Brackens Ridge Development

Economics Assessment

Prepared for Mount Soho Trust

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Formative

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1 Introduction

Mount Soho Trust (MST) is lodging an application to become a referred project under the COVID-19 Recovery (Fast-track Consenting) Act 2020 ("FTCA 2020") for Brackens Ridge ("BR"), a residential development on the edge of Arrowtown. MST has previously been granted a zone change for the subject site, which would allow 17 rural residential lifestyle lots.

Formative Limited has been commissioned by MST to provide economic research on whether the BR project will contribute to achieving the purpose of the FTCA 2020, and in particular, whether it will generate employment and economic benefits to support New Zealand's recovery from the impacts of COVID-19.

1.1 Background

Queenstown Lakes District has experienced rapid population growth, from around 17,850 in 2001 to 48,300 in 2021, which is equivalent to 5.1% per annum.[1] Even with Covid-19 border restrictions, Queenstown was one of the fastest growing districts in 2021, both in quantum (+900 people) and percentage (2%) terms, for the first time having more growth than the much larger urban areas of Auckland, Christchurch, and Wellington. In total 3% of the national population growth was located in Queenstown Lakes District.

Accompanying this population growth, the Queenstown Lakes District economy has also experienced strong employment growth, up from around 12,400 jobs in 2001 to 35,000 in 2020.[2] Employment in the District has grown by 5.3% per annum, again much faster than most districts in New Zealand. The GDP generated in the district economy has grown by 6.3% per annum, which is more than double the national growth rate.[3] However, the local economy has been particularly affected by the impacts of the Covid19 pandemic and border restrictions, with economic activity declining by -11% in the last year.

Queenstown Lakes District Council's projections show that the population is expected to continue growing strongly in the future, with the population projected to increase by 36,730 by 2051.[4] As in the past, the growth is expected to be driven by continued migration from other areas of New Zealand. Also, international visitors are expected to return in the coming years, which will drive additional growth. We agree with Council's research that the population "will continue to grow strongly, as it remains an attractive place to live, work and visit. This is the key assumption that has underpinned

[1] Statistics New Zealand (2021) Subnational Population Estimates.
[2] Formative (2021) Business and Employment Database – Total Employment Count which includes both working proprietors and employees.
[3] Infometrics (2021) Queenstown Lakes District Economic Profile.
[4] Utility Ltd (2020) Queenstown Lakes District Council Growth Projections - July.

the Council's demand projections and the selection of the Change the Path (High Growth) scenario as the preferred growth future"[5]. This growth has important implications for Council planning, with most growth likely to be located around the existing urban areas.

Arrowtown is one of those existing urban areas, and as such it is likely to play a role in accommodating both new residents and economic activity, if there is capacity for it to do so. The town consists of a historic commercial and residential centre, and newer residential dwellings to the south. The township is part of the urban environment of Queenstown, being approximately 15 minutes to Frankton or 20 minutes to Queenstown central.

1.2 Report structure

This report provides an assessment of the residential aspects of the BR development and how it will contribute to achieving the purpose of the FTCA 2020.

The report first provides a background of the planning context, recent demand outcomes and potential capacity options that are relevant to the BR proposal. The economic assessment then assesses the jobs and economic activity supported during the phases of development – consenting, land development, build development and then completion. The report then concludes with findings from this economic assessment of the residential component of BR development.

[5] Fairgray. D, Fairgray. S, and Hampson. N (2021) Housing Development Capacity Assessment Technical Report Queenstown Lakes District.

2 Brackens Ridge Development

The specifics of the application have been detailed in the application documents, and are recapped only briefly in this report. The relevant details include:

- The block of land is referred to as Brackens Ridge and is 17.9ha gross area. It has two road frontages, to the east of Centennial Avenue and to the west off McDonnell Road. The site is bounded to the north and east by the urban edge of Arrowtown. To the south and west are the Arrowtown Golf Course and the Hills Golf Club (Figure 2.1).
- BR proposal would provide 104 residential lots with an average area of 450m^2 across the subdivision, as shown in the proposed subdivision plan (Figure 2.2). This density is similar to what has been developed in the Arrowtown Low-Density Residential Zone. There is an area within BR, labelled POS-P2 within which buildings are a prohibited activity. The application does not apply to that part of the site.
- Each of the 104 residential lots could enable a secondary dwelling unit on it, potentially allowing for up to 208 dwelling units within BR. That figure of 208 dwellings is treated as a theoretical maximum in this assessment, although it is recognised that it is unlikely to be achieved given the proposed presence of some smaller lots (less than 300m^2) on which it would be difficult to accommodate a secondary dwelling.
- On McDonnell Road, there is a category 2 heritage building. Muter Farm Homestead[6] building which has been restored and is used a residential unit. There is also a woolshed which is being restored in accordance with an approved resource consent and will be retained and used as a wedding venue (GFA of approximately 300m^2). .

[6] Queenstown Lakes District Council (2016) Proposed District Plan Chapter 26 Historic Heritage.

Figure 2.1: Brackens Ridge location

It is envisaged that once resource consent is obtained works would commence immediately. MST is proposing to develop BR over the coming five years, with subdivisions occurring in a single stage. MST's aim is for consents to be completed in 2022, and for earthworks and infrastructure to begin in late 2022, and finished by the end of 2023. The construction of dwellings is expected to start in 2023 and be completed by 2026.

Figure 2.2: Brackens Ridge Proposed Subdivision Area (2022)

The subdivision plan has been designed to achieve an average of 6 to 12 lots per hectare, with a range of lot sizes. MST is proposing to provide lots ranging from 200m^2 to 800m^2, which will allow the construction of new residential dwellings which are similar to what has been built within Arrowtown over the last decade. Each lot can have a secondary dwelling, which means that there could be up to 208 dwellings in total, although secondary dwellings are unlikely on the smaller lots (those less than 300m^2). BR would connect into existing reticulated services. Road access would be off Centennial Avenue, and a second access off McDonnell Road, with connectivity provided through the site.

3 Planning Context

The planning framework that applies to Arrowtown and the BR development is important, as it provides critical context around the environment in which the development will occur. The following discussion covers the relevant parts of QLDC planning and research which includes the National Policy Statement on Urban Development ("NPSUD"), the Grow Well Spatial Plan and the District Plan Review.

3.1 National Policy Statement on Urban Development

The NPSUD includes a set of reporting requirements relating to urban development capacity, for both residential and business activity. A key part of the requirements is that Tier 1 and 2 councils must investigate how much capacity is enabled within their planning frameworks and the extent to which this capacity may be developed by the market. Councils are also required to assess the potential future demands of the community and businesses.

The comparison of the developable supply enabled within the council planning framework and the demand forecasts provide an indication of whether there is at least sufficient urban development capacity to meet expected demand for housing in the short, medium and long term[7]. In the case that there is deemed to be insufficient supply the councils must act to increase development capacity as soon as practicable.

In response to these requirements, in 2018, Queenstown Lakes District Council (QLDC) and Otago Regional Council (ORC) conducted research into the quantum of urban land demanded and supplied, across the district.[8]

That research found that:

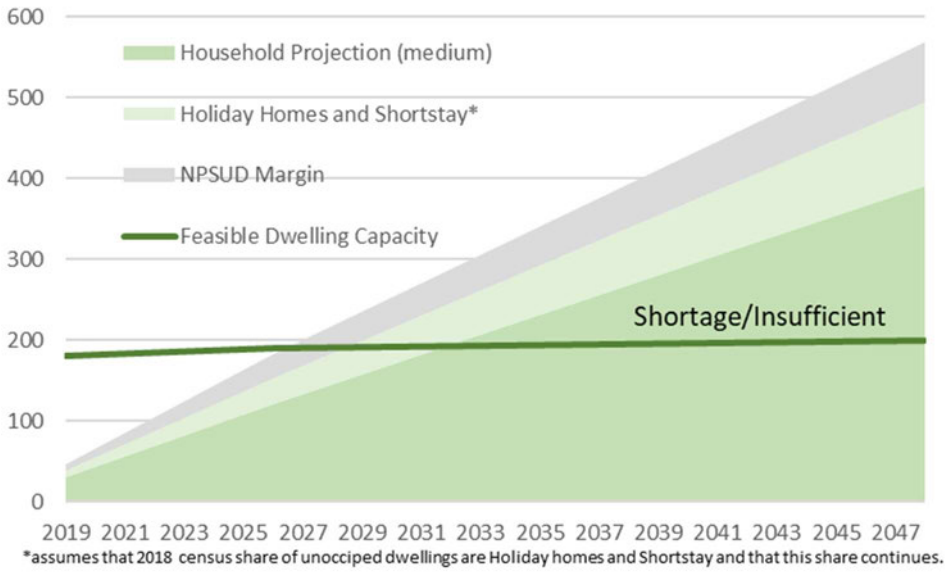
- The total housing capacity is well in excess of demand, for both urban Queenstown Lakes District (which includes Arrowtown) and the total District in the short, medium and long term.
- That there was a small amount of housing capacity in Arrowtown, with potential for 20 new dwellings in greenfield areas and 110 as infill or 170 as redevelopment. The assessment showed that the capacity in Arrowtown was almost all commercially developable. But that this capacity only represented 1% of commercially feasible capacity in urban Queenstown Lakes District.

[7] NPSUD defines short term as within the next three years, medium term as three to ten years and long term as between 10 and 30 years.
[8] Fairgray. D, Fairgray. S, and Hampson. N (2018) Housing Development Capacity Assessment 2017 Queenstown Lakes District.

- The demand assessment showed a medium demand projection of 120 new households in Arrowtown by 2026 and 390 by 2048. The report did not provide an estimate of holiday homes or short-stay accommodation for Arrowtown, however this demand would likely drive additional need for dwellings.

So while not stated explicitly, the 2018 Housing Assessment showed that Arrowtown did not have sufficient supply to meet the projected demands. Figure 3.1 shows the feasible capacity for new dwellings in Arrowtown (less than 200), the medium household projection (growing from 30 to 390), an allowance for Holiday homes/Short stay accommodation and the standard NPSUD margin. The figure shows that in 2018 the QLDC housing assessment implicitly exposed that a potential shortage would occur in Arrowtown in the coming decade.

Figure 3.1: QLDC Housing Assessment 2018 Demand and Supply – Wakatipu Basin Future Urban



While the 2018 QLDC housing research adopted the best available information, it has become out of date, particularly with regard to the demand projections which are well below the observed rate of growth over the last five years. For example, the QLDC projections predicted demand for between 4,600 (medium) and 5,900 (high) dwellings in Queenstown Lakes District between 2016 and 2026. The development in the District has exceeded even the high projection, with more than 6,100 dwellings already consented by 2021, which equates to an average of 1,230 consents per year, more than double the 460-590 additional dwellings projected to arrive each year in the period 2016-2026.[9]

[9] Statistics New Zealand (2021) Building Consents issued – December 2021.

Recently, QLDC released an updated 2021 Housing Capacity Assessment, which shows broadly similar findings as the 2018 study.[10] This latest research found that:

- The total housing capacity is greater than demand, for both urban Queenstown Lakes District (which includes Arrowtown) and the total District in the short, medium and long term.
- Based on the NPSUD assessment requirements there is no capacity for new dwellings in Arrowtown. However, the report suggests from a commercial perspective that there could be capacity for 90 dwellings in Arrowtown.
- The demand assessment showed a medium demand projection of 34 new dwellings by 2030 and 106 by 2050.
- The report explicitly finds that there is a shortage in Arrowtown, which occurs over all of the time periods, short (-10), medium (-40) and long term (-120).

While the findings presented in the latest QLDC housing assessment show a shortage in Arrowtown, it still relies on demand projections that are lower than consented growth. In the four months since the report was completed, there have been nine dwellings consented in Arrowtown, which is almost triple the annual level of demand that is projected by QLDC. If that rate continues, consents would continue to exceed projected growth by a large margin.

In summary, QLDC demand projections have consistently underestimated the actual outcome for Arrowtown. That appears to be at least partly the result of projections being constrained due to a (perceived) lack of capacity, whereas demand for dwellings in Arrowtown has been so strong that additional capacity has been created in places where it was not envisaged by the authors of the projections. While QLDC's assessments show that there is a shortage of dwelling supply, we consider that the shortage is likely to be significantly larger than is reported in the latest QLDC housing assessment.

3.2 Grow Well Spatial Plan

The findings from the QLDC housing assessments went on to inform the recently released Spatial Plan for the district.[11] The Spatial Plan proposed:

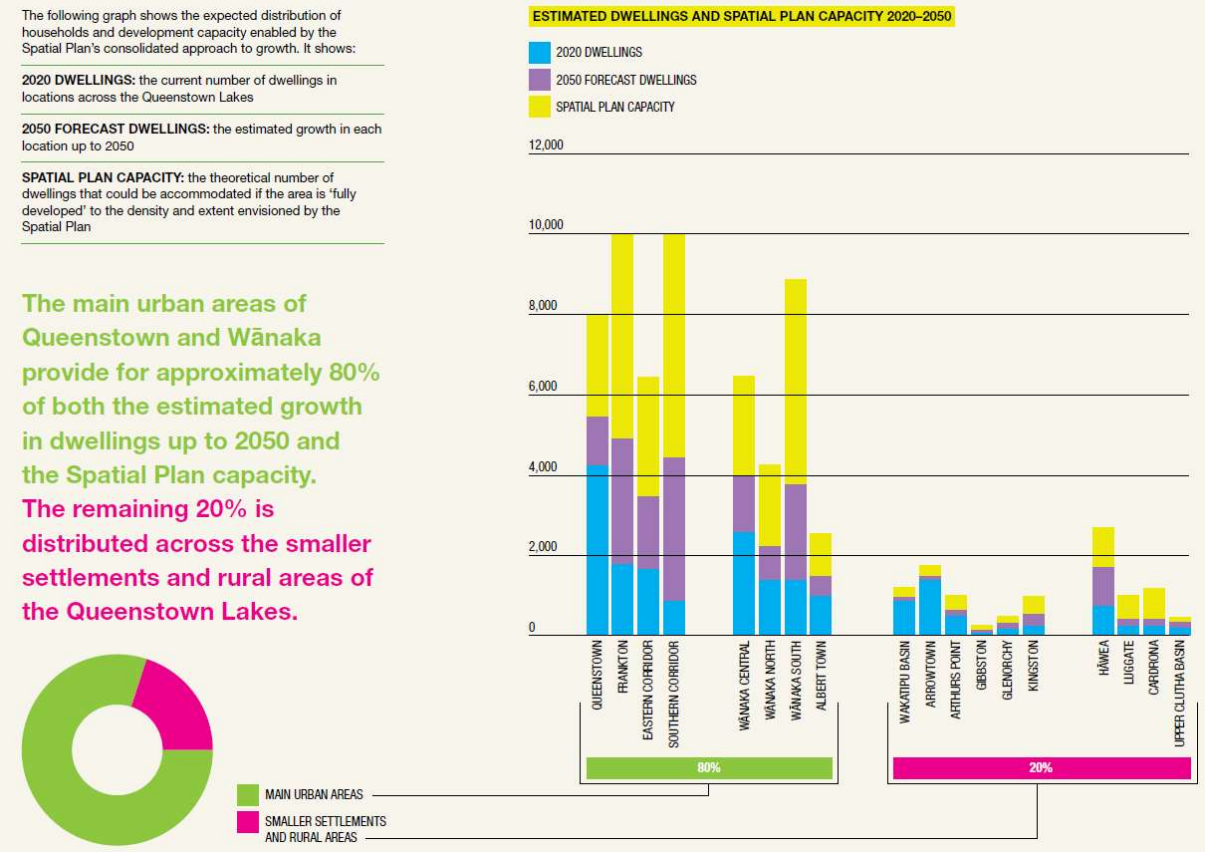
- a target of 80% of the District's growth to be directed to Queenstown and Wanaka, with 20% to the smaller towns (including Arrowtown). While not stated explicitly, reading off the Spatial Plan's chart (copied below as Figure 3.2), the diagram which outlines the

[10] Fairgray. D, Fairgray. S, and Hampson. N (2021) Housing Development Capacity Assessment Technical Report Queenstown Lakes District.
[11] Grow Well Whaiora Partnership (2021) The Queenstown Lakes Spatial Plan.

targets suggests that Arrowtown is forecast to grow by approximately 100 dwellings over the coming 30 years and that there is a capacity for approximately 300 dwellings.

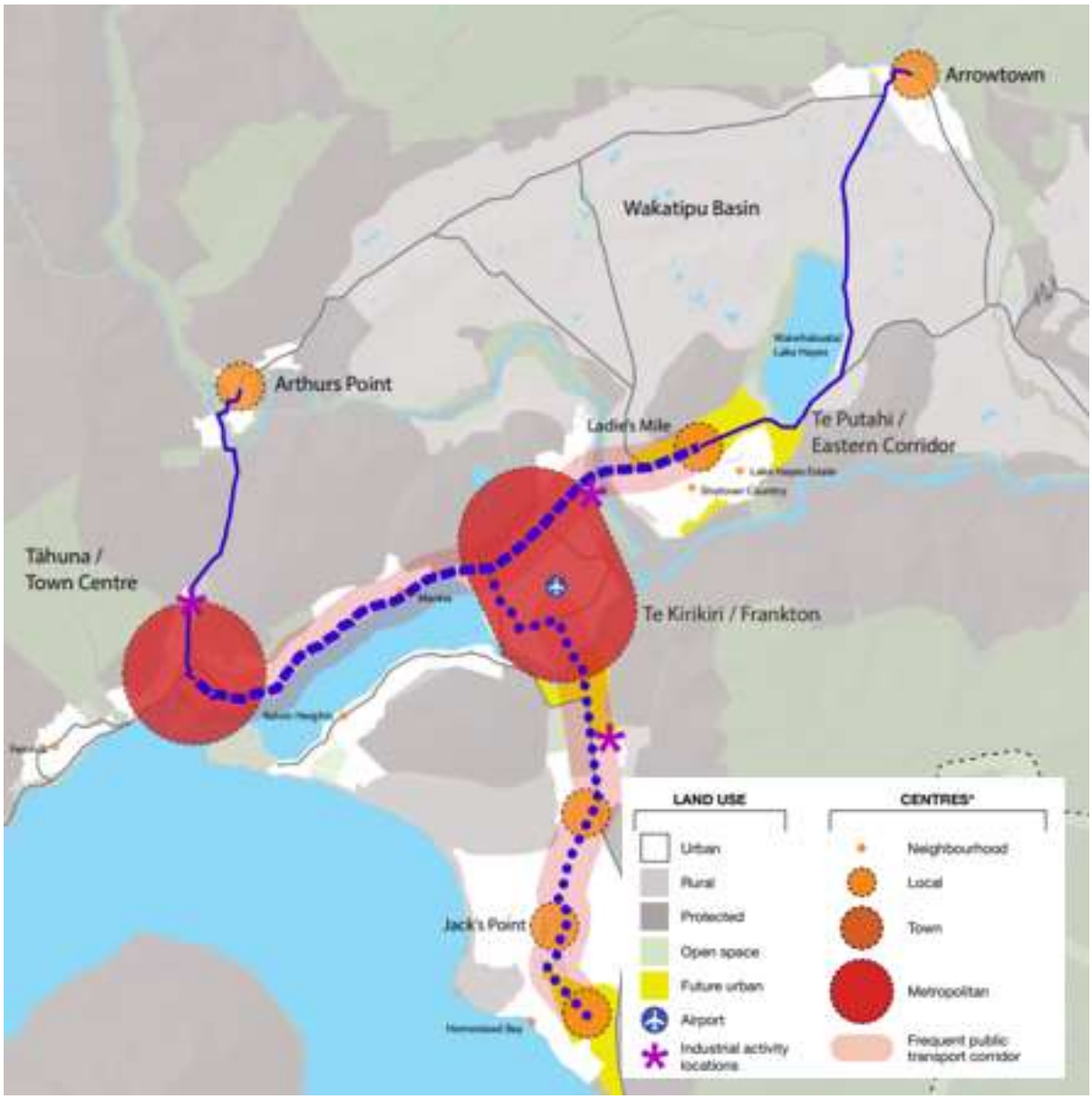
- an updated settlement pattern for Queenstown Lakes identified areas within the district that would accommodate additional dwellings.[12] Those areas are described as "Future Urban". There are no Future Urban areas noted for Arrowtown, and the Spatial Plan states that "Arrowtown will grow within the current urban areas, including any locations confirmed for urban development in the District Plan."

Figure 3.2: Spatial Plan estimated dwellings and capacity 2020-2050



[12] Ibid, page 58 -70.

Figure 3.3: Queenstown Lakes District Spatial Plan – Wakatipu Basin Future Urban



The Spatial Plan shows that QLDC still considers that there will be very little growth in Arrowtown. A consequence of adopting growth projections that appear to be constrained by (perceived) capacity is that those growth projections will not indicate any need for additional supply in the area, and therefore no development potential is planned for. Unconstrained growth projections would be expected to be higher, and to require some provision of additional capacity to accommodate the expected growth.

3.3 District Plan Review

While the Housing Assessments and Spatial Plan were being developed, QLDC was in the process of a District Plan review. In that process, the Council considered which zones would apply in the existing urban area[13] and whether to extend the urban boundary around Arrowtown[14].

3.3.1 Residential Zoning

For the residential zoning within Arrowtown itself, the Council commissioned research on demand and supply for dwellings.[15] This 2015 study considered that there was demand for an extra 120 to 140 dwellings by 2018 and 830 to 1040 over by 2035.[16] The report found that there was capacity for less than 150 dwellings in Arrowtown and that most of this supply would not be realisable in the coming years. This meant that there was expected to be a shortage before 2018.

This assessment was used in the QLDC planning response, which include up-zoning of residential areas around the historic centre of Arrowtown to allow intensification. During the planning hearing process there were many submissions from the community that were concerned about the impacts of the zoning on the character of and infrastructure in Arrowtown. The officer's report focuses on urban form and design aspects that would be used to mitigate the potential impacts on character. The report does not provide direct reference to supply or demand for housing in Arrowtown, or the extent of any shortages.

The Council also commissioned another independent economist to provide evidence on the demand and supply situation.[17] Mr Osborne confirmed that there were likely to be "several potential market shortfalls and risks that are manifest in the District's housing market"[18] and that "issues facing the District are not primarily the result of insufficient supply of residential land but the development locations and options currently provided"[19]. The evidence does not elaborate on either the specific locations where the shortfalls may occur, or the mismatch between supply and demand.

The research conducted for QLDC indicates that there was expected to be a shortage of dwelling capacity in Arrowtown before 2018. The planning response includes up zoning of some residential

[13] Leith, A. (2016) Officers Report Section 42 Report Arrowtown Urban Rezoning – Stage 1 and Stage 2 Submissions.
[14] Place, L. (2018) Officers Report Section 42 Report Arrowtown Urban Rezoning – Stage 1 and Stage 2 Submissions.
[15] Queenstown Lakes District Council (2015) Section 32 Evaluation Report: Medium Density Residential Zone.
[16] Insight Economics (2015) Arrowtown Dwelling Supply and Demand.
[17] Osborne, P. (2016) Statement of Evidence on Residential Chapters (Economics).
[18] Paragraph 3.15
[19] Paragraph 2.8

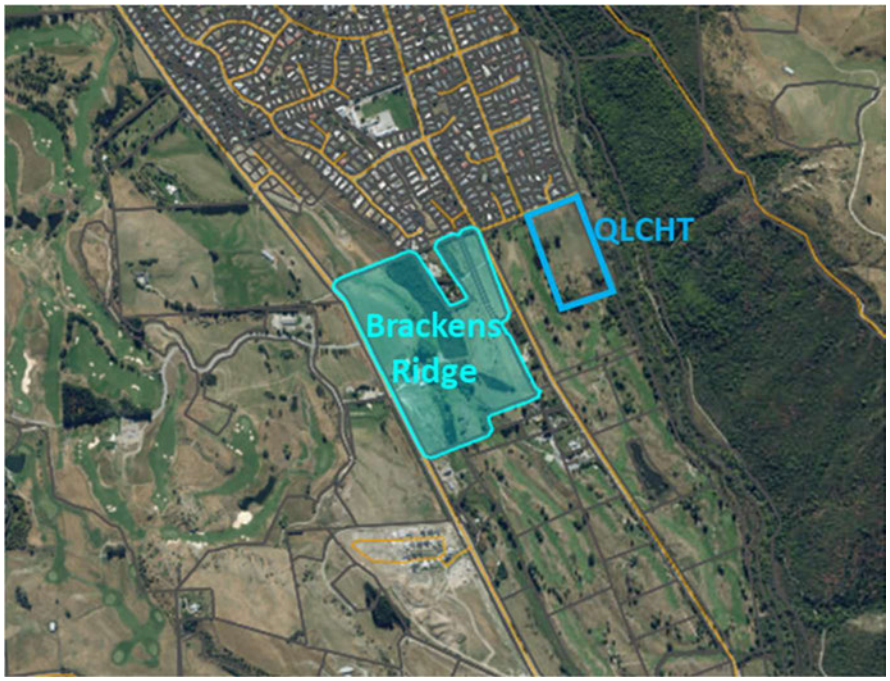
parts of Arrowtown. However, according to QLDC 2021 housing capacity assessment the change in zoning has not resulted in additional capacity within Arrowtown.

3.3.2 Urban Boundary

The officer's report that considered the urban boundary mostly focused on concerns about potential impacts on the existing community from new growth, which included impacts on car parking, amenity, infrastructure, a distinct and defendable urban boundary, etc. Also, the submissions from the community on the urban boundary were, for the most part, concerned about limiting growth in Arrowtown. There was little consideration of future demand for housing or the capacity within Arrowtown to meet those demands.

Land owned by the Queenstown Lakes Community Housing Trust (QLCHT), provides some opportunity for southern expansion of Arrowtown's urban extent, and falls within the Urban Growth Boundary. The QLCHT land is separated from BR by Centennial Avenue and part of the Arrowtown golf Course, but is otherwise similarly located between the southern edge of Arrowtown and the golf course (see Figure 3.4). QLCHT has recently released a request for tenders on the first stage of this development, which is expected to provide 68 dwellings on 3.7 hectares of land.[20]

Figure 3.4: Queenstown Lakes District Plan – Arrowtown Future Urban



[20] Otago Daily Times (2021) Ideas sought for sustainable housing at Arrowtown site – 10th August.

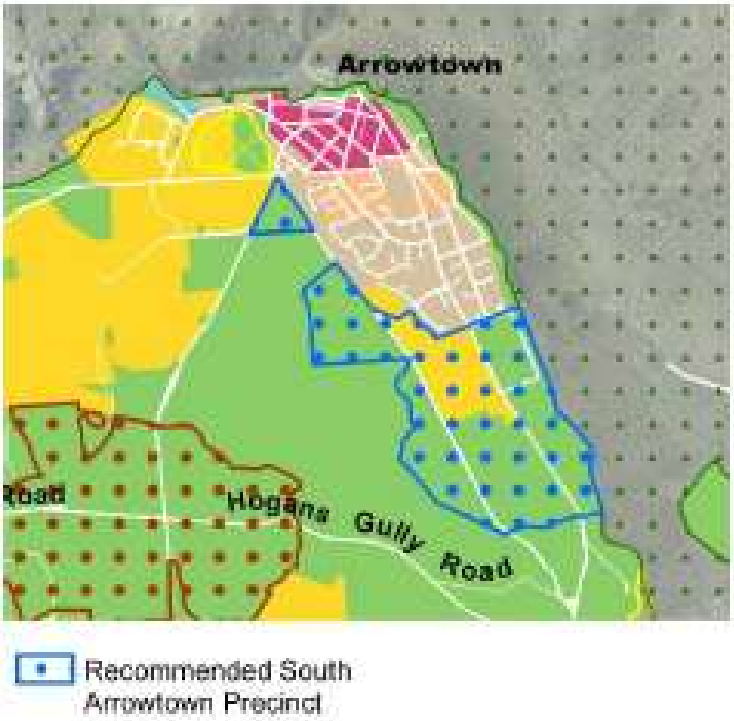
Currently, under the District Plan the BR development is outside the Arrowtown Urban Growth Boundary and is covered by a spot zone, which is called the "Arrowtown South Zone". Under the existing rules, the applicant could undertake a subdivision that would provide 17 rural residential lots.

3.4 Wakatipu Basin Land Use Planning Study

Upon completion of the hearing of submissions on the Strategic Direction, Landscape, Urban Development and Rural Zone chapters of the Proposed District Plan, the Hearing Panel issued a memorandum on 1 July 2016. The Hearing Panel considered that an additional study of the Wakatipu Basin was required to identify those areas able to absorb development without adversely affecting the environmental characteristics and amenity values of the area. Specifically, determine whether there is any capacity for further development in the Wakatipu Basin floor and, if there is, where it should be located and what form it should take.

The Council commissioned a study of the Wakatipu Basin to establish the potential locations where land use changes can be enabled to accommodate future urban growth.[21] This study recommended that the Arrowtown be extended to the south, with a new South Arrowtown Precinct that would include the BR area (see Figure 3.5).

Figure 3.5: Wakatipu Basin Land Use Planning Study – Recommended South Arrowtown Precinct



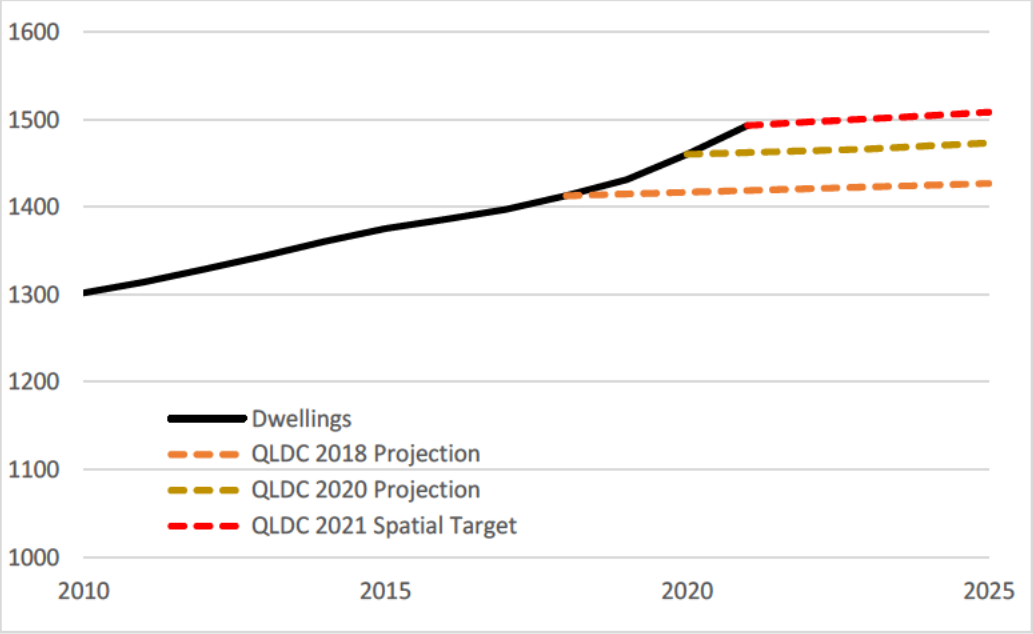
[21] BKA Consulting, Strateg.ease, Bridget Gilbert (2017) Wakatipu Basin Land Use Planning Study.

3.5 Findings – Planning Context

In conclusion, various attempts have been made in recent years to identify the extent of demand for housing in the District over the short, medium and long term, and what if, any, additional land is required to accommodate that demand. That assessment work has resulted in the development of a new Spatial Plan and District Plan review, which include dwelling targets and Future Urban areas to accommodate additional growth over the short, medium and long term.

While demand is covered in the next section, it is important to understand that QLDC's recent projections for Arrowtown have been significantly, and consistently, below actual development (see Figure 3.6). The QLDC 2018, 2020 and now 2021 assessments have all predicted a substantial decline in the rate of dwelling growth in Arrowtown, which is inconsistent with both the high amenity that is available in Arrowtown and the historic and ongoing level of development activity that amenity has supported. We consider that it is highly unlikely that the demand for new dwellings in Arrowtown will decrease to the levels suggested in the Spatial Targets (i.e. less than four per annum). This means that the shortages will be greater than what is predicted in the latest QLDC housing assessments.

Figure 3.6: Arrowtown Dwellings and QLDC projections



4 Demand Context

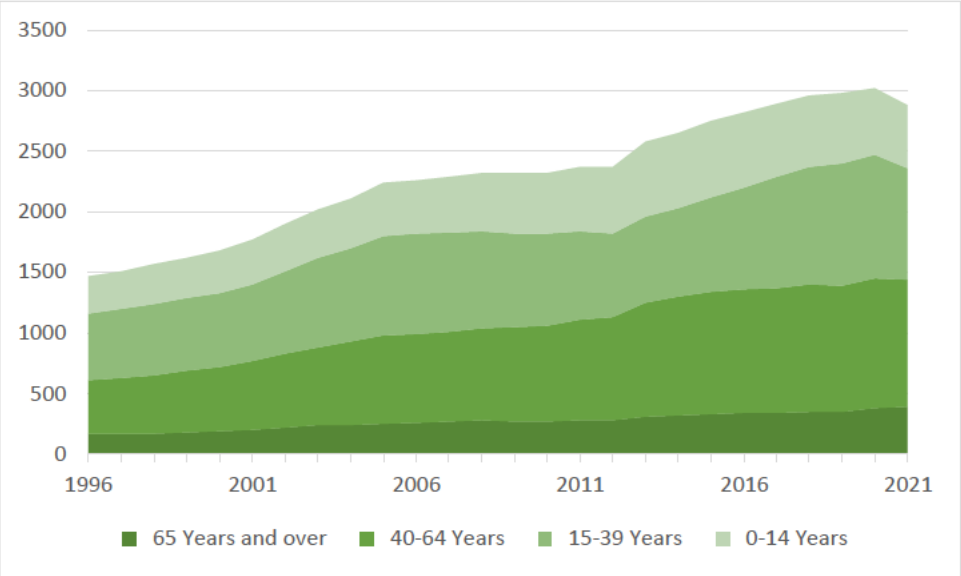
Arrowtown is renowned as one of the most picturesque settlements in New Zealand, has been named "the most beautiful small town",[22] retains a strong historical character and is famous for being charming and quirky. There is an abundance of nearby natural amenity, with the town being nestled in the bend of the Arrow River and below many magnificent mountain peaks. The town has three popular full-scale golf courses, The Hills, Millbrook and Arrowtown.

While these aspects of Arrowtown draw people to the area, they also restrict the development that can be achieved in the town. The environmental aspects of the location restrict growth potential in all directions: to the north (the river), west (Feehly Hill and the mountains), east and south (golf courses). Also, the historic buildings in the centre of Arrowtown reduce the potential for redevelopment within the existing urban area. This means that there is limited potential for the town to grow any further, either outwards or through intensification. The following discussion covers important aspects of demand, including Arrowtown's population, dwelling demand and housing market.

4.1 Arrowtown Population

Since 1996 the population of the town has grown by almost 3% per annum, from just under 1,500 residents to 2,900 in 2021. In 2020 there was a small decline in population, which was mainly caused by a reduction in the number of children and young adults, and may be related to the impacts of Covid19 or the significant jump in housing prices.

Figure 4.1: Arrowtown Population Demographics 1996 to 2021



[22] Keep New Zealand Beautiful Awards 2020.

During this period, the population has aged, household sizes have declined and the number of children has begun to drop.[23] There is anecdotal evidence that many families cannot afford to live in Arrowtown,[24] which is reflected in a recent decline in the role of Arrowtown primary school (-7% since 2017)[25]. The changing demographics of Arrowtown may have contributed to the slowing population growth over the last 5 years (population of 2,900 in 2017, compared with 2,880 in 2021).

4.2 Dwelling Demand

Arrowtown's role as a growth location has decreased over the decades. In the 1990s the town accounted for a large share of the new dwellings in the District, at its peak accommodating 11% of all building consents in Queenstown Lakes District. This role has declined over the last two decades, reducing to 5.5% of all new dwelling building consents in Queenstown Lakes District in the 2000s and further to 2.5% in the 2010s. However, this changing role seems to be influenced by reducing development potential and the restrictions noted above.

Notwithstanding the declining share of growth being directed to Arrowtown, as discussed above in the previous section, the actual demand for housing in Arrowtown (based on the number of new building consents issued per annum) has, for the last three years, significantly outpaced the projections used to underpin the QLDC housing capacity assessments 2018, or 2021 and the planning response to that assessment in the 2021 Spatial Plan and the District Plan review.

In particular:

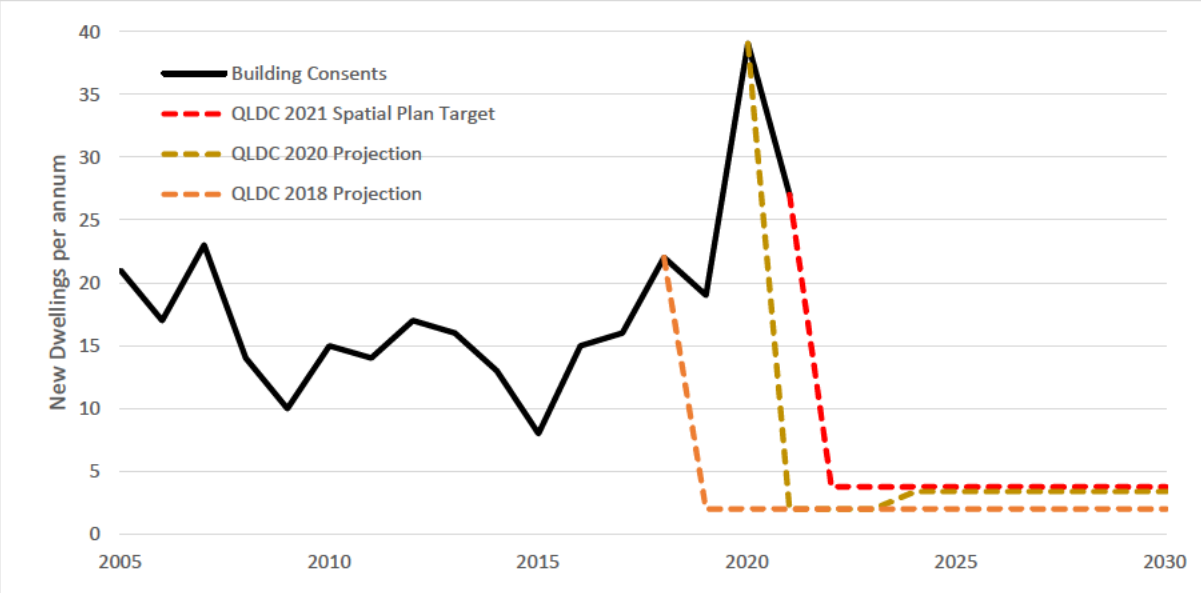
- There was projected to be demand for two new dwellings per annum in the 2018 assessment, where the QLDC projections suggested a total demand of only 20 new dwellings in Arrowtown over ten years to 2028. [26] By comparison, annual new dwelling building consents issued in Arrowtown increased from 22 in 2018 to 39 in 2020.[27] The actual demand was nearly ten times more than the projections. The consents issued in a single year was greater than the QLDC projections for the entire ten year period.
- In the 2020 assessment, there was projected to be a demand for two dwellings per annum until 2023 and then 3.4 per annum until 2031.[28] Again, by comparison, in the last 12 months, the number of new dwelling consents issued in Arrowtown was 27, which is more than ten times the projections.[29]

[23] Statistics New Zealand (2021) Population demographics.
[24] Mountain Scene (2018) A'town prices soaring – 19th December.
[25] Ministry of Education (2022) Rolls by ethnic group and gender, as at 1 July (2017-2021).
[26] Utility Ltd (2018) Queenstown Lakes District Council Growth Projections - December.
[27] Statistics New Zealand (2021) Building Consents issued – December 2021.
[28] Utility Ltd (2020) Queenstown Lakes District Council Growth Projections - July.
[29] Fairgray. D, Fairgray. S, and Hampson. N (2021) Housing Development Capacity Assessment Technical Report Queenstown Lakes District.

- The 2021 QLDC Spatial Plan suggested a target of approximately 100 new dwellings in Arrowtown by 2050 or just over 3.7 new dwellings per annum. By comparison, in the six months since the release of the plan, there were 12 new dwellings consented in Arrowtown.

The figure below shows the annual building consents for new dwellings issued between 2005-2021 (black line), which shows that at its lowest Arrowtown had eight dwelling consents in 2015. Even this lowest point is far higher than any of the QLDC projections or the Spatial Plan target. Even with the impact of Covid19 over the last three years, the number of consents has averaged 29 per annum.

Figure 4.2: Arrowtown New Dwellings Building Consents and QLDC Dwelling Projections



4.3 Housing Market

The average house price in Queenstown Lakes District and Arrowtown has increased significantly over the last decade. Most significantly, in the last two years, the average house price in the District increased from approximately $1,245,000 to $1,600,000[30] (+29%) and the Arrowtown average increased from $1,170,000 to $1,770,000[31] (+51%).

Most of the escalation in price has occurred in the last 12 months, with the District's average house price increasing by 23% and Arrowtown's increasing by 49%. Prices in both the wider District and Arrowtown have become increasingly unaffordable, with some very high sales prices being achieved.

[30] Quotable Value (2022) QV House Price Index.
[31] Corelogic (2022) Property Guru Sales data – Arrowtown.

For example, in November a small old cottage in Arrowtown on 286m^2 of land, with one-bedroom and one bathroom, sold for $1.85 million s 9(2)(a) [32]

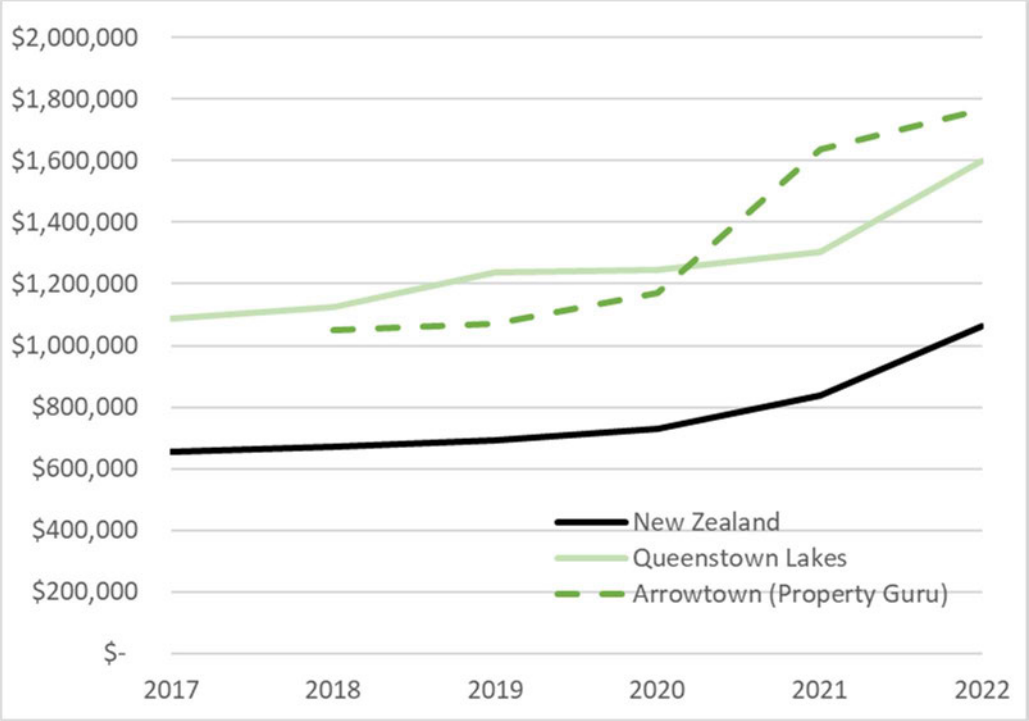
While there has been an escalation of house prices across New Zealand in the last year (27%), parts of Queenstown District have grown much faster than the national average. Most relevant to BR is that average prices in Arrowtown grew by almost twice as much as the national average.

This recent price escalation is high when compared to growth observed in the past. In the District between 2017 and 2019 the average house price increased by less than 5% per annum. However, the house price escalation over this period was still greater than general inflation rates (of 1.8% per annum)[33], income increases (of 2.7% per annum)[34] or house values (of 3.7% per annum) in the rest of the country.

The recent escalation in prices in the District and Arrowtown has occurred during a period where there has been both a reducing amount of capacity available in both Arrowtown and the District (which was discussed in the previous section). It is likely that some of the increase in prices in the District and Arrowtown will have been driven by reducing the availability of capacity. The BR development can therefore be expected to provide additional capacity for housing supply in the District and Arrowtown in the coming years, which could temper further price escalations.

[32] NZ Herald (2021) Tiny Arrowtown cottage goes for $1.85 million – 26th Nov.
[33] Statistics New Zealand (2022) Consumer Price Index.
[34] Statistics New Zealand (2022) Labour Cost Index (Salary and Wages).

Figure 4.3: Arrowtown House Price Sales - Average 2017- 2022



We consider that the rapid increase in house prices in Arrowtown is likely to be related, in part, to the lack of supply and Council's in action to provide more capacity to meet the demands of the community. This outcome reflects a market that is not operating efficiently.

4.4 Findings – Demand Context

We consider that the growth in residential demand is likely to continue to (greatly) exceed the level shown in the QLDC projections and QLDC Spatial Plan Target. This demand outcome is mainly driven by the continued attractiveness of Arrowtown as a place to live, which is unlikely to change much in the future.

In summary, the actual demand has and continues to far exceed QLDC's projections. Therefore, both the timing for and quantum of, additional land identified in the QLDC assessments as being required to meet that demand are no longer accurate.

The housing indicators discussed above provide evidence that demand for Arrowtown can be expected to remain high, which will mean that the remaining capacity is likely to be exhausted more quickly than anticipated and that further supply will be required. To address this, and as further set out below, additional land for housing must be made available as a matter of urgency.

Given the demand and the impending shortage of residential lots in Arrowtown outlined in the QLDC assessments and described above, it would be prudent to enable the development of the BR land as quickly as possible. We consider that there is already an undersupply of housing in Arrowtown, given

increasing house prices and decreasing school roll. If this undersupply persists, the price of land (which has already escalated significantly in recent years) could increase further, which will continue to negatively impact the affordability of housing. In that context, the BR development will alleviate some of the potential shortage that is expected in the coming few years.

In addition to these matters, BR would also be well proportioned in the context of the Arrowtown residential market and within the scale of development seen at comparable sites in the immediate area. To place that proposed additional capacity in context, there are currently around 1,500 dwellings in Arrowtown,[35] and 27 additional new dwellings have been consented over the last 12 months.

Based on its historic development rate of 28 dwellings per annum, BR would constitute around three years of supply for Arrowtown. When compared to the existing context in Arrowtown, the BR development would be equivalent to around 1% per annum growth in the town over the coming five years. The immediate development of residential land in BR will have a positive impact on housing supply in the District and Arrowtown, while being appropriately sized in the context of likely growth.

The following table shows the new dwelling projections for Arrowtown for 2023 and 2030, which is the period over which the BR is expected to be developed. The three latest QLDC projections suggest demand of less than four dwellings per annum. This compares to the 2015 projection which suggested a rate of approximately 40 dwellings per annum. The table also shows the potential level of demand if current levels of development continue, which would be around 28 new dwellings per annum.

Figure 4.4: Arrowtown New Dwelling Projections

New Dwellings Projections	2023	2030
QLDC 2018 Projection	6	20
QLDC 2020 Projection	6	30
QLDC 2021 Spatial Plan Target	11	38
QLDC 2015 District Plan Review	125	418
Average of Building Consents	85	283

While we have not developed our own demand projections for this report, we consider that the latest QLDC projections are too low for Arrowtown based on recent historical development trends, and should not be relied on when planning for the town. We also consider that it is likely that the demand for housing in Arrowtown is higher than the level shown in the building consents data, which means that actual demand for new housing is likely to exceed 85 by 2023 and 283 by 2030.

[35] Based on Statistics New Zealand Census 2018 and building consents.

5 Potential capacity options

In this section, we provide an estimate of the potential development capacity in Arrowtown in the coming years, which includes that enabled in the District Plan and that potentially required under the intensification policy in the NPSUD. This capacity is then compared to the demand, to provide an understanding of when a shortage can be expected to arise in Arrowtown.

5.1 District Plan Remaining capacity

The remaining plan-enabled capacity within the proposed Queenstown Lakes District Plan is, according to the 2021 Housing assessment, sufficient to enable less than 100 additional dwellings in Arrowtown. However, the QLDC report found that none of the capacity in Arrowtown would be reasonably expected to be realised in the short (2023), medium-term (2030) or even the long-term (2050).

It is likely that the remaining capacity may not be readily developable for several reasons. Most importantly, is that housing developments pursued under normal District Plan consenting or plan change channels tend to take many years to achieve. It is considered that FTCA approval for BR would facilitate the occupation of dwellings within BR several years earlier than if a plan change or resource consent application route were to be pursued. Any other larger residential developments in Arrowtown would experience similar timelines, meaning that it is likely that the capacity may not be reasonably realisable in the short term, and will (at best) become available for housing in the latter part of the decade.

For example, the extension of the Arrowtown urban boundary to include the land held by Queenstown Lakes Community Housing Trust may well provide capacity in the future. Although 'plan-enabled', the QLCHT development is going to take several years to produce dwellings and will not be available to alleviate the shortage in the coming few years. For that reason, this capacity is included in our assessment for the current application and is shown in Figure 5.1~~Figure 5.1~~ as being available in 2023 onwards.

5.2 Enabling Housing Supply Act 2021

The recently enacted Resource Management (Enabling Housing Supply and Other Matters) Amendment Act 2021 (EHSA) has codified Policy 5 of the NPSUD, which will mean that QLDC will need to consider heights and density in the urban areas to allow intensification. This may or may not result in increases in 'plan-enabled' capacity within the Arrowtown urban area.

While the implications of the EHSA for Queenstown Lakes District are not yet well understood, the additional capacity the Act seeks to enable is unlikely, in our opinion, to result in any material

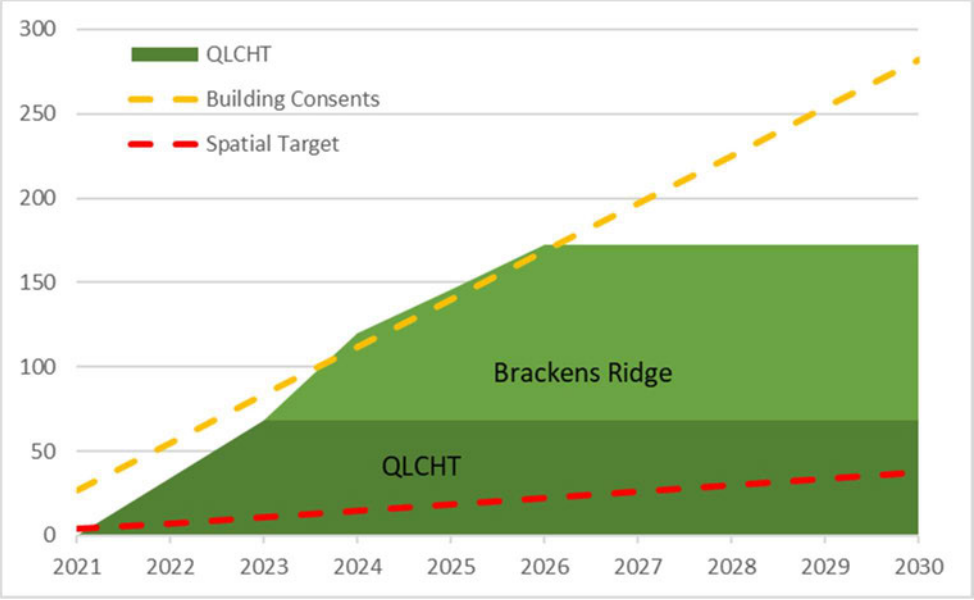
reduction in demand for greenfield residential development in Arrowtown, or provide development that could be realised in time to meet the impending shortage.

As discussed above, we consider that there are several reasons why the capacity that may be enabled by the EHSA is unlikely to be developed in material number over the coming decade and that this capacity would not be 'feasible' or 'reasonably expected to be realised' as defined in the NPSUD s3.25(1). This means that the EHSA will have minimal impact in Arrowtown during the development period that is expected for the BR development, and that the capacity is unlikely to meet the criteria for supply within the NPSUD. Therefore, the potential EHSA capacity is theoretical and should not be relied upon to provide for housing demands in Arrowtown for the short or medium term.

5.3 Findings – Potential Capacity

Figure 5.1~~Figure 5.1~~ compares the three different types of capacity for residential development that is already or could become, available in the coming decade (currently zoned in Operative District Plan, and potential supply in the QLCHT and BR blocks) in contrast to the targets established in the QLDC Spatial Plan, and the current demand for housing based on a projection of the current rate of new building consents.

Figure 5.1: Arrowtown Capacity (ODP, QLCHT and BR), Spatial Plan Target and Building Consents



In summary, based on these figures we consider that there is a shortage in the supply of land for residential development in Arrowtown now, which will become more pronounced unless additional capacity is provided as a matter of urgency. If demand continues at the current rate and no new supply is created this shortage can be expected to reach 150 dwellings in 2025. Even if the QLCHT and BR developments begin immediately the shortage may not be completely alleviated, and would only provide sufficient supply to satisfy demand up until 2026.

This is especially important as it can take many years to develop a greenfield site for residential uses. Generally, greenfield development has a lead time, particularly due to the plan change and consenting process. Once all development steps including, land development, sale of residential lots, dwelling design, the construction period, and sale to the purchaser, are accounted for, the whole development process may take up to five years.

Given the demand and the impending shortage of residential lots in Arrowtown outlined in the QLDC assessments and described above, it would be prudent to enable the development of the BR land as quickly as possible. If, as predicted, the current housing shortage in Arrowtown continues, the price of land (which has already escalated significantly in recent years) could increase further, which will continue to negatively impact the affordability of housing.

6 Economic role of Brackens Ridge

The economic activity associated with BR will change throughout the development phases, with different levels of activity supported during consenting, land development, build development and then residents spend once the development is completed.

The economic role of BR is measured in terms of the direct economic activity associated with the development, the potential demands of the households that will live in BR, and the wider role in terms of indirect and induced activities. The expected role of BR was estimated using a subnational economic model – Economic Linkages Model (ELM).[36]

The ELM is a proprietary model that has been developed to quantify and measure the economic activity and relationships within the New Zealand economy. In summary, the ELM measures the flows of money and goods through the economy, at a sector and sub-national level. The model records the interactions and relationships between actors in the economy, including businesses, households, government, exporters, and importers. The interactions in the model describe how each industry responds to changes in the economy, which ripples out to influence a range of other outcomes (e.g. household decisions).

The ELM measures the economy using a range of standard economic metrics, which includes gross output[37], GDP[38], value-added, employment[39], incomes[40], consumption[41], tax[42], and trade. The model uses a subnational Input-Output Table that has been regionalised by Formative. The appendix outlines the nature of the Input-Output table, the underlying assumptions within the ELM and the key modelling steps.

[36] Formative (2021) Economic Linkages Model.
[37] Similar to company revenue.
[38] There is a key difference between GDP and value added. The value added of a sector is measured net of taxes (for instance GST) and subsidies on products. In the GDP in the national accounts for New Zealand product taxes (minus subsidies) are recorded for the economy as a whole and includes as part of the value added.
[39] Formative uses BED measure of Total Employment Count (TEC) which includes both employment count and working proprietors.
[40] Includes salaries, wages and profits.
[41] Including household and government.
[42] Including income taxes, GST, government transfers and subsidies.

The first step in the estimation of the economic role of BR was to estimate the direct expenditure that will occur in each phase of the development. The following data has been used for each phase to estimate the likely direct expenditure:

- **Consenting and Land Development**: We have estimated the consenting and land development costs based on industry knowledge from similar developments, adapting them to the scale of the BR development.
- **Build Development**: the BR dwelling design concepts are combined with build cost data to estimate the likely construction expenditure that could occur during the build development phase. For this assessment we have conservatively assumed that 104 dwellings are constructed. If secondary dwellings are built, then there will be even more economic activity, as discussed later in this section.
- **Resident Demands**: We have detailed retail expenditure data which has been developed into a retail demand model.[43] This model provides an estimate of the quantum of demand from the new households that would live in BR after the development is completed.

Once identified, the direct expenditure impact was run through the ELM which allows the calculation of all flow-on effects associated with the BR development. The ELM calculates three types of economic impact:

- Direct impacts are the initial changes in the economy due to an economic shock (often new expenditure). The direct GDP effect is calculated based on the value of the shock and the direct employment effect is the number of jobs created by the shock itself.
- Indirect impacts arise as the firms that initially change their output as a result of an economic shock (i.e. the direct effects), purchase required inputs from their supply chain. These business-to-business transaction changes are known as the indirect impacts.
- Induced impacts flow from the direct and indirect impacts which generate wages, salaries, and profits for the households. The changed household incomes will generate more spending on goods and services. This household-to-business interaction is called induced activity.

The direct impacts associated with the BR development were estimated for each year and over 65 types of spending (Figure 6.1 provides a summary). The consenting phase is estimated to cost s 9(2)(b)(ii) and occur in 2022, which includes the developer's internal management time, expert

[43] Formative (2021) Retail Demand Model.

research and planning costs. The development of the land is estimated to cost s 9(2)(b)(ii) in total and occur in 2023.

The direct spend associated with the building activity in BR can be expected to exceed s 9(2)(b)(ii) which is estimated to peak in 2024 at s 9(2)(b)(ii) . Based on the modelled land development and build development costs it is expected that the average dwelling could sell for less than s 9(2)(b) which is much lower than the current average dwelling price in the District ($1,600,000) or Arrowtown ($1,770,000).[44] Applying a lower (rather than a higher) sale price makes the impacts assessed here conservative.

Finally, the direct impacts associated with the households that will live in the new dwellings are expected to spend a total of $3.8 million in the local economy over four years, with retail spending reach almost $1.2 million per annum by 2026.

In total, the BR development will generate approximately s 9(2)(b)(ii) in direct expenditure between 2022 and 2027. The direct expenditure will peak in 2024, with $30 million being spent in total in that year.

Figure 6.1: Direct Expenditure Brackens Ridge

Timeframes - BR ($m)	2022	2023	2024	2025	2026	2027
Consenting	s 9(2)(b)(ii)					
Land Development		s 9(2)(b)(ii)				
Build Develompment			s 9(2)(b)(ii)			
Residents			$0.6	$0.9	$1.2	$1.2
Total	s 9(2)(b)(ii)					$1.2

The direct expenditure that is generated by BR will flow through the economy, which will result in additional economic activity in supporting industries, and additional employment – indirect and induced impacts. The direct, indirect and induced economic impact of the BR development would support:

- $37 million in GDP and approximately 495 employment years[45] (or 447 Full-Time-Equivalents) over the development period in Queenstown Lakes District economy.[46] The

[44] CoreLogic (2022) Property Guru - House Price Data.
[45] Total Employment Count, which is equal to Count of employment and working proprietors.
[46] The employment recorded in this assessment is measured in terms of Total Employment Count (TEC), which includes part-time, casual, and full-time positions. While this type of measure of employment is the standard used in New Zealand for economic data and economic modelling, there are some instances where Full-Time-Equivalent (FTE) metric is used. For the purposes of the FTCA application we have estimated that the BR development will generate approximately 447 FTEs between 2022 and 2027 in the Queenstown Lakes District economy.

peak of activity will be in 2024, with $14 million in GDP in Queenstown Lakes District and employment of 189 for that year.

- As the development is completed the impact will stabilise at around $1 million in GDP per annum and approximately 17 jobs in the Queenstown Lakes District.

Figure 6.2: Economic Impact of Brackens Ridge

Timeframes - BR ($m)	2022	2023	2024	2025	2026	2027
Value Added (GDP, $m)						
Queenstown-Lakes District	$0	$7	$14	$8	$8	$1
Rest of NZ	$0	$5	$20	$11	$11	$1
Total	$0	$12	$35	$18	$18	$2
Employment						
Queenstown-Lakes District	1	76	189	103	107	17
Rest of NZ	1	48	194	99	101	5
Total	2	125	383	203	208	22

The development of BR would produce positive benefits for the local community, both in terms of providing additional and much-needed housing supply and the generation of employment and economic benefits for the local community.

In short, the economic role of the BR suggests that the development is expected to generate approximately s 9(2)(b)(ii) in direct expenditure over the coming five years. This would support total economic activity of $37 million in GDP and employment of 495 employment years[47] between 2022 and 2027 in the Queenstown Lakes economy.

For the FTCA application we have estimated that the BR development will generate approximately 447 FTEs over the course of the 5 year period, in the Queenstown Lakes economy. Of these jobs around 250 FTE are direct employment related to the land development and dwelling construction. The applicant will undertake the land development, which is expected to directly generate 50 FTE (i.e. 20% of the direct FTE) and are expected to be employed for the first year of project. The remaining 200 FTE will be employed by other businesses during the dwelling construction process, which is the development activity that is enabled by the applicant's subdivision and are expected to be employed for the following four years of project. This means that in each year of the project there is expected to be 50 FTE directly related to the development. Notwithstanding the likely transfer effects, the Arrowtown community and economy will benefit from additional economic activity that BR will generate in the local area.

MST is proposing to allow additional secondary dwellings within the Brackens Ridge development. This means that there is likely to be additional dwellings built over and above what has been assessed

[47] Total Employment Count, which is equal to Count of employment and working proprietors.

in the modelling above. Specifically, the assessment above has conservatively assumed that no secondary dwellings are built – i.e. only 104 dwellings are built in BR.

To provide some context, if every lot within in the BR development was developed to include both a primary and secondary dwelling, then there could be a maximum of 208 dwellings developed. This would result in more dwelling construction and resident spending. In total, if 208 dwellings were developed then BR development would support total economic activity of $54 million in GDP and employment of 730 employment years[48] between 2022 and 2027 in the Queenstown Lakes economy. For the FTCA application we have estimated that the BR development will generate approximately 660 FTEs over the course of the 5 year period, in the Queenstown Lakes economy. Of these jobs around 380 FTE are direct employment related to the land development and construction.

[48] Total Employment Count, which is equal to Count of employment and working proprietors.

7 Wider Economic Benefits of Brackens Ridge

We also note that there may also be other economic benefits associated with the development of BR that will contribute to achieving the purpose of the Act. For this report, we provide a brief qualitative discussion of these benefits, which are covered in more detail by other experts.

Given the location of the development, it may be more efficient to service the development, also households that live within the area will have good links to the transport networks (both road and active transport modes) and access to goods and services in the local area. These aspects of the development can be expected to generate benefits for the local community and the wider economy.

7.1 Infrastructure

First, while we have not assessed the relative infrastructure costs associated with servicing BR we consider that it is likely that there will be economic benefits from the fact that this site is adjacent to the existing Arrowtown settlement. In summary, it may be that infrastructure costs will be lower than other comparable developments. This outcome would improve the productivity of the economy, by reducing the amount of resources needed to accommodate new growth.

7.2 Transport

Second, the BR development is proximate to Arrowtown, both by road or active transport modes, and there is a range of services and retail provided in the local area. This means that households which live in BR should be able to travel more efficiently and access their needs locally which may contribute to mitigating transport costs and emissions. By comparison, other developments in the area are further from existing town centres. So it is likely that encouraging the housing supply in this location will result in better transport outcomes and associated economic benefits.

7.3 Well-functioning Urban Environment

Third, we consider that BR, and the proposal assessed in this report, would contribute to a well-functioning urban environment. BR is an appropriate location to enable higher density growth because it is already zoned for low intensity residential activity, and is close to Arrowtown. This location is an ideal place for a neighbourhood with a range of lot sizes, including higher density residential activity, to establish.

The development of the BR can be expected to positively impact the local businesses in area and contribute to the function of the Arrowtown town centre. The additional households that will live

within the BR development can be expected to shop and visit services within the local area, which will improve the viability of existing business and also potentially attract more businesses and community services to the area. This additional activity can be expected to improve the level of amenity in the town centre, which will positively contribute to a well-functioning urban environment.

We consider that the BR development can be expected to positively contribute to a well-functioning urban environment.

7.4 Findings – Wider Economic Benefits

In summary, we consider that there are likely to be other economic benefits associated with this development, such as efficient use of infrastructure, mitigating transport costs associated with residential development, and contribute to a well-functioning urban environment. These benefits should also be considered when assessing whether the development will achieve the purpose of this FTCA. We have not attempted to quantify these benefits and note that other experts have provide findings on these aspects of the BR development.

8 Outcomes

The development of BR would produce positive benefits for the local community, both in terms of allowing households to purchase housing and by supporting local jobs. The development of BR will generate employment, which will, in turn, contribute to achieving the purpose of the FTCA.

Under the existing planning framework, even with the additional supply enabled in the District Plan review, there is potential for a shortage of residential lots in the coming year in Arrowtown. To avoid the risk of a shortage, there is a case for more residential land to be zoned to meet demands in the coming decade.

In addition, the development timeframes associated with greenfield residential means that rezoning would need to occur soon to ensure that capacity is available to meet demands. If BR gained FTCA approval in 2022, the residential component would be expected to yield occupied residential dwellings inside the next five years.

The economic role of BR (104 dwellings) suggests that the development is expected to generate approximately s 9(2)(b)(ii) in direct expenditure over the coming decade. This would support total economic activity of $37 million in GDP and employment of 495 employment years[49] between 2022 and 2027 in the Queenstown Lakes economy. For the purposes of the FTCA application, we have estimated that the BR development will generate approximately 447 FTE over the 5 years in the Queenstown Lakes economy. Of these jobs around 250 FTE are direct employment related to the land development and construction. The applicant will undertake the land development, which is expected to directly generate 50 FTE (i.e. 20% of the direct FTE) and are expected to be employed for the first year of project. The remaining 200 FTE will be employed by other businesses during the dwelling construction process, which is the development activity that is enabled by the applicant's subdivision and are expected to be employed for the following four years of project. This means that in each year of the project there is expected to be 50 FTE directly related to the development. Notwithstanding the likely transfer effects, the Arrowtown community and economy will benefit from additional economic activity that BR will generate in the local area.

Also, if every lot within in the BR development was developed to include both a primary and secondary dwelling, then there could theoretically be up to 208 dwellings developed, although that upper end is unlikely, given the presence of some smaller lots of less than 300m^2. This would result in more dwelling construction and resident spending than is assessed above. In total, if 208 dwellings were developed then BR development would support total economic activity of $54 million in GDP and employment of 730 employment years, or 660 in FTE terms, between 2022 and 2027 in the Queenstown Lakes

[49] Total Employment Count, which is equal to Count of employment and working proprietors.

economy. Of these jobs around 380 FTEs are direct employment related to the land development and construction.

BR is an appropriate location to enable higher density growth because it is already zoned for low intensity residential activity, is close to Arrowtown, is adjacent to established residential dwellings and is the last non-urban land between the southern edge of Arrowtown and the golf course. The location of BR, and the proposal assessed in this report, therefore contributes to a well-functioning urban environment by providing dwellings in close proximity to major centre, which will also have positive effects in reducing greenhouse gas emissions. The proposal would also support efficient use of infrastructure, and more efficient access to infrastructure than in other alternative greenfields locations which require new networks to be constructed. These benefits should also be considered when assessing whether the development will achieve the purpose of the FTCA 2020.

Appendix 1 Economic-Linkages-Model

The Economic Linkages Model (ELM) is a proprietary model that has been developed to quantify and measure the economic activity and relationships within the New Zealand economy. In summary, the ELM measures the flows of money and goods through the economy, at a sector and sub-national level.

The model records the interactions and relationships between actors in the economy, including businesses, households, government, exporters, and importers. At its essence, the interactions in the model describe how each industry responds to changes in the economy, which ripples out to influence a range of other outcomes (e.g. household decisions).

The ELM measures the economy using a range of standard economic metrics, which includes gross output[50], GDP[51], value-added, employment[52], incomes[53], consumption[54], tax[55], and trade. The model uses a subnational Input-Output Table that has been regionalised by Formative. This appendix outlines the nature of the Input-Output table, the underlying assumptions within the ELM and the key modelling steps.

A1.1 Input-Output Table

The Subnational Input-Output Table (SIOT) has been developed by Formative to provide detail on the economic linkages between sectors and geographies within New Zealand. The table has been defined to include 65 economic sectors and 39 geographies.

The 65 'sectors' have been defined using standard industry classification (ANZSIC06), with each sector being defined by a grouping of industries based on cluster analysis of their supply chains and economic rationale. The 39 'geographies' have been defined according to either territorial or regional authority boundaries, with more disaggregation provided where there is more economic activity (e.g. upper North Island) and aggregation where there is less economic activity (e.g. West Coast of the South Island).

The SIOT has a base year of 2019. All transactions in the table are in 2019 dollars, and all economic impacts (for instance GDP, gross output, consumption, taxes) are also in 2019 dollars. The SIOT is

[50] Similar to company revenue.
[51] There is a key difference between GDP and value added. The value added of a sector is measured net of taxes (for instance GST) and subsidies on products. In the GDP in the national accounts for New Zealand product taxes (minus subsidies) are recorded for the economy as a whole and includes as part of the value added.
[52] Formative uses BED measure of Total Employment Count (TEC) which includes both employment count and working proprietors.
[53] Includes salaries, wages and profits.
[54] Including household and government.
[55] Including income taxes, GST, government transfers and subsidies.

based on a national level 2013 Input-Output table released by Statistics New Zealand which has been converted to 2019 based on Statistics New Zealand national account data for 2019[56]

The national level table has been regionalised using a hybrid approach. The hybrid approach of combining survey and non-survey (i.e. modelled) methods to regionalise an IO table which is considered the gold standard when an official SIOT is not available. The survey data sources used in generation of the SIOT include a range of customised datasets that Formative have purchased and developed:

- **Total Employment**: Formative maintains a detailed database of employment, by geographies and industry (Business Employment Database - BED), which records the total employment in each of 506 ANZISC06 industry classes and for Statistics New Zealand's Statistical Areas, including both employees and working proprietors.[57]
- **Electronic Card Transactions**: Formative has purchased detailed electronic card transaction data from Marketview, which records the origin and destination of four retail and services spend types by the 39 geographies. [58]
- **Subnational Economic Data**: a range of information that provides valuable insight into the scale of economic activity that is located within each geography. This includes regional GDP, Gross Output and household income.

The above datasets have been combined along with non-survey regionalisation techniques to allocate the national economic activity into each of the geographies. The key method used to accomplish this is the Industry-Specific Flegg's Location Quotient (SFLQ)[59]. This method employs location quotients (LQ) to understand the specialisations and structure of regional economies compared to the national economy. The use of LQ's has been known to understate the amount of regional trade, however the SFLQ approach combats this by allowing for industry specific rates of cross hauling (where regions both import and export a product or service).

This approach has been shown to create accurate estimations of regional multipliers and outperform other non-survey approaches[60]. The SFLQ method was supplemented by a gravity model to help inform regional flows. The SIOT has been calibrated to better match the relationships in the national Input-Output table and has been balanced using an iterative proportional fitting procedure to ensure

[56] This includes gross output by sector, and national subsidies, exports, imports, change in inventories, gross fixed capital formation, consumption spending (includes households, local and central government and non-profit expenditure), compensation of employees, taxes, consumption of fixed capital and operating surplus.
[57] Formative (2021) Business and Employment Database – Employment Count, Working Proprietors, Total Employment.
[58] Marketview (2021) Card transaction data – four spend types and 39 geographies for the 2019 calendar year.
[59] Julia Kowalewksi (2015) Regionalization of National Input–Output Tables: Empirical Evidence on the Use of the FLQ Formula, Regional Studies, 49:2, 240-250.
[60] Anthony T. Flegg, Leonardo J. Mastronardi & Carlos A. Romero (2016) Evaluating the FLQ and AFLQ formulae for estimating regional input coefficients: empirical evidence for the province of Córdoba, Argentina, Economic Systems Research, 28:1, 21-37.; Zhao, X., Choi, SG. On the regionalization of input–output tables with an industry-specific location quotient. Ann Reg Sci 54, 901–926 (2015).
JEM-436216-11-70-V2:JEM

that the table reflects regional gross out and input. The resulting SIOT table provides a modelled estimate of the relationships within the economy. This means that the economic linkages between sector-geography combinations as of 2019 are captured in the SIOT.

The ELM uses the SIOT to estimate the potential economic activity that can be expected from changes in the economy. All economic models apply assumptions because an economy and community is too complex to replicate exactly in a mathematical system. The structure of the ELM utilises the following assumptions:

- Leontief production function, which assume linear relationships between the production and inputs. This means change in the output for an industry will translate into a proportional change in demands for inputs.
- No supply constraints, which assumes that businesses can source sufficient resources (labour, capital, land, etc) to meet new demands.
- Constant returns to scale, which means that there are no economics of scale or diminishing returns in the model.
- Static prices, which assumes that prices remain at 2019 values. The model does not account for substitution effect or dynamic feedback from changes in demand and prices.

A1.2 Key Modelling Steps

The first step in the ELM is to establish the direct economic activity that will be generated or influenced by the proposed policy, investment, or activity. This estimation of the direct economic activity is generally conducted using financial information or developed via a first principles understanding of how businesses or households may change their behaviour or be impacted as a result of the proposed policy, investment or activity.

The next step is to map this activity into the 65 economic sectors and 39 geographies. In most cases the direct economic activity will occur across a range of economic sectors, commonly this can be drawn from either operational or capital budgets. Similarly, in most cases the direct economic activity will accrue across multiple geographies. Therefore, the activity must be mapped into to each geography to ensure that the modelling reflects likely pattern of activity.

Finally, the mapped activity is then fed into the ELM which measures the additional economic activity that can be expected to occur within the economy as a result of the new activity. In summary, other businesses and households in the community will respond to the changes in the economy.

There are three types of economic impact the ELM calculates, direct, indirect, and induced:

- Direct impacts are the initial changes in the economy due to an economic shock (often new expenditure). The direct GDP effect is calculated based on the value of the shock and the direct employment effect is the number of jobs created by the shock itself.
- Indirect impacts arise as the firms that initially change their output as a result of an economic shock (i.e. the direct effects), purchase required inputs from their supply chain. These business-to-business transaction changes are known as the indirect impacts.
- Induced impacts flow from the direct and indirect impacts which generate wages, salaries, and profits for the households. The changed household incomes will generate more spending on goods and services. This household-to-business interaction is called induced activity.

The ELM quantifies the economic activity in each geography and sector, which includes the direct, indirect, and induced activity. The associated employment impacts are calculated assuming constant productivity – that is, each sector-geography combination produces the same amount of output per employee.