860	NPV over 18 years ($000)
	Capital investment	$	44,799	Annual ($000)
	Employment		-	Remain outside the region
Net benefit	Multiplier analysis	$	8,461,199	NPV over a decade ($000)
	Capital investment	$	15,715	Annual ($000)
	Employment		3,065	Average annual

10.13 It is apparent that on both measures the benefits estimated for the development are well in excess of the costs it might impose. Further, there is a significant amount of "head room" for risk and any noise or error in the measurement and estimation process.

10.14 On these measures the proposal may therefore be said to be net beneficial.

11. CONCLUSIONS

11.1 The APL proposal, being far reaching and broad in its ambit, has arisen at a very opportune moment for Ohinewai and the Waikato district generally and more widely, the region.

11.2 The need for investment and job generation has never been greater. The fact that such can be achieved at a very minor cost is a further gain.

11.3 Measured in two contrasting ways benefits can be seen to exceed costs by a wide margin.

11.4 I therefore conclude that:

(a) There are no economic effects which would amount to adverse effects likely to arise from the proposal; and that,

(b) There would be a significant adverse economic effect likely to arise from declining the APL proposal.

Brent Wheeler B.A., Ph. D
9 July 2020

ATTACHMENT A

INVESTMENT SCHEDULE

Construction	Invest NPV	March Yrs $000 Costs	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Earthworks and Civil	$ 215,258	$ 203,849	$ 151,000	$ 25,000	$ 25,000	$ 25,000						
Sleepy head Factory	$ 117,005	$ 106,475		$ 30,000	$ 32,000	$ 32,000	$ 32,000					
DFO outlet	$ 57,404	$ 53,328			$ 30,000	$ 30,000						
Service Centre	$ 9,428	$ 8,721		$ 3,333	$ 3,333	$ 3,333						
Neighbourhood Retail	$ 14,868	$ 13,709		$ 4,000	$ 4,000	$ 4,000	$ 4,000					
Light industrial	$ 148,684	$ 139,019			$ 40,000	$ 40,000	$ 40,000	$ 40,000				
Rail Siding & Civil	$ 56,572	$ 52,669		$ 20,000	$ 20,000	$ 20,000						
Housing	$ 280,363	$ 261,298			$ 45,000	$ 45,000	$ 45,000	$ 45,000	$ 45,000	$ 45,000	$ 45,000	
		$ -										
TOTAL	$ 899,582	$ 839,068	$ 151,000	$ 82,333	$ 199,333	$ 199,333	$ 121,000	$ 85,000	$ 45,000	$ 45,000	$ 45,000	$ -
Cumulative Investment			$ 151,000	$ 233,333	$ 432,666	$ 631,999	$ 752,999	$ 837,999	$ 882,999	$ 927,999	$ 972,999	

With Multipliers Estimated Output	Multiplier											NPV
Factory	1.79	$ -	$ 48,867	$ 100,992	$ 153,117	$ 205,241	$ 205,241	$ 205,241	$ 205,241	$ 205,241	$ 205,241	$ 879,831
Retail	1.43	$ -	$ 9,700	$ 59,082	$ 108,464	$ 114,184	$ 114,184	$ 114,184	$ 114,184	$ 114,184	$ 114,184	$ 538,500
Light Industrial	1.97	$ 279,622	$ 362,953	$ 520,356	$ 677,759	$ 751,831	$ 825,903	$ 825,903	$ 825,903	$ 825,903	$ 825,903	$ 4,722,095
Housing	2.60	$ -	$ -	$ 109,044	$ 218,088	$ 327,132	$ 436,176	$ 545,220	$ 654,264	$ 763,308	$ 763,308	$ 2,334,633
		$ 279,622	$ 421,520	$ 789,474	$ 1,157,428	$ 1,398,388	$ 1,581,504	$ 1,690,548	$ 1,799,592	$ 1,908,636	$ 1,908,636	$ 8,475,059

ATTACHMENT B

EMPLOYMENT COUNTS AND MULTIPLIERS

Estimated Employment Counts and Multiplier Effects												
Raw Estimates												
Employment Counts		EC	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Average
Factory		1,000	0	500	750	1,000	1,000	1,000	1,000	1,000	1,000	1,000	825
Retail		358	0	0	269	358	358	358	358	358	358	358	277
Light Industrial		1,150	0	0	288	575	863	1,150	1,150	1,150	1,150	1,150	748
													1,850
With Multiplers													
Employment Counts	Multiplier												Average
Factory	1.50		0	750	1125	1500	1500	1500	1500	1500	1500	1500	1238
Retail	1.17		0	0	314	419	419	419	419	419	419	419	325
Light Industrial	2.01		0	0	578	1,156	1,734	2,312	2,312	2,312	2,312	2,312	1502
													3,065

ATTACHMENT C

AGRICULTURAL USE EFFECTS

Opportunity Cost of OSP - Impact on Loss of Agricultural Output

Estimate of current output — Key assumption: Dairy is overwhelmingly the dominant activity in area affected.

Parameters		Source:
Cows per hectare in Waikato	2.95	Dairy NZ Statistics Waikato 2017/18
Area of OSP (ha)	178	Application
Expenditure per cow (2017/18)	$ 1,490	Dairy NZ Statistics Waikato 2017/18
Output	$ 782,399.00	

Value added multipliers — Waikato Region input-output model 106 Industry

	Direct	Indirect	Induced	Type II
	0.48	0.06	0.03	1.19
Output	$ 782,399	$ 45,027	$ 24,804	**$ 931,055** p.a.

Estimated cost of capital 2.08% — Based on Commerce Commission findings on CAPM for Fonterra

NPV over 18 years	**$13,860,719**

Note: direct and indirect do not sum to "type II" multiplier since some direct cost is absorbed in direct production.