

**BEFORE THE HEARINGS PANEL
FOR THE WELLINGTON CITY COUNCIL**

IN THE MATTER of the Resource
Management Act 1991

AND

IN THE MATTER of Proposed Plan
Change 83 to the
Wellington City District
Plan

STATEMENT OF EVIDENCE OF PHILIP ANDREW SIMPSON

21 November 2018

1 INTRODUCTION

1.1 My name is Philip Andrew Simpson.

1.2 I am a management consultant with over 16 years experience in business analysis, contracting and local government. Prior to this I worked for 4 years at Wellington City Council (WCC) including business planning coordination and running major projects; and I worked for 5 years at the Department of Conservation in Business Management. I have a BSc Hons and a Masters in Business Administration.

1.3 My involvement with Kiwi Point Quarry dates from 1999 reviewing its business operations, planning and management and I continued to play an advisory role to WCC in respect to the site and operational matters. I project managed the prior District Plan Changes 25 & 26 supporting the planner with aggregate and financial impact forecasting. I managed the contracting/leasing process leading to the commercial leasing of the site to Holcim with retention of ownership by WCC. I have been involved in subsequent analysis of aggregate supply and assisted in providing WCC with advice that has led to them seeking Plan Change 83.

1.4 My submission relates to the strategic case for the quarry and why it is beneficial and desirable to continue operating.

1.5 While I understand that the present hearing is not a matter to which the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note (2014) applies, I confirm that I have approached the preparation of this evidence in the same manner as I would for Environment Court proceedings and have complied with the requirements of the Code. I confirm that the issues addressed in this evidence are within my area of expertise and the opinions I have expressed are my own except where I have stated that I have relied on the evidence of other people. I have not omitted material facts known to me that might alter or detract from my evidence.

2 SCOPE OF EVIDENCE

2.1 I have been asked by Wellington City Council to prepare evidence on its behalf as proponent of Proposed Plan Change 83.

2.2 The evidence I was asked to prepare specifically relates to the strategic case for the quarry and its benefits.

2.3 My evidence will address the following points:

- (a) The ongoing demand for aggregates to support building and construction in Wellington;
- (b) The limited supply options for aggregates and limited alternative sources of aggregates;
- (c) The strategic benefits of continued operation of the Kiwi Point Quarry;
- (d) The financial benefits to WCC and the community from continued operation of Kiwi Point Quarry.

2.4 The key documents and information that I have referred to and relied on in preparing my evidence include the following reports authored by me (which also reference other documents/sources where necessary):

- (a) Appendix 1 – Aggregates in Wellington Regional Demand, Supply and Alternatives.
- (b) Appendix 2 – Kiwi Point Quarry Benefits Model of Continued Operation.

3 EXECUTIVE SUMMARY

3.1 Aggregates are an overlooked non-renewable resource that is necessary for building and construction. There is ongoing demand in the Wellington region for aggregates, with particularly high growth in residential building.

- 3.2** Three quarries currently supply the Wellington region: Kiwi Point Quarry, Belmont and Horokiwi. There are limited sources of suitable rock resources and there are significant barriers to establishing a new quarry.
- 3.3** Kiwi Point Quarry supplies the adjacent concrete and asphalt plants and is well located to transport routes to supply the Wellington market.
- 3.4** Without the Plan Change and continued supply from Kiwi Point Quarry, there will be increased costs for all customers, particularly as transport is a significant cost for aggregate supply. Wellington City Council will also lose a source of revenue from the quarry and have direct cost increases for its infrastructure projects. With closure the negative impact on the community is estimated at a \$41 million (on a Net Present Value basis).
- 3.5** Continued operation of the quarry provides for a competitive and resilient market for aggregates. It ultimately delivers flat land suitable for well-located commercial development. The benefit from the continued operations, partial leasing, and eventual sale of the entire site is estimated at \$25 million benefit (NPV basis). The difference between the negative impact of \$41 million and the benefit of \$25 million results in a net projected benefit of \$66 million.

4 DEMAND FOR AGGREGATES, CURRENT SUPPLY AND LACK OF ALTERNATIVES

- 4.1** The demand for aggregates is typically quoted at a population level of 7-8 tonnes of aggregate per person per year. Currently according to the Aggregate and Quarry Association demand in New Zealand equates to about 8.5 tonnes per person per year.
- 4.2** Quarry materials are used in roading in basecourse, sealing chip, asphalt. Each kilometre of motorway uses about 40,000 tonnes of aggregate.
- 4.3** Quarry materials also are used in construction, including foundations, concrete, building materials, and drainage. A single new house is estimated to require about 250 tonnes of aggregate for its construction.

4.4 There has been sustained demand for quarry products in the Wellington Region. Ongoing demand is also anticipated to be strong with the current construction forecasts for the Wellington indicating significant growth. These are included in Appendix 1 and include a 65% increase in residential construction between 2017 to 2023.

4.5 There is very limited scope to develop a new quarry in the region. While there are many small historical quarry areas, establishing a new quarry would be challenging. The rock resources in the Wellington region are located close to fault lines but there are limited areas that have been identified with suitable rock. Appendix 1 outlines the barriers to develop a future quarry and the difficulties with specific sites in the region that have previously been identified. There would be major environmental impacts to establish and operate a new quarry.

5 BENEFITS OF CONTINUED QUARRY OPERATION

5.1 From early settlement in Wellington, quarrying has been carried out on the surrounding hills to support the growth and development of the city. The drivers have always been similar - finding resources close to construction and supporting the development of roading. As a route out of the city the Ngauranga Gorge has undergone considerable modification as well as being utilised as a source for other materials.

5.2 The following pictures¹ show some this development from the 1880's through 1912 to the first recognisable motorway in 1939. The road has been carved out of the landscape with the quarries being an important source for the roads and city development.

¹ All Sourced from the National Library online. National Library References Ref: 1/2-140328-G; Ref: APG-1395-a-1/2-F and Ref: PICT-000166



1880's road winding up the gorge.

1912 horse and cart on a winding section of the road.

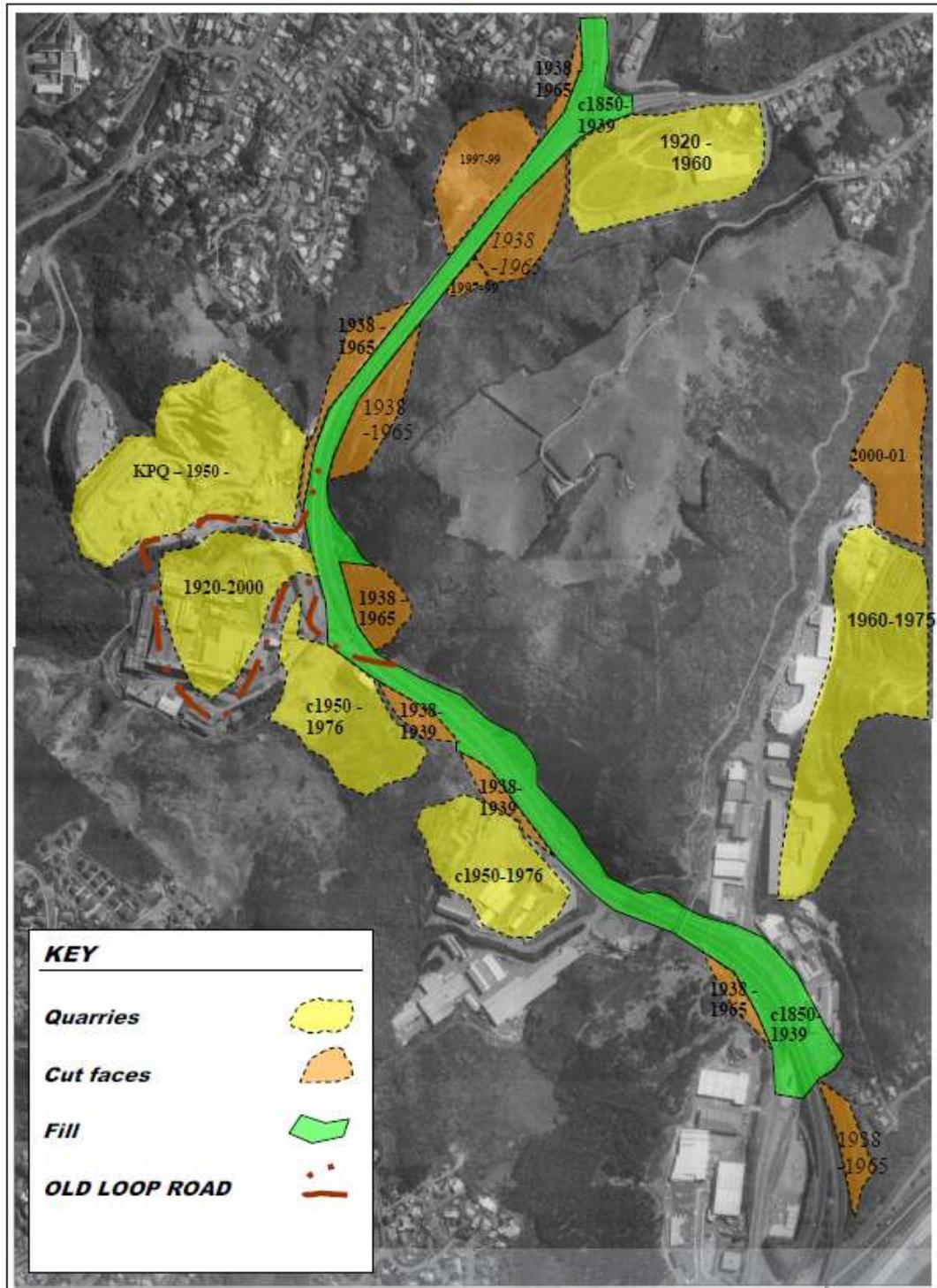
1



1939 Road in the Gorge. Note the hill in the middle has been removed for the current site of Taylor Preston, KPQ, Allied and Downers etc.

5.3 The extent of quarrying in the gorge is also represented in the following aerial diagram with quarry activity overlaying it. As well as providing for the development of the major arterial SH1 route, the quarrying activity itself has enabled the construction of the surrounding suburbs, housing, schools, and city infrastructure. It has also contributed to the development of flat land for commercial development on SH1.

Aerial Photo (1997) showing location and types of major modifications to the Ngauranga Gorge landforms



- 5.4** Plan Change 25 similarly canvassed the benefits of the quarry and was approved. A limited plan of development was proposed at the time, which in retrospect was too constrained in its scope. Now with the changes arising from the Health & Safety at Work Act 2015 and new regulations and guidelines for quarrying requiring more extensive benching, the South Face area is not able to be utilised as intended.
- 5.5** Kiwi Point Quarry has been determined to be a strategic asset of Council. This was recommended dually on the basis of the need for aggregate resources close to Wellington and the future benefits of the flat land located close to an arterial route. The Greater Wellington Regional Council through Policy 60 of the Regional Policy Statement Policy also directs that particular regard be given to the social, economic, and environmental benefits of utilising mineral resources within the region.
- 5.6** Plan Change 83 will enable continued access to aggregate resources and operation of the quarry for approximately 15-18 years. It will enable continued supply of materials closely located to demand. It will ultimately free up valuable flat commercial land, well-located to transport in about 2036/37. The flat land will give Council a financial return, but also enhance commercial economic development options.
- 5.7** Horokiwi and Belmont quarries have forecast lives of approximately 20 and 40 years respectively. The three quarries provide complementary locations for aggregate supply. If Kiwi Point Quarry closes in the short term, these other quarries will have higher demand and shorter lives. These shorter lives will significantly increase costs and transport impact for future rock supply.

With KPQ Plan Change	2020	2025	2030	2035	2040	2045	2050
KPQ							
Belmont							
Horokiwi							
Without KPQ Plan Change	2020	2025	2030	2035	2040	2045	2050
KPQ without Plan Change							
Belmont							
Horokiwi							

- 5.8** The financial model in Appendix 2 includes a comparison of continued quarry operations on the South Face (the area included in Plan Change 83) compared to a closure upon expiry of the North Face. The continued operation includes in the financial model the interim leasing of the North Face (the current quarry area) from 2026, followed by the

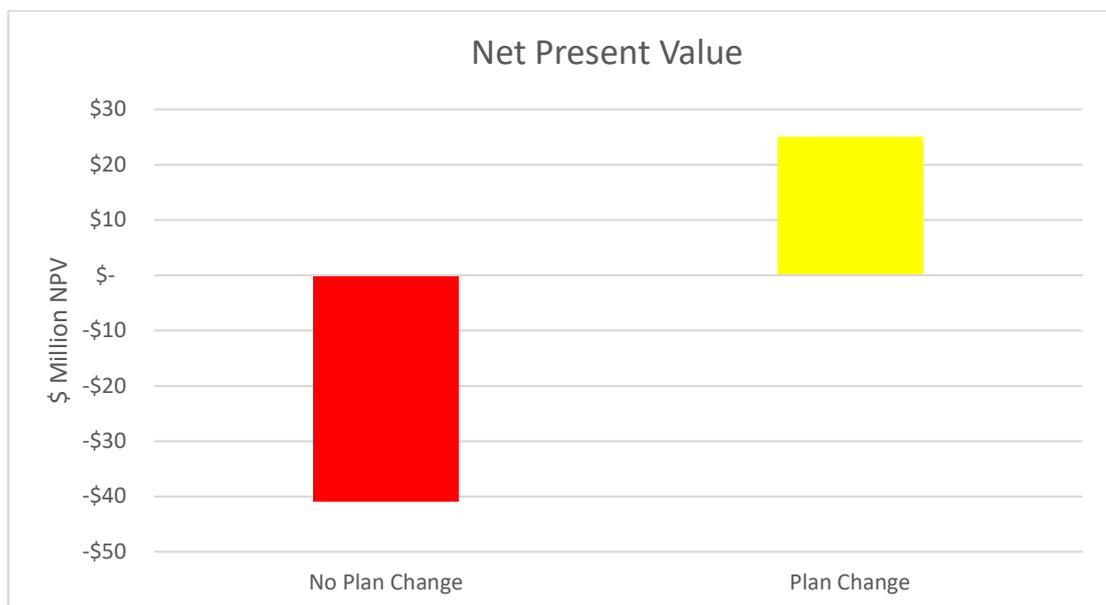
eventual sale of the entire quarry area. The final area is about 13.5 hectares of flat land and it is forecast to be worth nearly \$35 million in 2035/36. This lease and sale are discounted back (at a discount rate of 4.5%) to a Net Present Value (NPV) in today's terms of about \$25 million. Details are in Appendix 2.

5.9 If Kiwi Point Quarry closes:

- a) **There will be increased costs for customers.** This results from the high transport cost associated with aggregates with costs increasing with distance from site. If Kiwi Point Quarry closes, then there would be increased demand on the two closest quarries at Belmont and Horokiwi to supply the Wellington market. Transport costs and loss of competition will drive up prices. The forecasts and assumptions with this are included in Appendix 2. 'Customers' include home-buyers, road-users, businesses, taxpayers and ratepayers who ultimately purchase or pay for construction.
- b) **There will be a loss of income for Council.** Wellington City Council earns royalties from the quarry operations and these are currently included in its Long Term Plan (LTP). Loss of this revenue source will ultimately impact on ratepayers or through reductions in levels of service. Council also directly and indirectly purchases materials for infrastructure so there will be additional direct costs in the LTP if Kiwi Point Quarry closes.
- c) **Additional flat land will not be available.** Council will not have flat land available for sale from the South Face as in its current undeveloped state it has limited commercial value.
- d) **There will be direct losses of business and employment.** There will be hardship and economic losses from the potential closure of the Holcim business and loss of jobs. We have not factored in the economic costs and the economic multiplier of loss of this activity. There will also be increased costs for the adjacent customers Allied Concrete and Downers and potentially this activity and jobs could also be relocated at some point.

- e) **There may be lost development opportunities.** The higher costs of construction to Wellington may marginally reduce the economic developments that are undertaken.

5.10 The financial model in Appendix 2 factors in the 'shortfall' in rock resource that would need to be transported from the other local quarries and the resulting increased prices. It also includes the loss of royalty payments to WCC. All up, the total cost to the community is \$83 million, but by including the sale of the North Face, and discounting back on an NPV basis the economic cost to the region is about \$41 million. Compared to the benefit of about \$25 million, this results in a 'gap' of about \$66 million in benefits.



5.11 There are other benefits for the region in the continued operation of Kiwi Point Quarry close to the city. It supports earthquake resilience by providing a close source for aggregates for stabilisation and rebuild activities. If Kiwi Point Quarry closes there would also be increased traffic on SH2 with increased truck movements from Horokiwi and Belmont. This would add an estimated additional 200 truck movements per day along SH2 north of Ngauranga representing a 5% increase in heavy vehicles with consequent increase in congestion and additional environmental impacts including CO₂ emissions.

6 RESPONSE TO ISSUES RAISED IN SUBMISSIONS

6.1 There are several submissions from contractors, developers and the public in support of the Plan Change noting the benefit of the continued operation in relation to lowering transport costs for

aggregates and keeping pricing competitive which supports the propositions that underpin this evidence.

6.2 The Greater Wellington Regional Council supports the Plan Change as they recognise that aggregates are in short supply and Policy 60 of the Regional Policy Statement specifically addresses the benefits of utilising mineral resources.

6.3 There are several submissions, while opposing the Plan Change for environmental issues support the use of the site as a Business Park or similar. This is the long-term intention and will be enhanced by additional flat land created by the Plan Change.

6.4 Several opposing submissions note that the quarry should be located '*somewhere else*'. As noted in the Appendix 1 Regional Resources document attached there are no readily realisable locations in the Wellington area. The direct costs to establish a new quarry would likely run into many millions. The environmental impacts of any new quarry operation would be significant and obtaining planning approvals would be highly challenging given possible extent of land modification, land use changes and heavy trucking impacts for any new site.

7 CONCLUSION

7.1 Plan Change 83 will enable the continued operation of the Kiwi Point Quarry. This will provide ongoing financial benefits to the region and provide valuable commercial flat land in future. If Kiwi Point Quarry does not continue to operate, then there will be increased costs for housing and construction, a loss of income for Wellington City Council, and a quicker exhaustion of regional rock supplied from the other quarries.

7.2 The indicative forecasts, in today's terms are of a potential cost to the region of \$41 million from the suspension of current quarry operations, compared to a potential gain of \$25 million – a net difference of about \$66 million.

Philip Andrew Simpson
21 November 2018

Appendix 1 – Aggregates in Wellington – Regional Demand, Supply, and Alternatives

Aggregates in Wellington Regional Demand, Supply and Alternatives



November 2018

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1. Background

Kiwi Point Quarry (KPQ) is a strategically hard rock quarry located in Ngauranga Gorge, on State Highway 1 within Wellington City. There are limited sources of aggregate material in the region. The greywacke rock resource reserves along the Wellington Fault have for many decades been the prime source of the hard rock quarried for use in the wider Wellington and Hutt Valley areas. Ngauranga Gorge has been quarried for over 100 years.



1920 Quarry activity in Ngauranga Gorge:Track & Stream (Alexander Turnbull Library)

A District Plan Change is required to enable KPQ's continued operation. This report documents that the underlying demand for quarry materials, the current supply forecasts, and the lack of identifiable alternatives for aggregate supply.

2. Market Demand

Underlying demand for aggregate

There is an underlying demand for aggregate for a wide range of uses in building, roading and infrastructure. The 'rule of thumb' is that the per capita consumption rate is about 8 tonnes per person per year¹. Of course, that consumption is averaged out depending on specific demand depending on the construction type. Primary aggregate use can be direct such as fill, roading basecourse, drainage fill etc. Secondary aggregate utilisation is in the provision of concrete, asphalt and other roading products.

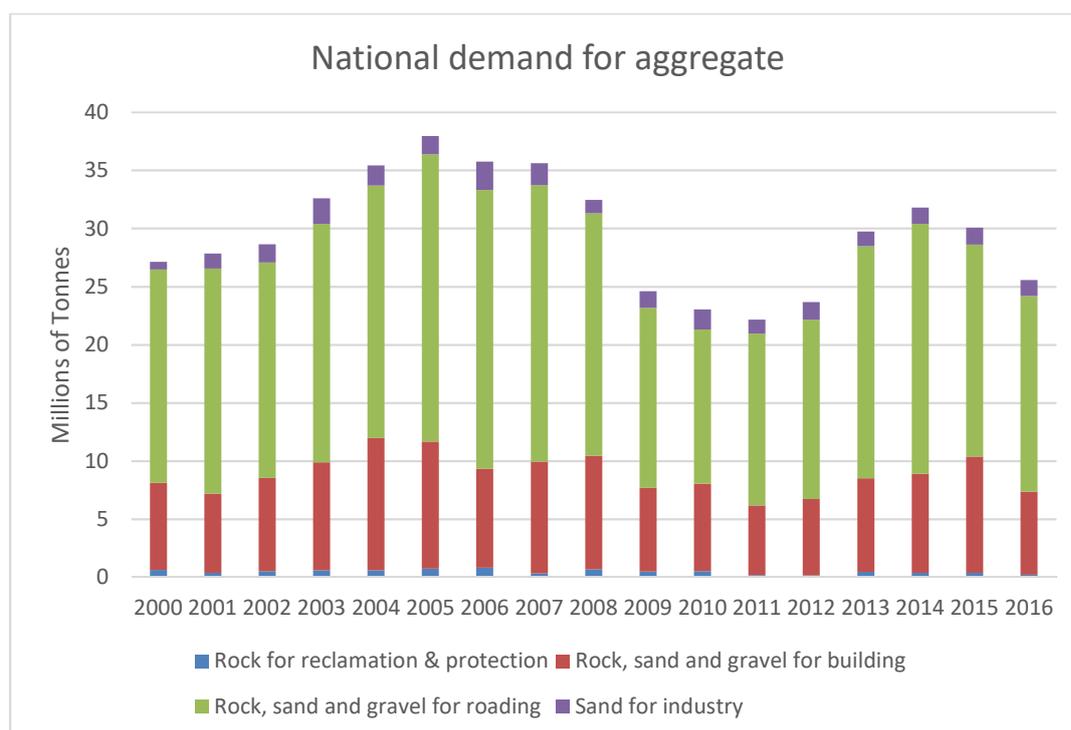
Some examples of drivers of aggregate use are:

- A new house uses approximately 250 tonnes of aggregate including foundations, retaining works, drains, cladding, linings, driveways and landscaping etc.
- 1 km of motorway uses 40,000 tonne of aggregate from basecourse to sealing chip.

Commercial construction uses significant concrete inputs, and drainage and landscaping uses all require aggregate inputs.

National Production

Nationally, aggregate production² has been somewhat cyclical. Following the global financial crisis in 2008 there was a dip in demand.

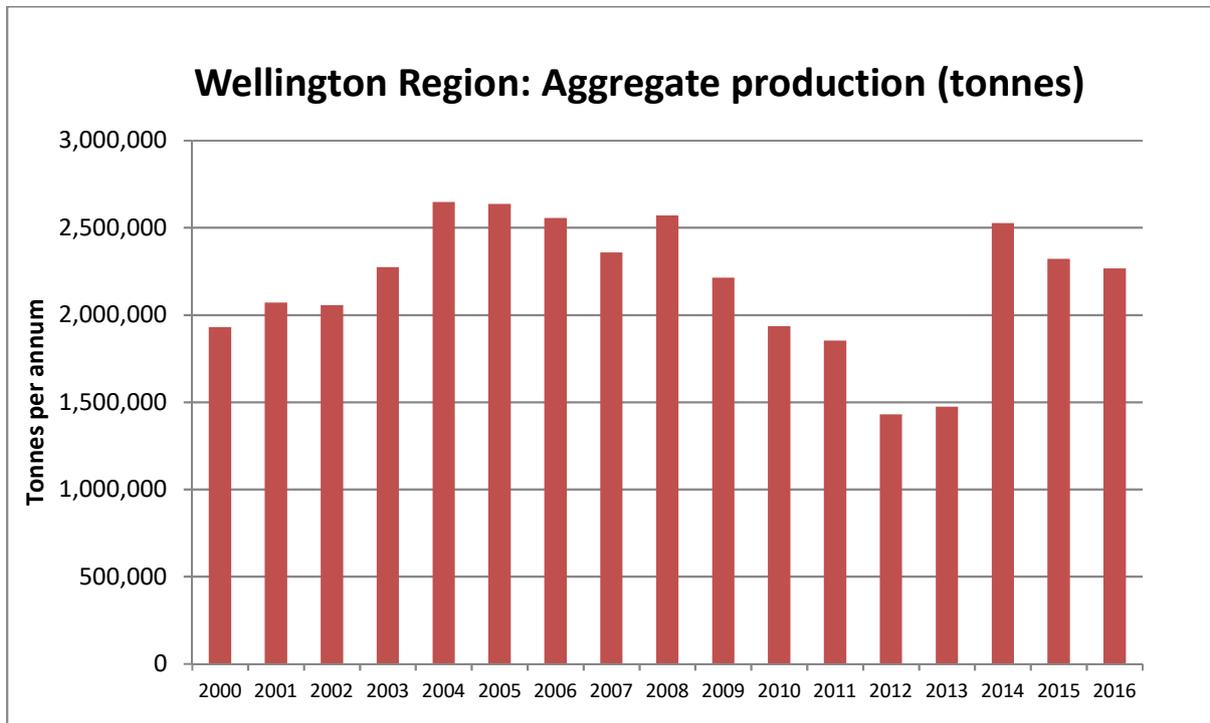


¹ Source: Aggregate & Quarry Association: Aggregate Facts 2015"

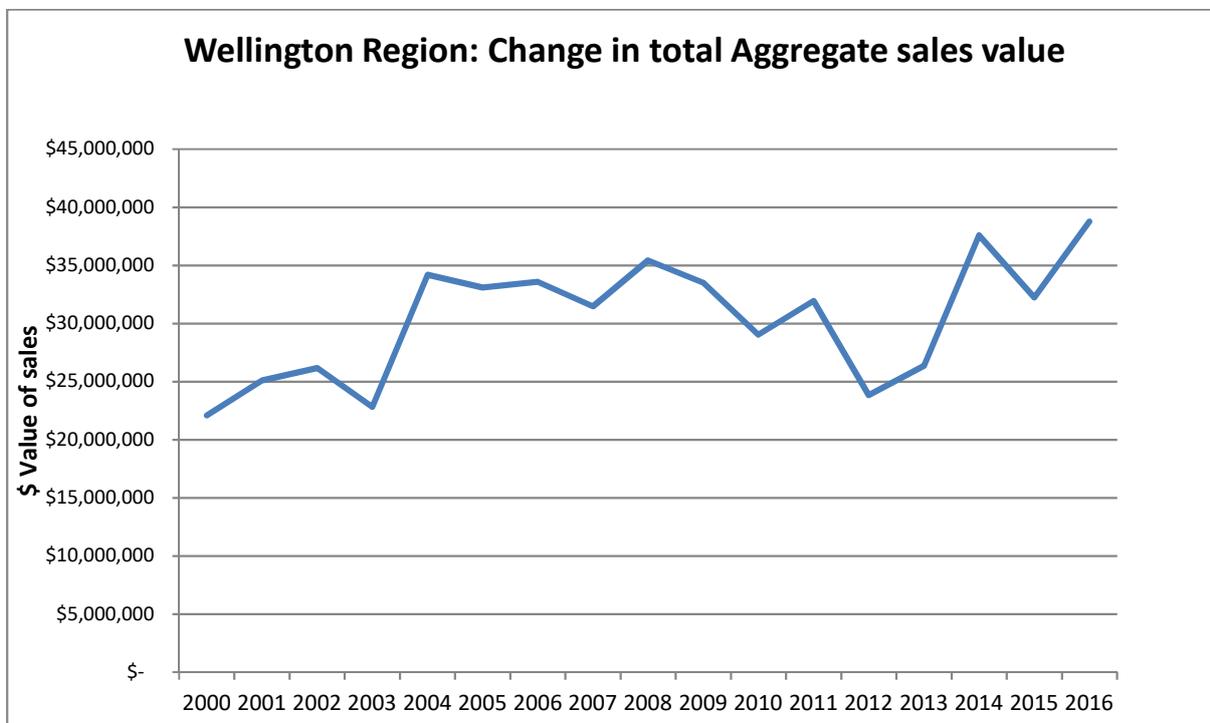
² Source: Crown Minerals data

Wellington Regional Production

The Wellington market³ has also had similar cyclical demand cycles with reasonably strong demand since 2014. In the Wellington Region, the estimate of usage is about 6.3 tonnes per person per year for a total of about 2.3-2.5 million tonnes:



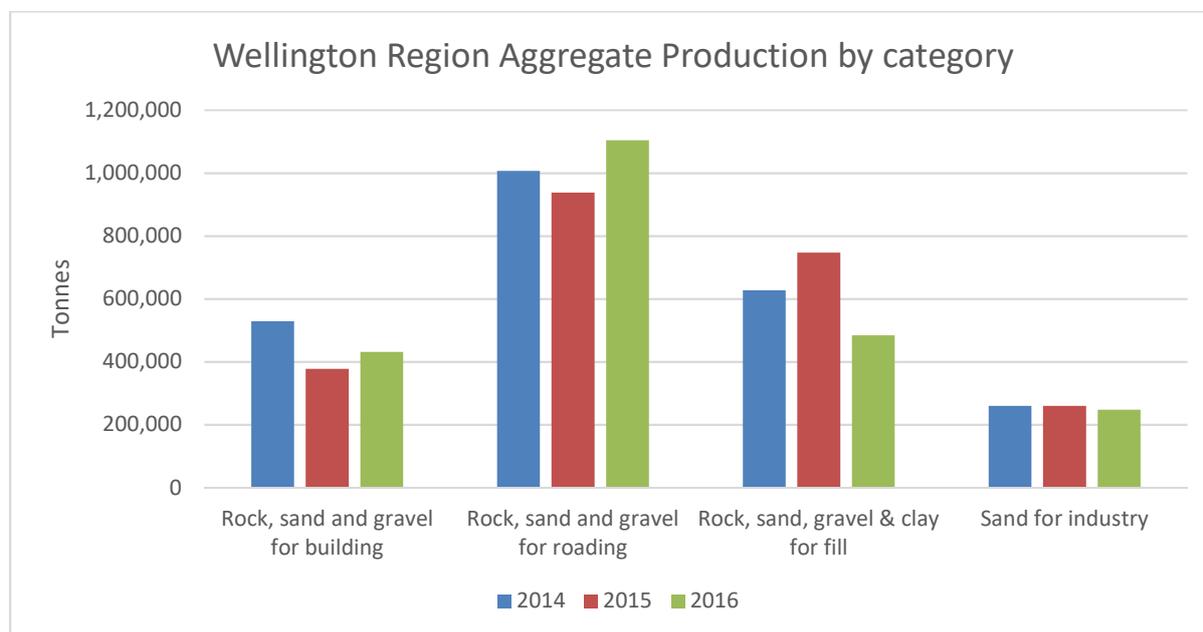
Sales value of Aggregates in the Wellington Region has increased:



³ Source Crown Minerals data.

Aggregate mix

The mix of aggregates sold in Wellington is across the following construction categories:

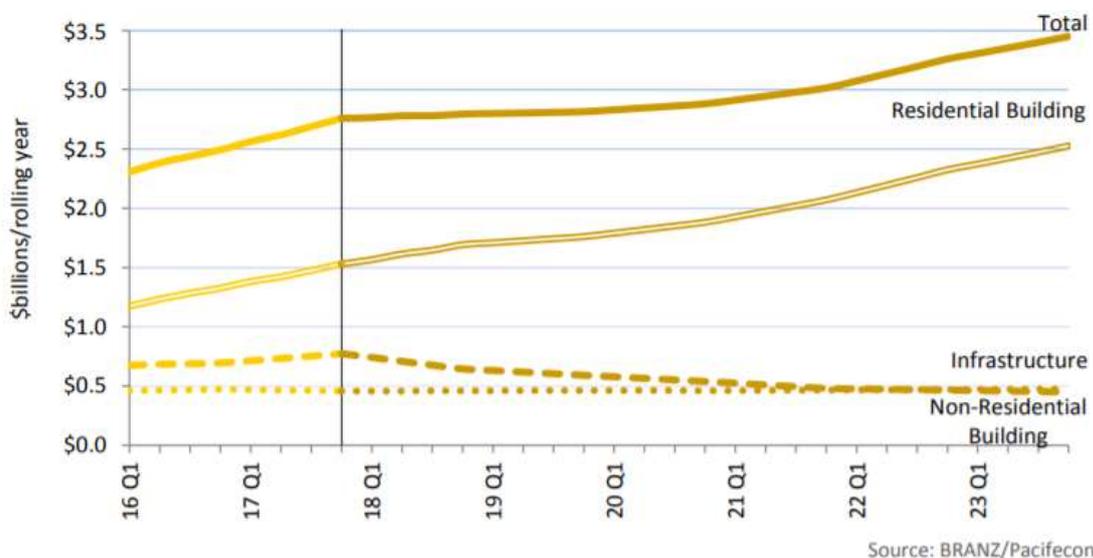


Construction forecasts and future development

The population of Wellington City for 2018 is 211,809 and is forecast to grow to 249,997 by 2043; a rise of 18%⁴. Slightly lesser increases are forecast for other areas in the region. This population increase will underpin ongoing construction demand particularly for residential housing.

The current construction pipeline forecasts⁵ predict the strongest regional growth is in the Wellington region. In 2017, total construction value was \$2.8 billion and is forecast to remain at this elevated level to 2020 when it will further increase. By 2023 this is forecast to increase to \$3.4 billion. The biggest driver of this is residential growth which is expected to have an increase of 65% from \$1.5 billion in 2017 to \$2.5 billion in 2023. Wellington non-residential building is forecast to decrease but level out from 2023. Infrastructure growth is expected to increase by 4% from 2017 to 2023 and then be maintained

The following graph is taken from the June 2018 MBIE forecasts for the Wellington Region:



⁴ Source: Wellington City Population Forecasts at <https://forecast.idnz.co.nz/wellington>

⁵ National Construction Pipeline Report 2019. MBIE June 2018.

These forecasts are supported by indications of planned non-residential works and infrastructure works in Wellington that include:

- Conference Centre, retail and entertainment
- Hospital construction
- Non-residential building work arising from the earthquake (reinstatement, strengthening etc.)
- Infrastructure such as ongoing water and waste investments in Council AMP's including reservoir construction etc.
- Ongoing Airport related development (terminal expansions, runway overlay, property development)
- Retirement village expansion
- Roading including completion of Transmission Gully, link roads (e.g. Petone to Grenada), Airport linkages, cycleways etc.

Demand risks

Given the constancy of historical demand for aggregates it is hard to envisage significant downside risks to demand with economic slow-downs having some, but limited impact on demand. More likely are potential increasing demands. This may be from higher demand for construction and infrastructure development or from re-building from one-off events. GNS has estimated the risk of a large (>magnitude 7.5) earthquake on the Wellington Fault as 10% in the next 100 years⁶. The experience from Christchurch is that following their earthquakes there was considerable demand for quarry materials to support re-instatement of infrastructure (roads, fill etc.) and then subsequent heightened demand for re-building. However, a lesser earthquake, such as the 2013 Wellington earthquake and the 2016 Kaikoura earthquake, can also trigger considerable demand e.g. to strengthen or replace earthquake prone buildings.

Market Demand Summary

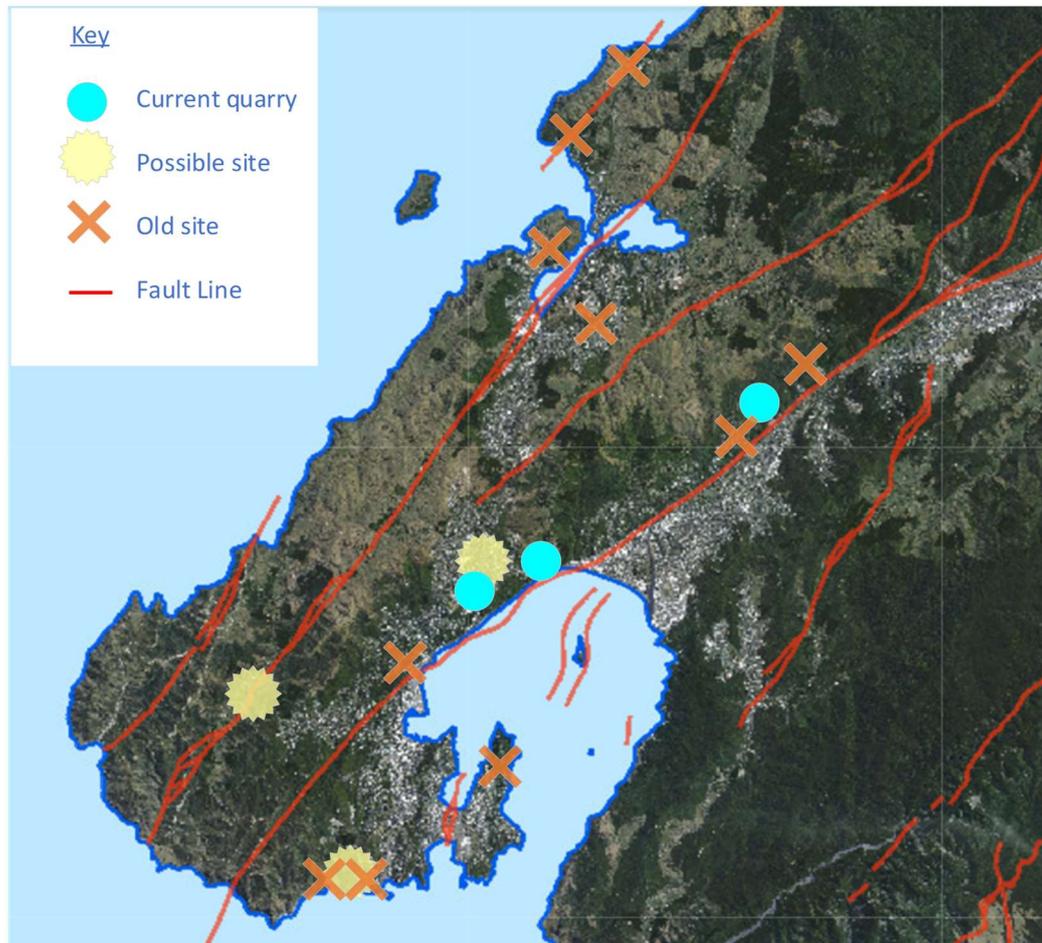
Construction demand will continue to underpin demand for aggregate materials. There is sufficient demand across residential, non-residential, and infrastructure projects to support the ongoing demand for quarry materials.

⁶ www.gns.cri.co.nz

3. Current Regional Rock Supply

Location of rock resources

The three main existing Wellington quarries (Kiwi Point, Belmont and Horokiwi) are all located adjacent to the Wellington Fault. This has lifted greywacke available for extraction. There are many older and abandoned sites. The following diagram shows the location of existing quarries in relation to the fault lines, some of the older sites in the region, and possible investigative sites (covered in more detail in section 4 as to the issues with these).



Product Mix

All quarries produce a range of material. While Belmont and Kiwi Point Quarry have traditionally had more ability to produce higher grade roading product, there is reasonable ability for any of the quarries individually or together to support the construction or roading markets from all quarries.

Lifespan with KPQ Plan Change

Both Belmont and Horokiwi appear to have sufficient resources in the medium term:

- Horokiwi's lifespan was estimated in 2014 to extend out another 20 years⁷.
- Belmont had a plan change approved in 2014 that gave it access to additional resources of about 10 million cubic metres. This additional resource also improved their access to higher-quality resources. This is thought to extend the current life of the quarry up to 40 years⁸.

⁷ <http://www.insideresources.co.nz/news-story/19374/horokiwi-pushes-ahead-quarry-development>

These lifespan forecasts were made when the assumption would have been that KPQ would be able to continue to operate due to the previous Plan Changes 25 & 26.

⁸ <http://www.insideresources.co.nz/news-story/14999/winstone-prepares-belmont-expansion>

The lifespans for the quarries with Plan Change 83 can be represented on the following timeline:

With KPQ Plan Change	2020	2025	2030	2035	2040	2045	2050
KPQ							
Belmont							
Horokiwi							

Lifespan without KPQ Plan Change 83

Without Plan Change 83 and continued access to resources KPQ will be exhausted in 2019. Without the Plan Change, then there is a more severe supply outlook and both Belmont and Horokiwi can expect to have their lifespans reduced as increased demand will exhaust their resources faster:

Without KPQ Plan Change	2020	2025	2030	2035	2040	2045	2050
KPQ without Plan Change							
Belmont							
Horokiwi							

The loss of access to high quality resource at KPQ would speed up the utilisation of resources from the other two quarries. Belmont is likely to be significantly impacted – it is expected that it would be able to gear up for higher demand and continue to supply a full range of high quality products. Belmont and Horokiwi would both be exhausted about 7 to 8 years earlier without Plan Change 83 as the KPQ resources represent about 15 -18 years of supply. There would be opportunity for increased prices due to lessening competition in this period, as well as additional transport costs for southern and western areas of the Wellington region.

4. Alternative Regional Rock Supply

Barriers to entry and supply

With road or alternative haulage costs a significant factor in supplying quarry products there are barriers to non-local entry into the market. Local haulage costs are also a significant factor of the cost.

The Commerce Commission has noted the following barriers to entry in the quarry and aggregate industry⁹:

- Appropriate Resource. The rock needs to be of sufficient quality to be utilized.
- Land. Land needs to be available next to the appropriate resource.
- Equipment/capital. There is significant investment required to establish and develop a quarry. Hard rock quarries have higher equipment needs than river gravel extraction.
- Resource consent.

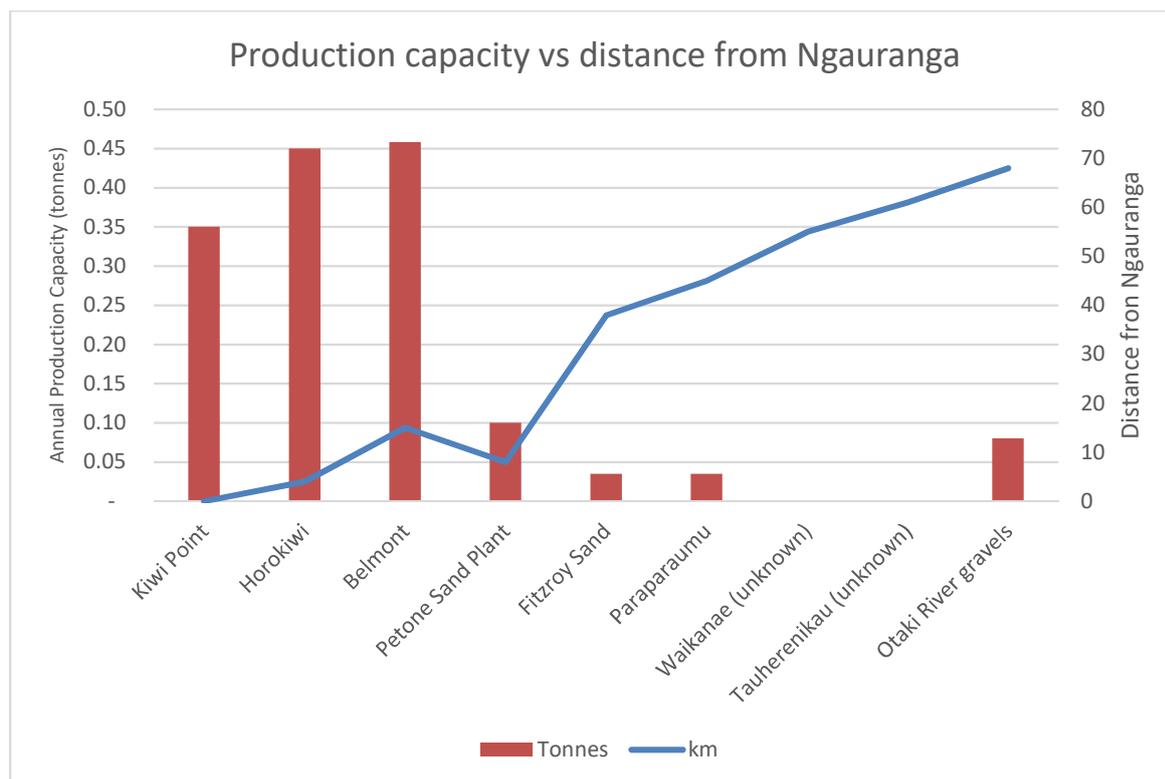
New quarry sites would run into considerable difficulty to be established due to these factors. Consenting activities would also need to be considered in relation to the District Plan provisions with potential sites in the Wellington region more likely to be zoned 'rural' or 'open space B' which would likely require a plan change. A new site is unlikely to be well-located to transport routes so there would be environmental impacts from truck transportation as well as the need for significant roading infrastructure investment.

Alternative existing sites for Aggregate supply

The previous section focused on the two major existing hard rock quarries in the region. There are other minor sources of sand and river gravels in the region. However, they have limited and constrained production capacity, a narrow range of products, and a significant distance to market. The production capacity is often related to other factors e.g. the Petone Sand plant is an extraction for river flood management purposes and other river extractions can be similarly constrained. The following chart¹⁰ summarises the theoretical capacity, and distance to Ngauranga (as a comparison to Kiwi Point Quarry supply).

⁹ Commerce Commission decision: Fletcher-Building-Holdings-NZ-Ltd-Higgins-Group-Holdings-Ltd-and-Horokiwi-Quarries-Ltd-clearance-application-16-February-2016

¹⁰ Tonnage information derived "Assessment of economic effects of Belmont Quarry extension. A NZIER report to Winstone Aggregates Limited".



This means that outside of the three Wellington hard rock quarries there are no currently alternative sites that can adequately supply the Wellington market. The other aggregate providers have limited products, and production constraints, and are located at significant distance to the Wellington market.

Alternative new sites for Aggregate extraction

A 1978 major geological review of the Wellington region initially estimated around 84 million tonnes of extractable resource¹¹. About 30 million tonnes are estimated still to be available.

If the current quarries approach the end of their useful life, the potential rock resources that have previously been identified in the Wellington region are the Makara area (centered around Quartz Hill), Owhiro Bay Quarry, and the Northern Ngauranga Gorge. There would be considerable difficulties accessing these resources. The following is a brief summary of the issues associated with these potential sites:

- **Makara/Quartz Hill.** This area is located on a ridgeline running above the Makara Road on a South West orientation. The easterly flanks of this ridge may represent a large area of accessible hard rock resource. However, there would be significant issues accessing this resource:
 - Meridian's wind farm is located along the ridgetop and is a valuable wind resource with a large investment in turbines. The cost of acquiring and accessing this land would be considerable.
 - The ridge including Quartz Hill and White Rock Hill to the southwest was included in the ridgeline and hilltop overlay for protection under the District Plan.
 - Transport and access would present major difficulty as the roads from Karori to Makara and through the Owhariu valley to Johnsonville are currently small and narrow. Widening and straightening them would be challenging, particularly in Makara valley. Karori Road is also heavily used and congested at peak times and the

¹¹ Applied Geology Associates, 1978. Planning for Mineral Resources in the Wellington Region.

presence of heavy trucking would cause significant impacts. The Owhariu route is much longer with similar challenges.

- Amenity & landscape values. The Makara Road is a popular scenic route for drivers and cyclists. While most visual impacts could be hidden depending on the location of the quarry operations, trucking and noise would be detrimental to the amenity values. The local community are also sensitive to noise and disruption (as evidenced in their opposition to the Wind Farm construction).
- Accessing this or other resource in the Makara beach area or from the western side and attempting to transport through the Coastal Area (e.g. by barge) would present significant logistical and environmental challenges. There is some DOC land, a Coastal walkway and limitations on activities in the coastal area (let alone the logistical challenges of operating on an exposed coast and barging back to some other port facility through Cook Strait).
- Northern Ngauranga Gorge. On the North Side of SH1 across from Kiwi Point Quarry is a potential resource. It likely has similar rock characteristics to the existing KPQ operation. The issues accessing this resource would include:
 - Land access as there is subdivision on the top of the hill for lifestyle blocks.
 - Operational constraints as there is little space separating SH1 and the steep upper slopes. On the eastern side the North Island Main Trunk Line (railway) would constrain access.
 - Landscape and amenity values as the area has been included in the ridgetops and hilltops overlay in the District Plan, and there would be visual impacts from the northern Khandallah area.
 - The northern side of Ngauranga is regenerating forest, assisted by being damper and less disturbed than the southern faces. Disturbance could fragment a developing ecological corridor up the gorge that links to Tyers Stream Reserve to the south.
- Owhiro Bay. The former quarry at this site was closed in 1999. It was decommissioned mainly in response to concerns about environmental effects. The obstacles to this site include:
 - Commercial barriers as the terms of the Wellington's City Council purchase means the Council cannot reopen the quarry as of right.
 - Previous works and rehabilitation which means that accessing resource would require significant land modification.
 - Considerable public opposition to activity in the coastal area. This is an important recreation resource for the public accessing the wild south coast including walkers and mountain bikers. The quarry also lies within an area of special value to local iwi with cultural sites for protection. Given a main reason for public pressure closure was environmental effects in the coastal area reopening this quarry or nearby would be highly contentious.
 - Transport through Happy Valley & Brooklyn would add more heavy vehicles on this route.
 - Access from Happy Valley (landfill) side was considered during the quarry closure process and was not considered feasible as the access to high quality rock was constrained by intervening overburden and poor rock.

In the previous section, constraints with extractions from river-based quarries were noted and these apply to existing and any alternative river quarries that would be developed. In the wider region there are limited other possibilities for hard rock quarries. Plimmerton quarry was closed due to the environmental effects of trucking through the village and was a limited resource. The 'next nearest' hard sources may be able to be developed in the Wairarapa, but would have considerable transport impacts and costs. Barging in material is a possibility but also comes with high risks and complexity.

Summary on alternatives

There are no currently identifiable alternative sites to the existing three quarries. Additional work is needed in the Wellington Region to re-assess, survey and rank potential alternative sites in terms of resource and feasibility.

Appendix 2 – Kiwi Point Quarry – Benefits Model from Continued Operation

Kiwi Point Quarry

Benefits Model of Continued Operation

Contents

1. Purpose and background	2
2. Overall Benefit Summary	3
3. Background to the Model	5
Appendix 1: Resource Forecast.....	9
Appendix 2: Expected Rock Volumes, Tonnages, and Assumptions	Error! Bookmark not defined.

November 2018

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1. Purpose and background

Kiwi Point Quarry is a strategic asset of Wellington City Council located in Ngauranga Gorge. The quarry is operated by Holcim on a long-term lease, currently on what is referred to as the 'North Face'. Additional rock resource for Kiwi Point were secured in a District Plan Change 12 years ago for development of the 'South Face'. Following changes to quarry regulations amid Health & Safety regulatory change the original plans to quarry this South Face are less favourable. Benching within the quarry now needs to be of greater width restricting the extraction areas. There is also a greater understanding of the rock resources available within the quarry area.

The following is an update of the model that has informed previous planning.

2. Overall Benefit Summary

Table 1 summarises the benefits for projections from 2017/18 out to 2034/35 for two broad options to develop the quarry areas. Develop means to quarry the land, backfill with cleanfill where necessary and then have the land available for lease initially in the case of the North Face land and then sale as flat land. The options are:

- Option 1 - No Plan Change, with no development of the South Face¹; sell North Face land.
- Option 2 – Plan Change approved, Develop and then sell the South Face, leasing the North Face land in the interim then selling all the land.

Table 1. Summary Benefits Table.

	Option 1 - no development of South Face; sell North Face land	Option 2- Develop South Face, lease North Face and then sell all land
Future Strategic Value/flexibility	None	High
City Resilience	Very limited resilience	High
Cost/Benefit to Council (opex)	Cost to Council	Continued direct benefit to Council from lower costs
Net Present Value (NPV)	Loss of \$41M	Gain of \$25M
Community Impact/Benefit	Significant increased costs to community for construction activity	Continued benefits of competitively priced inputs for construction activity

In summary, extending the life of the quarry, and leasing the flat land that is generated during the lifespan of the quarrying will provide the greatest benefit to Council and the community. The net difference is about a \$66 million benefit in NPV terms. Failure to develop the South Face will result in high costs for both Council and the community and a loss of resilience, strategic options, and flexibility. Full development will provide lower costs to Council and the community and enable the liberation of highly strategic land.

Table 2 provides more detail of the financial impacts from the model.

¹ Option 1 is somewhat simplified in that if the Plan Change is not approved Council and the Quarry Operator could look at possible options for limited quarrying on the South Face within the currently permitted area. This ‘fallback option’ would be necessary to meet contractual supply obligations and maintain some capacity while other quarry options (which are limited) were further investigated. This would lead to increased costs would include transport of alternative materials to the KPQ site to meet supply commitments and additional costs for handling and managing the overburden that would need to be removed from the site. These increased costs under this ‘fallback option’ would mean the net financial position would be basically similar to that presented in Option 1.

Table 2. Financial Summary

Summary	Option 1. No Plan Change	Option 2 with Plan Change	Difference between Option 1 & 2
Rates impact	-\$14,329,398		
Total cost to community (incl. rates)	- \$83,625,545		
Land lease and Sale benefit	\$17,455,517	\$34,599,265	
NPV (loss)	- \$40,956,832	\$24,977,595	\$65,934,427

Note the modelling is indicative and the final values with/without the Plan Change is an estimate only. In any modelling there are a range of assumptions and uncertainties in the future demand and supply. However, reasonable inferences can be made from historical and projected patterns of demand and supply of aggregates, known market responses, and underlying commercial considerations. There is a significant gap of \$66 million between the net community cost of No Plan Change (\$41 million) and the project benefit of \$25 million. The model would also be sensitive to changes in:

- Underlying economic demand, and specific demand for construction materials.
- The mix of resources quarry products and the average selling price that can be achieved.
- Competitor responses or alternative supply.

The next section provides information on the modelling including the forecasts of rock resource available from the South Face and the full financial model and projections of resource depletion as well as documenting the assumptions.

3. Background to the Model

3.1. Quarry Areas and Volumes.

A brief description of the areas to be quarried are:

- North Face area: This is the current quarry area which should be exhausted in 2019. It will free up about 8 hectares of flat land which will be somewhat constrained in the short term by KPQ operations, but which should be able to be leased in future. The model assumes that this is leased around 2024, until the South Face is completed when both areas will be sold.
- South Face: This is the area available from District Plan Change 83. There will be initially high levels of overburden, but then more favourable extraction, and toward the end of extraction there will be increasing utilisation of high grade rock. It will free up about 5.5 hectares of flat land for sale.

A production forecast has been used for the modelling with production increasing up to 2025 reflecting known production demands and peaking at just over 340,000 tonnes per year. This is probably about the production limit of the current quarry operation.

Appendix 1 outlines the expected volumes of rock available from the South Face.

3.2. Assessment Criteria

The criteria to assess the South Face are as follows:

Table 3. Assessment Criteria

Future Strategic Value: flat land and ongoing resource access and flexibility	There are two major strategic issues: land availability and quarry materials supply. One of the major reasons for the quarry being a 'strategic asset' of Wellington City Council is that it ultimately produces flat land. Wellington is space constrained, particularly for industrial zoned land ² . The city will be growing over the forecast period and constraints and demand for flat land will only increase. Being located next to SH1 also increases the future strategic value. By the end of the forecast period both the North Face and South Face would be available for prime industrial land. Note this flat land is only created with appropriate quarry management including controls over backfilling with clean fill etc. The models include leasing the North Face and then selling both the North Face and South Face at the end of quarry extraction. There may be other options for land use that Wellington City may identify in future, maximising future flexibility.
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² CBRE KIWIPPOINT QUARRY INDICATIVE VALUE IMPACT REPORT, JUNE 2016

	<p>Note that access to quarry materials is of itself considered “strategic”. The consumption rate of about 6-8 tonnes per person per annum is used to indicate the input of quarry materials to the economy for use in housing, roading and infrastructure. Access to good quality rock is an issue for many cities as they increase their footprint and limit opportunities for rock. There are three operating quarries in the Wellington Region available to readily supply the Wellington market. When these run out, the development of any other resource is going to be very costly or problematic.</p>
City Resilience	<p>When Wellington experiences a major earthquake event it is likely there will be a significant demand for aggregate for rebuilding. Having a quarry strategically located near the city improves the logistics for supply of this aggregate.</p>
Cost to Council: Loss of Royalty	<p>As owner of the quarry, the Council receives a royalty based on the sales from the quarry operators. This revenue is included in the Council’s current LTP.</p> <p>Without continued operation of the quarry this revenue source will not be available and therefore Council would need to increase rates to offset the revenue loss (or reduce services).</p>
Community Costs Transport costs and Loss of competition	<p>Quarry materials are costly to transport relative to their selling price. Cost increases significantly with distance travelled. If KPQ was not operating, the cost of transporting would be significant.</p> <p>With the loss of one of the three quarries in the Wellington region, it is also likely that prices would increase through loss of competitive pressure.</p> <p>The businesses of Downer and Allied Concrete (also lessees of Wellington City Council on the site) benefit from this arrangement as well. If these have higher input costs, there are flow-on effects for their viability or increased costs for customers.</p>
Cost to Council: As a purchaser of materials	<p>Council is a significant purchaser of quarry materials – through its funding for drainage, roading and other building projects requiring aggregates (including concrete). With increasing costs to the Community some of this will be passed onto to the Council in higher costs for its infrastructure projects.</p>

Note the potential costs/benefits we have assessed do not include the following factors:

- Economic effects from loss of jobs from quarrying or reduced economic ancillary activity (asphalt and concrete plants, or less building).
- Early closure of one of the other regional quarries if they cannot extract all their resource which could lead higher selling prices and transport costs regionally.
- Improvement in average selling price over time.
- Cleanfill revenues adding to Council's royalty returns.
- Higher costs leading to other projects not proceeding.
- Additional roading impacts on SH2 North of Ngauranga where an estimated additional 200 truck movements per day represent a 5% increase in heavy vehicles³ with consequent increase in congestion and additional environmental impact such as CO₂ emissions.

³ Based on transport volumes from NZTA "State Highway 2: Ngauranga to Te Marua, Programme Business Case August 2016" /

4. Rock Resource and Usable Tonnages

The following table details the rock tonnages available from the proposed utilisation of the South Face. The starting estimated resources is based on Ormiston Associates 2018 survey of the site and the final land forms of development. Blue and blue-brown greywacke is the highest quality rock and has a relatively high usability, allowing for processing losses and possible voids/errors in survey of 65%. There are limited uses for brown rock (generally other than as fill) and fault rock so their usability forecast is lower.

Table 4 Rock Volumes and Tonnages

Rock Type	Estimated Resource (Tonnes)	Usability estimate	Forecast usable resource
Blue greywacke	5,572,000	65%	3,621,800
Blue-brown greywacke	2,548,000	65%	1,656,200
Brown rock including some overburden	3,500,000	10%	350,000
Breccia Fault	920,000	50%	460,000
Total Recoverable (tonnes)	12,540,000		5,628,000

Notes to table

Tonnage demand	The projected demand and supply of material from KPQ
Resource Usage	This shows the material used from the North Face and then the South Face
North face remaining/South Face remaining	This is a count-down of remaining tonnes
Tonnage shortfall	If South Face is not developed this is the forecast shortfall (equates to the unmet demand)
Land Value Forecasts	These are the CBRE Valuations for the land, inflated over time
Regional Cost imposts	If there is no Plan Change this represents the additional costs for customers from transport and reduced competition
Direct WCC Costs	The loss of royalty and the direct costs of its share of construction for WCC projects

Assumptions included in the Financial Forecast

Assumption	Value
Resources	
Growth demand for quarry materials per annum 2018 - 2023 (stable after that - reaches max production capacity at site)	1.9%
North Face remaining resource (tonnes)	790,000 tonnes as at 2017/18 Currently this is estimated as about 600,000 tonnes
South Face Resource (tonnes) (See resources table)	5,628,000
Cost increase factors	
Additional transport cost per tonne @ \$0.80 per km at 15km from Belmont to Ngauranga. This is based on prior transport forecasts including recognising increased labour/fuel costs	\$12.00
Reduced competition resulting in an increase in average selling price	5%
Average selling price (this is based on total revenue over total tonnage).	\$19.00
Royalty payable to WCC	10%
Sales attributable to WCC direct/indirect	5%
Land Value	
CBRE Valuation for North Face (as at June 2016)	\$15,500,000
CBRE Valuation for South Face (as at June 2016 - they had 12 ha, adjusted to 5.5ha)	\$8,250,000
Price /\$m2 (CBRE Report \$243 as at June 2016, adjusted by CPI) – note this is higher than the values used for the valuations above but is provided for illustrative purposes	\$ 251
Land appreciation rate (CBRE Report "Base growth)	2.0%
Ground rent value (leasing)	8.0%
NPV	
Discount rate	4.5%
Land Areas	
North Face area (available for sale in 2024 if there is no South Face and in 2026 if the South Face is utilised)	8.0
South Face area (available in 2035/36)	5.5