PRISM
ECONOMICS AND ANALYSIS

Analyzing the Economic Benefits of the Upper's Quarry Construction & Operation

Prepared by Prism Economics and Analysis
for
Walker Aggregates

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Executive Summary

Walker Aggregates commissioned Prism Economics and Analysis to conduct an assessment on the economic benefits of constructing the Uppers Quarry, proposed to operate on a site within the City of Niagara Falls and adjacent to the City of Thorold. At Walker Aggregates' projected levels of production, the quarry is estimated to remain in operation for 40 to 50 years. The project will bring numerous economic benefits to the Niagara Region in the form of employment and increased municipal and provincial tax revenue directed to the community, including the school system in the Niagara Region, throughout the project's lifespan. The construction of a new quarry in the Region will also have indirect effects on general construction costs, as reduced transport costs for construction aggregate (sand, gravel, crushed stone etc.) will be reflected in the cost of aggregate as a building material.

Employment

- Employment estimates have been produced for site preparation and the quarry's lifespan post-construction. During site preparation and quarry construction, it is estimated that 84 person-years of employment will be generated directly, and 64 person-years of employment in support industries that manufacture materials used at Upper's Quarry.
- The project will also generate employment post-construction during the 40-50-year lifespan of the quarry. It is estimated that 20 full-time jobs will be required in Niagara Falls and 1 in Thorold from proximity to site, which include direct, indirect, and induced employment.
- Employment will also be generated in trucking, for the transportation of the construction aggregate. It is estimated that 9 trucking jobs will be created for the 40-50-year lifespan of Upper's Quarry; 7 in Niagara Falls and 2 in Thorold.
- In the City of Niagara Falls, wages and salaries for employment are projected to reach $1,770,000 annually (for construction aggregate production and trucking). In Thorold, wages and salaries are projected at $333,000 annually.
- Annual estimates of employer social contributions to pension and benefit plans are $238,000 in Niagara and $45,000 in Thorold.

City of Niagara Falls Revenue

- Property taxes will be paid to the City of Niagara Falls based on the assessed value of land, estimated at between $31,000 and $41,000 annually depending on the distribution of land classifications for the site.
- The City will also earn revenue from construction aggregate fees amounting to an average of $173,000 annually over the life of the project.

Niagara Region Revenue

- Property tax and waste management fees for the site will be paid to the Niagara Region, amounting to between $38,000 to $51,000 annually depending on the distribution of land classifications for the site.
- The Region will also earn revenue from construction aggregate fees amounting to an average of $43,000 annually over the life of the project.

Indirect Benefits

- Transportation costs make up a considerable portion of the price of construction aggregate. The location of the Upper's Quarry will be advantageous to the City of Niagara Falls given its close proximity to urban areas and associated infrastructure projected to grow and intensify. Lower

transportation costs will therefore be reflected in the cost of construction aggregate thereby reducing the overall cost of construction and increasing the feasibility of infrastructure projects and residential construction. The lower construction costs could also lead to less volatility in housing prices and municipal budgets.

Board of Education

- The City of Niagara Falls and the Niagara Region will indirectly benefit from property taxes paid to the School Board for education. Depending on the distribution of land classification for the site, this would provide between $17,000 and $26,000 annually.

Introduction

Prism Economics and Analysis has been commissioned by Walker Aggregates to conduct an economic benefits study on the construction and operation of Upper's Quarry in the City of Niagara. Upper's Quarry will benefit construction industries in the Region as a nearby source of construction aggregate, a material heavily used in the construction of roads, subways, and buildings. The project will also bring numerous economic benefits to the Niagara Region in the form of employment, increased municipal and provincial tax revenue directed to the community, and indirect effects on the cost of construction.

This study will measure the economic benefits for the duration of the project and will generate estimates of the following:

- Employment from site preparation and ongoing employment at the site;
- Contributions to tax revenues for the City of Niagara Falls and the Niagara Region from property tax revenues and aggregate license fees;
- Indirect benefits to the City of Niagara Falls and the Niagara Region due to reduced transportation costs reflected in the price of construction aggregate needed for construction projects;
- Indirect benefits for local boards of education through provincial tax revenue.

Quarry Construction Area

Upper's Quarry site is being proposed within the City of Niagara Falls. The proposed quarry site is 106.3 hectares, with the addition of other lands owned by Walker Properties amounting to 31.6 hectares, a portion of which will be used for compensation planting.

In terms of overall output, the estimated lifespan of the quarry is projected to be between 40 and 50 years, with an estimated total tonnage to be extracted of between 60 and 70 million tonnes. This analysis assumes an annual average production of roughly 1.3 million tonnes based on conservative assumptions of total production. Annual production in aggregate can vary based on economic considerations, external spending decisions and other factors but the maximum annual tonnage limit proposed for the quarry is 1.8 million tonnes. This output is unrelated to other sites in the region which may close or open over the lifetime of the project and oare outside The proposed maximum asphalt production limit is 400,000 tonnes per year. This analysis does not include closure and rehabilitation costs.

Employment Impact of the Proposed Upper's Quarry

Employment will be generated during the site preparation phase, and permanent jobs will be in place during the lifespan of the quarry.

Site Preparation

Assuming a rate of return of 10 percent on capital costs, construction expenditures for this project will come to approximately $23 million. Direct employment generated from quarry construction is primarily in the construction industry, while indirect employment will be generated in other support industries, such as the manufacturing of materials and equipment used at the site.

Based on capital expenditures required for the site, it is expected that 84 person-years of direct employment will be generated at the quarry and 64 person-years of employment in support industries that manufacture materials and equipment used at the quarry. One "person year" is the amount of work that could be completed by one person in a working year. Additional workers in other services like accountants, lawyers, and marketing, are not included in this analysis as our main focus is on the economic benefits to the City of Niagara Falls and the Niagara Region, while these office staff are not necessarily confined to working in the Niagara Region.

Table 1: Employment Estimates Generated from Site Preparation

Employment Generated	***Direct***	***Indirect***
Rate (Per Million):	3.625	2.75
Total Employment:	84	64

Source: Estimates by Prism Economics and Analysis

Ongoing Employment

The construction of Upper's Quarry will result in continuous employment in both the City of Niagara Falls and the City of Thorold. Economic multipliers calculated from Statistics Canada's Supply-Use tables were applied to revenue projections, to provide estimates for employment and wages. Those multipliers calculate Provincial impacts; a base analysis was further performed on the impact estimate at the 4-digit NAICS level in order to define the size of regional capture of those effects. From the site production of the aggregate and asphalt itself, it is expected that 20 jobs will be generated in Niagara Falls; 12 of which will be created directly on-site, and 8 from support industries and increased economic activity in the region due to employee wages. In the City of Thorold, 1 continuous job will be created in support industries or the general job market from increased economic activity. Off-site employment in overhead positions related to the quarry are not considered in this analysis, but typically account for between 12 and 20 percent of overall employment in the industry.

Transportation makes up a significant portion of construction aggregate costs. We estimate that 9 trucking jobs will also be created for the proposed Upper's Quarry: seven in the Niagara Falls and two trucking jobs created in Thorold.

Table 2: Employment Estimates Generated from Ongoing Operations

City	**Direct**	**Indirect and Induced**	**Trucking**
Niagara Falls	12	8	7
Thorold	0	1	2

Source: Estimates by Prism Economics and Analysis

Employment Income

Estimated total direct wages and salaries amount to $5,450,000, with employer social contributions (pension and benefit plans) of $700,000 during the period of construction.

Total direct wages and salaries for on-site operations and trucking are estimated to be $1,770,000 annually for employment in the City of Niagara Falls and $333,000 annually for employment in the City Thorold over the full 40 to 50-year lifespan of the project. Employer social contributions over this period are estimated at $238,000 and $45,000 annually for Niagara Falls and Thorold respectively. These figures include employer contributions to pension funds, workers' compensation funds, and health insurance plans.

Tax Revenue

Upper's Quarry will provide much needed revenue for the City of Niagara Falls, primarily in the form of property taxes and construction aggregate license fees. Industrial land value is estimated based on an average of comparable sites in Southern Ontario of $11,088 per acre. This would set the maximum (high-impact) land value of the site (assuming 100% industrial) at roughly $2.9 million, although in practice sites are valued at a mix of industrial (for the extraction area), residential (around the extraction area), and farmland. An alternative (low-impact) scenario is presented here for comparison where the property is designated 60% industrial and 40% residential. Note that the existence of a residential buffer effectively removes consideration of the impact of the project on existing residential property valuations in the area, since these are only considered for properties that are "directly and immediately contiguous, physically touching, or sharing a common boundary line" with a newly defined industrial zone.

Municipal property taxes

Municipal property tax rates in 2022 ranged from 1.40% for industrial land to 0.53% for residential annually. Using the estimate of assessed value, municipal taxes paid to the City of Niagara Falls for the site would range from between $31,000 annually in the low-impact scenario to $41,000 annually in the high-impact scenario over the 40 to 50-year lifespan.

Aggregate License Fee

Upper's Quarry will also contribute to City revenue through construction aggregate license fees. In 2022, the fee is $0.213 per tonne of aggregate. Nearly two thirds (61 percent) of these fees are directed to the local municipality, averaging $173,000 annually over the quarry's 40 to 50-year lifespan.

Niagara Region Revenue

Upper's Quarry will generate revenue for the Niagara Region, benefiting both the City of Thorold and Niagara Falls through the collection of regional property taxes and license fees for the duration of the project. Regional property tax rates in 2022 (including waste management fees) ranged from 1.74% for industrial land to 0.66% for residential annually.

Regional Property Taxes

As stated previously, the estimated assessed value of the property is $2,912,419. This would have the Upper's Quarry project generating (using 2022 property tax rates) between $38,000 and $51,000 annually over a period of 40 to 50 years, depending on the distribution of industrial and residential classification over the site lands.

Table 3: Property Tax Revenues

Recipient of Fee	**Baseline Scenario Annual Tax Amount**	**Low-Impact Scenario Annual Tax Amount**	**High-Impact Scenario Annual Tax Amount**
City of Niagara Falls	$3,879	$31,000	$41,000
Niagara Region	$4,808	$38,000	$51,000
Education	$1,114	$17,000	$26,000

Source: Estimates by Prism Economics and Analysis

Aggregate Licence Fee

Of the $0.213 per tonne of aggregate licence fee, 15 percent is directed to the Niagara Region and 61 percent to Niagara Falls. On average, $173,000 will be generated for Niagara Falls and $43,000 for the Niagara Region annually over 40 to 50 years from the aggregate produced.

Table 4: Aggregate License Fee Revenue

	License Fee Share	**Total Annual Fee**
Aggregate Resources Trust	3%	$9,000
Niagara Falls	61%	$173,000
Niagara Region	15%	$43,000
Ontario	21%	$60,000

Source: Estimates generated by Prism Economics and Analysis

Indirect Financial benefits for the City of Niagara Falls and Niagara region

Geographic Location & Proximity

Transportation costs make up a large portion of the cost of construction aggregate. Based on the 2017 Supply Use tables for Ontario, transportation accounted for 11% of sand and gravel costs for the road construction industry. Based on an analysis of data from the Canadian Freight Analysis Framework, the estimated marginal cost in Ontario of shipping one tonne of minerals by truck an additional kilometre was $0.08 in 2016. This matches with the results of a detailed study published by the Ontario Stone, Sand, and Gravel Association ("OSSGA") identified a per-trip cost of $2.77 plus $0.09 per kilometre travelled in 2019. The nearest quarries to the City of Niagara Falls currently are between 22km and 38km away from the city centre. The proposed location for Upper's Quarry is considerably closer, just 9km away, requiring between $1.04 to $2.32 less per ton in transportation costs to the city centre from the next nearest source in 2016 dollars. This creates the potential to significantly lower the cost of construction projects in the City of Niagara Falls and the Niagara Region.

Boards of Education

Property taxes generated from Upper's Quarry will contribute indirectly to local schools in the region. Education property tax rates in 2022 are approximately 0.88% for industrial land and 0.15% for residential. Estimated contributions education from this project range from $17,000 annually to $26,000 annually over the 40 to 50-year project lifespan depending on the distribution of industrial and residential classification over the site lands.

Conclusion

Prism Economics and Analysis conducted an economic benefits study on the construction and operation of Upper's Quarry, a project that is proposed in the Niagara Region. The analysis generated estimates for employment (direct and indirect), municipal tax revenues and license fees, transportation, and provincial revenues for education.

Total project revenue estimates from the construction of the Uppers Quarry are as follows:

- City of Niagara Falls: between $31,000 and $41,000 annually over a period of 40 to 50 years
- Niagara Region: between $38,000 and $51,000 annually over a period of 40 to 50 years

Upper's Quarry is estimated to create 84 person years of direct employment throughout construction and provide ongoing employment totaling 30 jobs.

Indirect benefits to the City of Niagara Falls and Niagara Region include reduced transportation distances due to the closer geographic proximity of Upper's Quarry, and provincial taxes generated from project that will be directed to education, including schools located in the Region.

Prepared by Prism Economics and Analysis for Walker Aggregates

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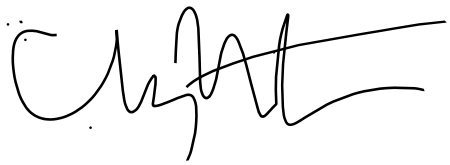

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PRISM ECONOMICS AND ANALYSIS

CHEYENNE MARTIN

OVERVIEW

Economist with 20 years of experience specializing on economic modelling, analysis, and impact assessment. Recent quantitative work includes forecasting national and sub-regional trends in demographics and labour markets and how they intersect with specific industries, neighbourhood-level housing market forecasts, and a multi-dimensional analysis of the impact of affordable housing investment in Nunavut. Extensive experience with analyzing labour markets, the socio-economic effects of major resource projects, and policy development with a deep personal interest in how all of these areas intersect with Indigenous communities.

WORK HISTORY

PRISM ECONOMICS AND ANALYSIS, Toronto, ON
Partner (Present), Managing Consultant (2016 – 2020)

- Project lead for Prism on economic studies including: defining and forecasting labour market for environmental employment using textual analysis of online job postings; a comprehensive inventory and stochastic forecast of Ottawa's rental housing market; an analysis of the socio-economic impact of affordable housing investment in Nunavut; a Bayesian tourism impact assessment tool for Bruce County.
- Quantitative/modelling lead on multiple large dataset projects including: developing a comprehensive database of financial data relating to Indigenous governments; development of the CANTRAQ apprenticeship forecasting model; labour supply modelling for FPHRC; Quantitative analyst on housing and labour market policy analyses.
- Economist focusing on economic impact assessment, policy development/evaluation and industry/strategic analysis. Recent analytical projects include analysis of the impact of apprenticeship ratios on training outcomes for OCOT and the development of affordable housing benchmarks for CMHC. Areas of policy focus include housing, infrastructure, energy, Indigenous inclusion, and innovation.

CHEYENNE ECONOMICS, Toronto, ON
President (Present), Consulting Economist (2016)

- Developed a stochastic estimate of financial risk arising from the introduction of carbon pricing on INAC expenditures nationally (electricity, heating and transportation) and the economic effects of the introduction of cap-and-trade on the Ontario economy with EnviroEconomics.
- Performed business, strategic and financial risk assessments as part of the due diligence process for a proposed purchase of the Hudson Bay Railroad and Port of Churchill with Castlemain Group.

GOLDER ASSOCIATES, Toronto, ON
Senior Socio-Economic Specialist (2014 - 2015)

- Socio-economist focusing on financial valuation services, quantitative risk management, socio-economic effects management and assessment.
- Performed stochastic financial analyses, including developing measures of risk- adjusted ROI

analyses of adaptive measures based on climate change modelling for Glencorp and Vale incorporating approaches from Golder's transportation infrastructure quantitative project risk assessment methodology.
- Developed scenario analyses detailing the sectoral economic effects of a cap-and- trade regime on the Ontario economy for the Canadian Steel Producers Association and Canadian Vehicle Manufacturers Association.
- Performed scenario-based social and financial cost-benefit analyses for multiple clients including the MOECC on waste diversion programs.
- Managed multi-disciplinary and multi-region teams for projects and proposals.
- Presenter (conference and client) on social licence risks for major infrastructure projects, particularly as they intersect with Indigenous communities.

AMEC ENVIRONMENT & INFRASTRUCTURE, Mississauga, ON
Economist and Aboriginal Business Specialist (2011 - 2014)

- Economist focusing on socio-economic effects analysis), baseline assessment and labour market analysis, with specialized responsibilities concerning social risk assessment and management, Aboriginal engagement and business development.
- Led the economic impact analysis for multiple mining projects, including those for IAMGOLD's Côte Lake Project and New Gold's Rainy River Project.
- Wrote socio-economic effects assessments for Goldcorp, Western Copper and Gold, others.
- Performed labour studies and helped develop socio-economic effects monitoring programs.
- Led focus groups and performed primary research into barriers facing Aboriginal learners for the Council of Ontario Universities.
- Managed multi-disciplinary and multi-region teams for projects and proposals.

KEWIN CONSULTING, Toronto, ON
Managing Consultant (2010 - 2011)

- Management consultant focusing on financial and economic analysis for a firm focusing on the needs of Aboriginal organizations, businesses and governments.
- Services performed included business plan development, resource industry consultation, institutional engineering, restructuring, and change management.

EDUCATION

MBA Strategic Management, Schulich School of Business, Toronto, 2010

MA Economics, University of Toronto, Toronto, 2007

BA Economics (Specialist) and East Asian Studies (Major), University of Toronto, Toronto, 1997