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# Dimension Stone

## Limestone Investment Package

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Jamaica's Limestone Industry  
Value Chain Development Project

Prepared by PricewaterhouseCoopers



June 2020

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# 1.0 Executive Summary

## Overview

Limestone is the largest mineral resource possessed by Jamaica and is an essential raw material for multiple industries such as steel, cement, agriculture, pharmaceutical and construction. It is estimated that there are over 150 billion metric tonnes in limestone reserves in Jamaica of which 50 billion metric tonnes are deemed recoverable. A significant portion of these reserves are of high purity limestone, which is defined by a high concentration (i.e. 95% to 98%) of calcium carbonate.

In Jamaica, the production of limestone is supported by one hundred and forty-six licenced mining and quarry operators situated in all parishes across the island. Over the past four years, the country's production has been increasing. Approximately 10% of extracted limestone is exported, while the remaining 90% is consumed domestically and the total value of limestone exports from Jamaica is just above 1% of the total value of limestone imported in the nearby regions. Although Jamaican limestone is used primarily as construction material and road base, limestone can be utilised in a wide range of sectors. The high value of import in prominent markets in North America, South America and the CARICOM region presents an opportunity for Jamaica to enter the value-added market of limestone which is significant in terms of value.

## Why Jamaica?

The Government of Jamaica (GoJ), in its 'Vision 2030 Jamaica' document, has identified Mining and Quarrying as one of the key and strategic sectors to achieve its vision to make Jamaica a developed nation by 2030. The GoJ has secured funding from the World Bank to finance a project entitled Foundations for Competitiveness and Growth Project (FCGP) that is designed to enable private sector-led growth in the Jamaican economy, in an inclusive and sustainable way.

The limestone industry in regions near to Jamaica, namely CARICOM, North and South America has been primarily driven by the growth in construction activities in the residential and commercial building sectors and other infrastructure developments. In addition, low, stable economic growth, infrastructure development, increasing populations and rising disposable incomes have further increased the demand for value-added limestone products across sectors. The central location of Jamaica provides a strategic advantage where it is closer to the import destinations as compared to the countries from which limestone is currently imported. Other important indicators of the need for the development of Jamaica's value-added limestone industry and other key success factors are highlighted in the table below.

**Table 1: Jamaica's limestone value-added success factors**

The Value-Added Opportunity	Sustainable Growth Factors
<ul style="list-style-type: none"><li>Jamaica has large quantities of limestone reserves and high-purity limestone.</li><li>The export market for limestone as well as value-added products has been growing and there is opportunity for the development of higher products for export globally.</li></ul>	<ul style="list-style-type: none"><li>Increasing stability in the region</li><li>Increasing transparency both in governments and local authorities</li><li>Inflation stability</li><li>Decreasing unemployment levels</li></ul>

The Value-Added Opportunity	Sustainable Growth Factors
<ul style="list-style-type: none"> <li>Increased growth in limestone consumption in the Americas region presents an opportunity for Jamaica.</li> <li>The cost of labour in Jamaica represent one of the lowest in the Americas for accounting to the IDB Labour market division.</li> <li>Various trade agreements exist between Jamaica and the Caribbean and developed nations with growing demand such as the USA, Canada and the European Union (EU).</li> </ul>	<ul style="list-style-type: none"> <li>Strong relationship with international development partners</li> <li>Increasing access to regional and world markets</li> <li>Jamaica's geographic location makes it is strategically placed to become a regional player in transshipment. Kingston Port has been predicted to become region's biggest transshipment hub.</li> <li>Growth is being driven by a more stable and increasing income and lower debt levels</li> </ul>

## Product Overview

Limestone has many industrial uses and can be processed into a wide variety of products. It is used as a filler in a variety of products, including paper, plastic and paint. The purest limestone is used in food and medicines such as breakfast cereals and calcium pills. Limestone is also the raw material for making lime (CaO) and has many additional uses in the chemical manufacturing industries. Value-added limestone products such as Calcium Carbonate (i.e. Ground Calcium Carbonate (GCC) and Precipitated Calcium Carbonate (PCC)), Lime (Quicklime, Slaked Lime and Hydraulic Lime), Dimension Stones (i.e. aggregates, stones, blocks.) and Cultured Marble are used across industries.

This Information package focuses on Dimension Stone.

**Table 2: Summary of Dimension Stone**

Product	Description	Application/Industries
<b>Dimension Stone</b>	<p>Dimension Stone is natural stone or rock that has been selected, cut and finished depending on its application in the construction industry.</p> <p>Dimension Stone is used for its resistance to weather or its aesthetic appeal in buildings, walls and decorative purposes.</p>	<ul style="list-style-type: none"> <li>Building</li> <li>Construction</li> <li>Decoration</li> </ul>

## Financial Highlight

An assessment of the valued-added production for Dimension Stone in Jamaica indicates that for a total production of 30,000 tonnes per annum, an investment in this product could be financially feasible. The analysis was conducted under two scenarios,

- I. On a standalone (start-up) basis and
- II. an incremental basis.

On an indicative basis, the internal rate of return (IRR) could range from 4.8% to 30.3% and net present value (NPV) range from US\$5.4M to US\$7.3M on a standalone and incremental basis respectively.

## 2.0 Introduction and Overview

### The Jamaican Context

It is estimated that Jamaica has over 150 billion metric tonnes in limestone resources of which 50 billion metric tonnes are deemed recoverable. Over the past four years, the country's production has been increasing. Limestone is the largest mineral resource possessed by Jamaica and is an essential raw material for other industries such as steel, building and cement, agriculture and paper and pulp. It is usually extracted in open pits and predominantly used as a construction material and road base. The production of limestone is supported by one hundred and forty-six licenced mining and quarry operators situated in all parishes across the island.

As of 2019, Jamaica is exporting limestone valued at US\$4.0m per annum. The total existing export market in the region (Americas and CARICOM) stands at US\$300 million and is expected to grow by at least US\$7 million every year. The annual increase in limestone import in the nearby region is itself double the value of the existing export market of Jamaica.

### The Limestone Value-Added Opportunity

Despite the vast quantity of limestone reserves and the large number of quarries operating in the island, the industry remains largely underdeveloped as many of the quarries operate under capacity, and the sector lacks financing. Approximately 10% of extracted limestone is exported while the remaining 90% of the production is used to meet local demand. Exports are directed to the USA, South America, Canada, and CARICOM. More importantly, the value of limestone exported from Jamaica is slightly above 1% of the total value of limestone import in the nearby regions.

A large proportion of Jamaica's limestone is considered to be "high purity" due to its concentration of calcium carbonate (<95%-98%). Geographical studies conducted on limestone deposits in Jamaica reveal large deposits of reserves in the parishes of Portland, St. Elizabeth and Trelawny, with high to very high purity limestone, as shown in Table 3 below, suitable for end use in multiple industries from construction to pharmaceuticals.

**Table 3: Quality of limestone in Jamaica**

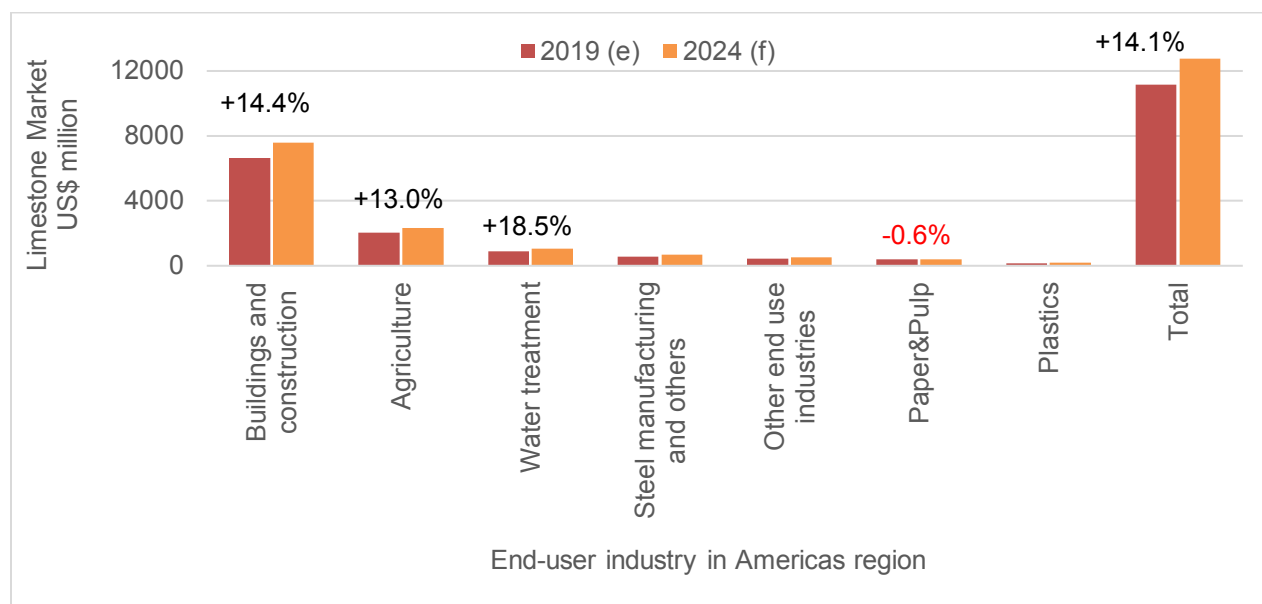
	Portland (Average)	Trelawny (Average)	St. Elizabeth (Average)
<b>Calcium Carbonate, CaCO<sub>3</sub> (%)</b>	>99	>99	>98
<b>Magnesia, MgO (%)</b>	~0.60	~0.2	~0.3
<b>Silica, SiO<sub>2</sub> (%)</b>	<0.20	0.50	<0.20
<b>Iron oxide, Fe<sub>2</sub>O<sub>3</sub> (%)</b>	<0.10	0.05	0.20
<b>Aluminium Oxide Al<sub>2</sub>O<sub>3</sub> (%)</b>	<0.10	<0.15	0.35

Source: PwC Research, MGD reports

Limestone is used in a wide variety of applications depending on whether it is crushed, ground or is converted to lime. These include construction materials, water treatment, food & beverage, pharmaceuticals, iron & steel, agriculture, plastics and paper. In the Americas region, all the end use sectors are set to grow with a Compound Annual Growth Rate (CAGR) in double digit value terms with an

exception of the paper and pulp industry which is expected to see a reduction in demand. The key end-use industries of limestone are collectively set to grow by 14.1% between 2019 and 2024.

**Figure 1: Limestone end-use industry consumption in the Americas region**



Source: Mordor Intelligence; e: estimated, f: forecasted

## Global Trends

The global limestone market exceeded US\$5.7 billion in 2017 and is estimated to surpass US\$9 billion while growing at a CAGR of 6.5% over the period of 2019 to 2024. This growth is primarily due to an increase in consumption in iron & steel processing, building & construction and agricultural industries. As per International Trade Centre (ITC) Trademap statistics, the total quantity of limestone exported across the world in 2018 increased by 10 million tonnes from 47 million tonnes to 57 million tonnes.

## Top Exporters and Importers of Limestone in 2018

As shown in Table 4, the five largest limestone exporters in 2018 were United Arab Emirates, Japan, India, Oman and Turkey. These countries represent 72% of world production.

**Table 4: Top Limestone Exporters**

Rank	Exporters	Quantity Exported in 2018 (Million Tonnes)	Percentage of Global Export by Quantity	Export Value in 2018 Million US\$
1	United Arab Emirates	24.53	44.3%	229.90
2	Japan	5.15	9.3%	52.28
3	India	3.30	6%	61.55
4	Oman	2.95	5.3%	66.86
5	Turkey	2.60	4.7%	6.72

Source: ITC calculations based on UN COMTRADE and ITC statistics (accessed on March 24, 2020)

As shown in Table 5, the five largest limestone importers in 2018 were India, Germany, Bangladesh, Taiwan and Kuwait.

**Table 5: Top Limestone Importers**

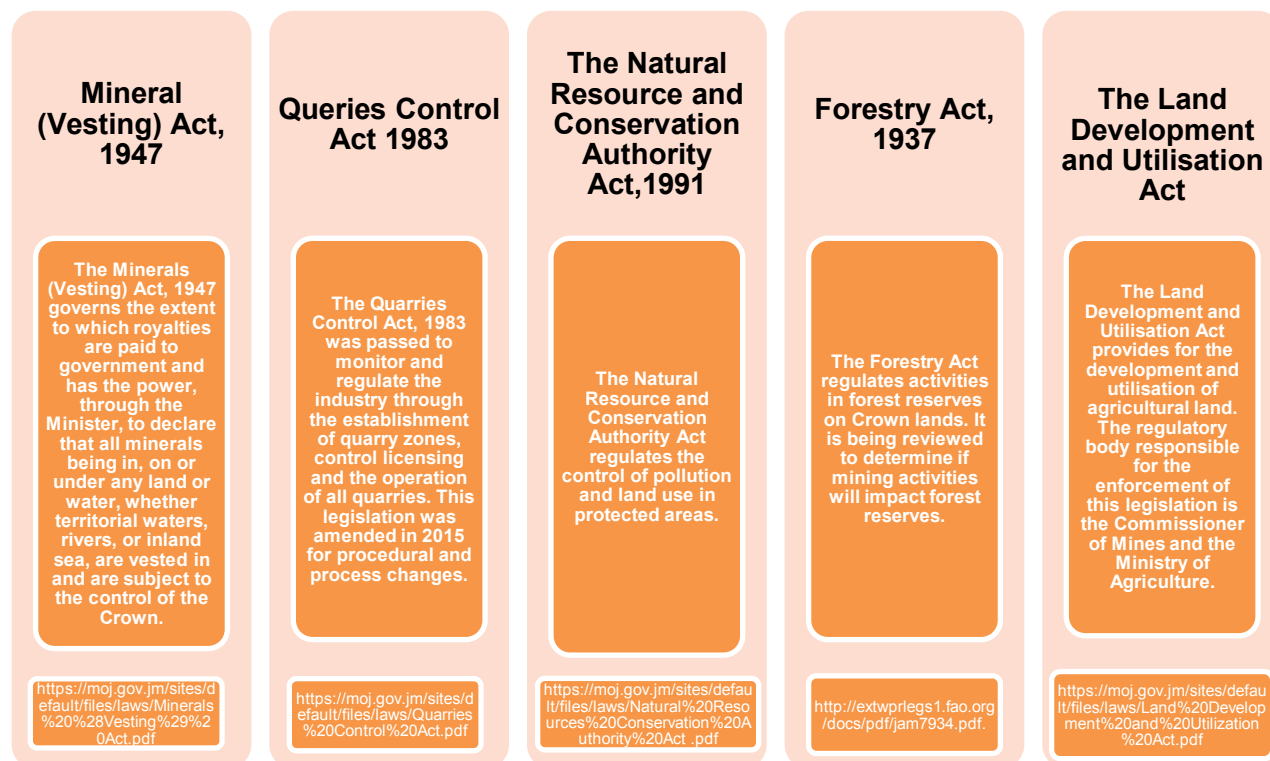
Rank	Importers	Quantity Imported in 2018 (Million Tonnes)	Percentage of Global Import by quantity	Import Value in 2018 Million US\$
1	India	22.85	39.6%	453.63
2	Germany	3.65	6.3%	43.11
3	Bangladesh	3.61	6.3%	43.23
4	Taiwan	3.21	5.6%	64.38
5	Kuwait	2.94	5.1%	31.74

Source: ITC calculations based on UN COMTRADE and ITC statistics (accessed on March 24, 2020)

## Regulatory Environment

The main legislation / regulations that impact the mining and quarrying industry in Jamaica include:

**Figure 2: Jamaica regulations for Mining & Quarrying**



According to the Minerals Policy, the GoJ has separated its regulatory role through the Ministry of Transport and Mining (MTM) and its ownership in the mining industry and its operations through the Jamaica Bauxite Mining Limited (JBM) and Clarendon Alumina Production Limited (CAP). The Ministry's main responsibilities are the overall policy responsibility and development of the industry. The Mines and



Geology Division (MGD) has statutory authority under the Mining Act and the Quarries Control Act to exercise general supervision over all prospecting, mining and quarrying operations throughout the island. The MGD also manages the investigation, characterisation, documentation and release of information on all aspects on the geology of Jamaica.

## Investing in Jamaica

As an emerging market Jamaica relies on foreign direct investment (FDI) to spur its growth and international competitiveness. Jamaica has welcomed FDI as a major part of the development of several industries. In 2018 the inflow of FDI to Jamaica valued approximately USD\$ 775 million. The ability to conduct business efficiently has been improving over the past 10 years. Jamaica’s ease of doing business current ranking improved to 71 in 2019 from 75 in 2018, according to the latest World Bank annual ratings, Jamaica is ranked 71 among 190 economies.

The Jamaican economy provides many benefits to foreign investors such as stable and positive economic growth and improved competitiveness in the region. Jamaica also boasts a strategic geographic location, stable democracy, a relatively large English-speaking market and access to major shipping paths such as the Panama Canal.

The limestone industry in the region is driven by construction in the residential and commercial building sectors and other infrastructural development. As the region continues to grow with the increased population, rising disposable incomes and continued infrastructural development the demand for value-added products across sectors is expected to rise.

With billions of limestone reserves and the strategic advantage of being closer than most import destinations such as India and Japan, Jamaica’s value-added limestone industry is uniquely positioned to tap into the growing market. Table 6 below highlights the position of the market and other key success factors of limestone value-added production.

**Table 6: Investing in Jamaica Limestone - The Opportunity**

The Value-Added Opportunity	Sustainable Growth Factors
<ul style="list-style-type: none"> <li>• Jamaica has large quantities of limestone reserves and high-purity limestone.</li> <li>• The export market for limestone as well as value-added products has been growing and there is opportunity for the development of higher products for export globally.</li> <li>• Increased growth in limestone consumption in the Americas region presents an opportunity for Jamaica.</li> <li>• The cost of labour in Jamaica represent one of the lowest in the Americas for accounting to the IDB Labour market division.</li> <li>• Various trade agreements exist between Jamaica and the Caribbean and developed nations with growing demand such as the USA, Canada and the European Union (EU).</li> </ul>	<ul style="list-style-type: none"> <li>• Increasing stability in the region</li> <li>• Increasing transparency both in governments and local authorities</li> <li>• Inflation stability</li> <li>• Decreasing unemployment levels</li> <li>• Strong relationship with international development partners</li> <li>• Increasing access to regional and world markets</li> <li>• Jamaica’s geographic location makes it is strategically placed to become a regional player in transshipment. Kingston Port has been predicted to become region's biggest transshipment hub.</li> <li>• Growth is being driven by a more stable and increasing income and lower debt levels</li> </ul>

## Economic Profile

Jamaica has a mixed economy that is heavily reliant on services. Approximately 70% of the country's Gross Domestic Product (GDP) is derived from services, and most of its foreign exchange comes from tourism, remittances, and bauxite/alumina exports. Over the last decade, Jamaica's GDP (at market price) has grown by 88%. The country's GDP for FY2019 stood at JM\$ 2,053 bn, representing an increase of about 6.5% over FY 2018.

High public service debt obligation and vulnerability to frequent natural disasters are the key concerns to the macroeconomic stability of the island. In terms of the public service debt obligation to GDP, Jamaica was previously at 147% of GDP. In 2019 Jamaica successfully completed its economic reform programme supported by the International Monetary Fund (IMF) and through the programme the debt obligation to GDP ratio fell to 94%. This indicates strong political will and a strong future of economic growth and development.

**Table 7: Key economic indicators for Jamaica**

Indicator	FY 2016	FY 2017	FY 2018	FY 2019
<b>Total Gross Domestic Product at Market Prices (JM\$ million)</b>	1,688,754	1,787,954	1,927,202	2,053,185
<b>Mining &amp; Quarrying sector contribution to the GDP (JM\$ million)</b>	32,845	35,246	46,852	60,573
<b>Central government gross debt (JM\$ million)</b>	2,068,760	2,158,846	2,028,154	1,998,668
<b>Gross Debt to gross GDP (%)</b>	123%	121%	105%	94%
<b>Interest rates (Domestic currency, %)</b>	3.51%	3.75%	2.85%	2.51%
<b>Interest rates (Foreign currency, %)</b>	1.65%	2.07%	1.90%	1.83%
<b>Exchange rate (US\$ to JM\$)</b>	118.75	127.13	127.99	130.60

Source: Statin, Bank of Jamaica

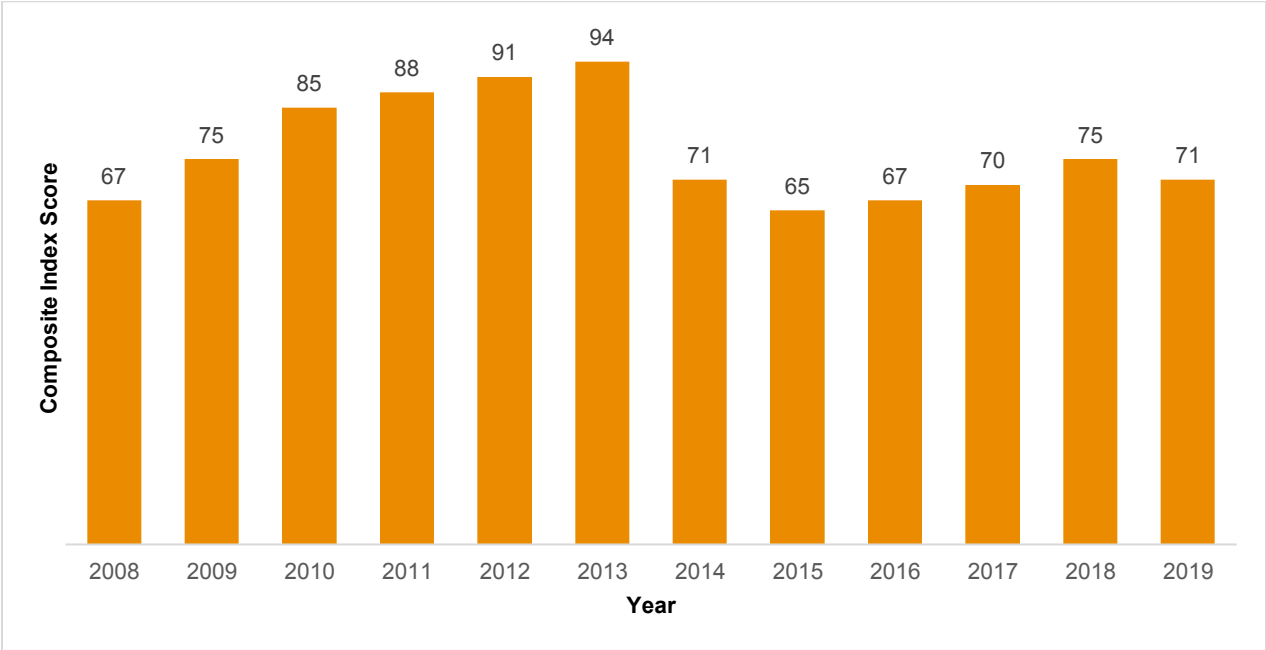
**Table 8: Jamaica's credit rating by leading Credit Rating Agencies (CRA)**

No.	CRA	Rating	Outlook	Date (as of)	Remarks on CRAs' ratings
1	Fitch	B+	Positive	January 29, 2020	For Fitch, a bond is considered investment grade if its credit rating is BBB- or higher. Bonds rated BB+ and below are speculative grade, sometimes also referred to as "junk" bonds.
2	Moody's	B2	Stable	December 11, 2019	For Moody's, a bond is considered investment grade if its credit rating is Baa3 or higher. Bonds rated Ba1 and below are speculative grade, sometimes also referred to as "junk" bonds.
3	Standard and Poor's (S&P)	B+	Stable	September 27, 2019	For S&P, a bond is considered investment grade if its credit rating is BBB- or higher. Bonds rated BB+ and below are speculative grade, sometimes also referred to as "junk" bonds.

### Investor Friendly Reforms

Jamaica has been trying to attract investors to the island through business-friendly reforms. Since 2013, Jamaica’s Parliament passed numerous pieces of legislation to improve the business environment and support economic growth through a simplified tax system and broadened tax base. This has allowed improvement in Jamaica’s Doing Business Ranking as depicted in the figure below.

Figure 3: Jamaica’s historical Ease of Doing Business ranking

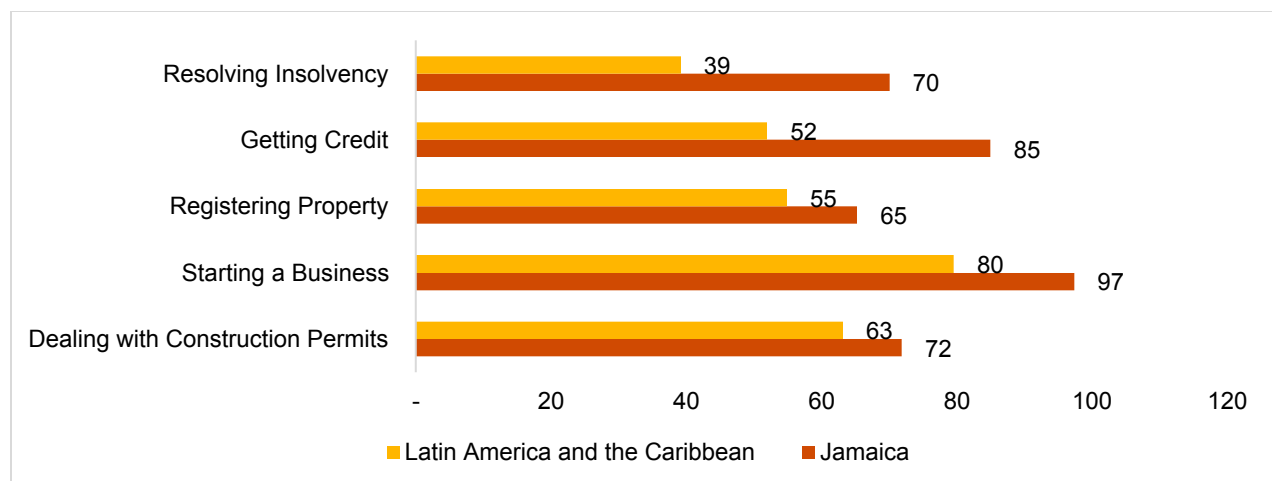


Source: The World Bank

The establishment of credit bureaus and a Collateral Registry under the Secured Interest in Personal Property (SIPP) legislation are improving access to credit. Jamaica made starting a business more streamlined by consolidating forms and made electricity less expensive by reducing the cost of external connection works. The GoJ is also open to foreign investment in all sectors of its economy and is currently in the process of developing a National Investment Policy to guide future FDI reform.

The graph below compares Jamaica’s ranking in key doing business ranking factors within the region. Compared to the region, it is clear Jamaica has made significant gains in absolute terms, and there are further reforms currently in the works including process re-engineering for construction permits, as well as reforms around decreasing the length of time it takes to gain an electrical connection. Taken together, this demonstrates a focus on creating a further business-friendly environment in Jamaica.

**Figure 4: Doing Business Indicators in Jamaica compared to the Latin America and Caribbean Region**



Source: The World Bank

## Enabling Environment

The Government of Jamaica provides vast support for the development and expansion of the sector, including:

- Incentives to investors including income tax relief, duty concessions on production-related imports
- Introduction of online registration for importers and exporters that allows access to all trade related agencies
- Provision of information on commerce and industry such as information on product marketing, trade statistics and government incentives
- Large scale improvements to the transport infrastructure and services

## Taxation Environment

The incentive regime came into effect in Jamaica on January 1, 2014 and provides for varying levels of relief, via the following legislation:

**Table 9: Key Legislations to Consider when Doing Business in Jamaica**

Key Legislation	Summary
1 The Fiscal Incentives (Miscellaneous Provisions) Act, 2013	<p>The standard tax rate is 25% for non-regulated entities. This Act provides for:</p> <ul style="list-style-type: none"> <li>• the reduction of the effective corporate income tax rate by applying an Employment Tax Credit (ETC) at a maximum value of 30%, which reduces income tax from standard rate 25% for unincorporated company to an effective tax rate of 17.5%</li> <li>• Capital Allowances that cover, among other things, a broadened definition of 'industrial buildings' to include Duty-free Importation of Equipment and Machinery, as well as revised tariff rates ranging from 0% to no higher than 20% (with some exceptions).</li> </ul>

Key Legislation	Summary
	If designated as SEZ Reduced income tax from standard rate 12.5% for unincorporated company to an effective tax rate of 7.5% or 0%
2 The Income Tax Relief (Large Scale Projects and Pioneer Industries) Act, 2013	This provides for an improved and more attractive rate of income tax for projects that are considered to be large scale or of a pioneer nature. As of the date of this investment package the related regulations regarding how this benefit will be administered have not yet been promulgated.
3 The Customs Tariff (Revisions) (Amendment) Resolution, 2013	This Act provides for the duty-free importation of capital equipment and raw material.
4 The Stamp Duty (Amendment of Schedule) Order 2013	Provides stamp duty exemption on raw materials and non-consumer goods.

The above acts provide relief through tax credits, duty-free importation, stamp duty exemptions and capital allowances as it relates to specific industrial buildings. With the development of new manufacturing plants to process the limestone into value added products, the limestone industry can draw on these acts to mitigate the costs associated with manufacturing. Particularly, the income tax relief will improve profits and the customs tariff resolution will significantly reduce the heavy charges that are accompanied with importation of capital equipment.

## Special Economic Zones

The Jamaica Special Economic Zone Authority (JSEZA) was created to implement and manage special economic zones within Jamaica. These zones are areas in which the regulations of the country do not apply or are modified to allow for increased investment, employment and job creation.

Under the SEZ Act, many reforms were introduced. Under the previous free zone regime, manufacturing entities were only allowed to supply up to 15% of production locally. Entities under the SEZ are now able to sell goods both locally and for export with no restrictions. It can be noted however that the JSEZA highly prefers exportation of locally produced goods. The SEZ also provides a number of additional tax benefits and incentives which includes a 12.5% reduction in income tax, no General Consumption Tax (GCT) on electricity and telephone services and stamp duty relief.

### ***Implications for the Limestone Industry***

Although an SEZ cannot be applied to mining and quarrying operations they can be applied to manufacturing and other related industries which would provide support for value-added products. JSEZA highly recommends Single or Multi-Occupancy for this purpose; however, there must be a clear separation of business from mining. The limestone industry can seize the opportunity offered by SEZ legislation to become Multi-Occupancy by setting up a Special Purpose Vehicle (SPV) for value-added products that they plan to market or export.

JSEZA has also introduced a business centre to facilitate quick application processing for prospective SEZs. Provided that the required regulations and licences are approved by the respective authorities the timeline for an application review is at least forty-five (45) days, with a pre-approval timeline of approximately thirty (30) days.

## Trade Agreements

Jamaica has negotiated trade agreements with the world's major trading powers such as the European Union, Canada, and the United States, as well as in our important domestic CARICOM markets. These trade pacts provide a range of opportunities for Jamaican exporters. The main trade agreements that Jamaica is party to include:

### Figure 5: Summary of Key Trade Agreements

<b>The European Partnership Agreement</b>
<ul style="list-style-type: none"><li>• The accords immediate duty-free/quota-free market access for CARIFORUM goods into the EU except sugar.</li></ul>
<b>Caribbean Basin Initiative (CBI)</b>
<ul style="list-style-type: none"><li>• The CBI comprises the Caribbean Basin Economic Recovery Act of 1983 (CBERA) and the Caribbean Basin Trade Partnership Act of 2000 (CBPTA). The CBI Act was established by the US in 1984 to provide economic aid to Jamaica (and 23 other countries in the Caribbean and Central America) through the waiver of tariff benefits. Most products manufactured or grown in CBI beneficiary countries are eligible for duty-free entry into the United States.</li></ul>
<b>Caribbean-Canada Trade Agreement (CARIBCAN)</b>
<ul style="list-style-type: none"><li>• CARIBCAN is a preferential arrangement guaranteeing duty free access to Canada for a wide range of products excluding textiles and apparel, footwear, luggage and handbags, leather garments, lubricating oils and methanol.</li></ul>
<b>Caribbean Single Market Economy (CSME)</b>
<ul style="list-style-type: none"><li>• Established by CARICOM to create economies of scale in the region. It offers Jamaicans the right to establish a business in another territory in the CSME without restriction. Jamaican goods that have already entered a CSME country will also be eligible for export/import into another CSME territory without duty. Capital from Jamaica can also 11 circulate freely in other CSME countries. Jamaica has also negotiated and signed Free Trade Agreements (FTA) with Argentina, Colombia and the Dominican Republic.</li></ul>

## Potential risks and constraints

Jamaica has a world class quality and abundant quantities of limestone. The limestone in Jamaica is readily accessible but there is a need for evaluation of reserves along with improved mining techniques, upgraded state-of-the-art machinery and equipment and modernization process. The industry also faces several risks to the limestone market such as:

- Inadequate record keeping
- High cost of energy
- Lack of bulk shipping of products
- Lack of security of the precious material

The Jamaican government is willing to provide an enabling environment to reduce these risks and have started the process through active engagement with stakeholders, implementing the Draft Minerals Policy and improving access to finance. JAMPRO has a specialist to assist investors and market players with entering the value-added industry.

The table below highlights common issues associated with limestone and respective factors used to mitigate them.

**Table 10: Common Issues associated with Limestone**

Problems associated with Limestone		Constraint Mitigating Factors
<b>Weathering</b>	Limestone is more prone to chemical weathering than other stones, such as granite, owing to the presence of calcium carbonate which readily reacts with rainwater. Rainwater gets acidic when it combines with carbonic acid and causes weathering in limestone walls.	After extraction mined limestone can be stored to prevent weathering by rain and other atmospheric elements.
<b>Erosion</b>	Limestone walls when exposed to continuous air or water, is prone to erosion. The airborne abrasives floated by wind cause erosion on limestone.	Erosion can be mitigated by planting in areas surrounding limestone walls.
<b>Staining</b>	Staining is also known as discolouring of limestone. Different types of organic and inorganic oils that limestone absorbs, organic matters, such as leaves, flowers or tea and coffee, animal droppings, and metals, like copper or iron, which causes rust, are the major reasons of staining on the limestone.	Limestone surfaces can be cleaned to prevent long-term stain.
<b>Crumbling</b>	The most critical problem of limestone and limestone materials is crumbling. Limestone has a brittle structure and inherent weakness of the stone along with external factors and gradual breakdown of the binders used in the building affects the durability and strength of the stone, thus causing crumbling in the limestone walls.	Potential sources of crumbling can be repaired if detected early.

# 3.0 Product Overview – Dimension Stone

## Overview

Dimension Stone is natural stone or rock that has been selected, cut and finished depending on its application in the construction industry. It is used for its resistance to weather or its aesthetic appeal in buildings, walls and for decorative purposes.


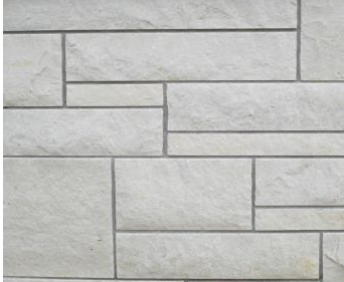
**Figure 6: A typical representation of Dimension Stone**



## Key Applications of Dimension Stone

Dimension Stone is used in the following products described in the table below.

**Table 11: Key Applications of Dimension Stone**

Product		Uses
<b>Building and Construction</b>		Dimension Stone is used in the building and construction industry. It is typically quarried into rectangular blocks then further refined based on end-use specification.
<b>Decoration</b>		Dimension Stone is used in furniture and decorative objects. It is made in a variety of shapes and colours to fit the end-use specification.



Product	Uses
<p><b>Tiles</b></p> 	<p>Dimension Stone is used to produce tiles of different sizes, colour and shapes according to end-use specifications.</p>

### Production Process

The production process for Dimension Stone is detailed in the table below.

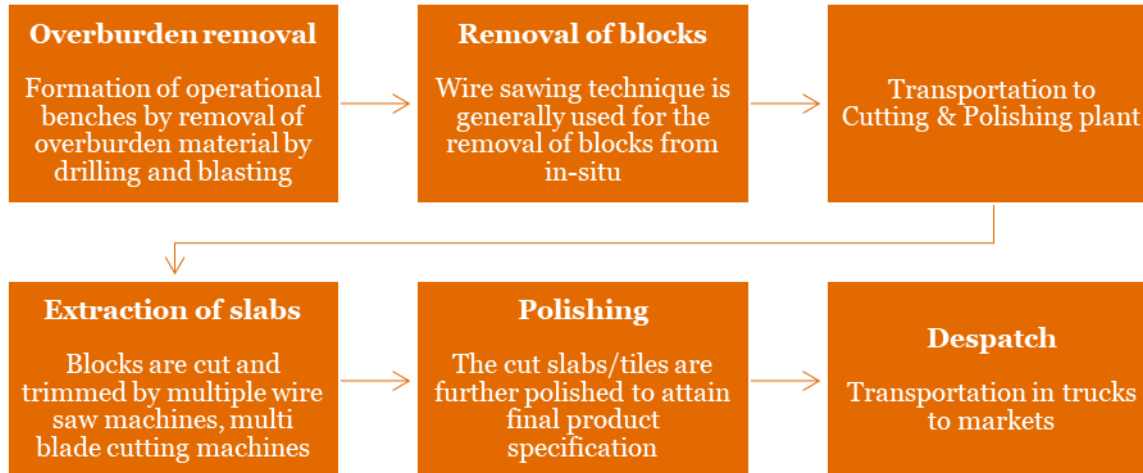
**Table 12: Production Process for Dimension Stone**

Production	Process
<p><b>Excavation of Blocks</b></p>	<p>Excavation of blocks begins with the removal of waste material from the surface. A general geological mapping is done after exposing the hard mineral for deciding the subsequent mining sequence. Boreholes are drilled to test the physical characteristics for assessing suitability for cutting and polishing and determining the block size. After exposure, the hard blocks are delineated by marking the surface. Drilling and blasting may be required for the removal of waste rocks. Drilling equipment is required for the precise drilling of holes horizontally and vertically for inserting a wire saw. The designated blocks are then cut by wire saws.</p> <p>Block sizes would depend on the geology and disturbances. The dimension is typically between 2.2 and 3 meters. Width can also be 1.2 to 1.5 meters and 0.9 to 1.2 meters in height. However, larger blocks can also be extracted.</p> <p>Once each block is extracted from the mine, the blocks are classified based on quality criteria such as:</p> <ul style="list-style-type: none"> <li>• Block size</li> <li>• Tonnage</li> <li>• Number of streaks: the lower the number of streaks, the higher quality and better classification</li> <li>• Cleanliness: clean materials are those with no stains</li> <li>• Cracks or fractures</li> </ul> <p>Quality control is key in the selection of block sizes maintaining the above factors for better yield. For the separation of blocks from in situ after cutting, excavators with special attachments are used. The blocks are loaded by cranes or front-end loaders to low-bed trucks for transportation to a processing facility.</p>
<p><b>Cutting, Trimming and Polishing</b></p>	<p>The blocks are cut by multiple wire saws and multi-blade cutting machines per the end-use requirement. Block cutters are used for cutting strips for the manufacture of tiles. The cut blocks are further polished, honed and bush hammered per the end use requirement.</p> <p>They are then stacked for transportation. Trailer trucks with special storage are used in order to main the structural integrity of the tiles/dimension stone products during transport and prevent cracks or breaks.</p>

## Process Flow

The key steps involved in the production of Dimension Stone are reflected in the figure below.

**Figure 7: Production process flow for Dimension Stone**



## Waste Generation and Pollutants in a Dimension Stone Production Line

Due to the mechanical dry nature of the production process, waste and pollutants are generated mainly in the form of dust (consisting of Particulate Matter (PM)) and noise. In addition to waste/ pollutants generated from the direct production process, drainage channels around the processing plant & storage yard area and pollution due to machinery may also cause environmental disturbances.

Although these pollutants are not significant or hazardous at a nation or global level, they can be a source of pollution within communities in which the operation resides.

Therefore, best industry practices shall be followed during the plant operation to minimise or control pollution within permissible limits as regulated by NEPA.

Some of the key areas leading to the generation of unwanted wastes in the production line of Dimension Stone are stated below:

- **Air pollution (PM and gaseous pollutants)**
  - Dust generated during mining activities such as drilling, blasting and other mining operations.
  - Fugitive dust emissions during transportation of staff & material over mine access roads/haul roads.
  - Gaseous emissions due to the use of diesel engine operated Heavy Earth Moving Machinery (HEMM).
  - Dust generated during cutting & polishing of blocks at processing facility.
  
- **Soil & Land degradation**
  - Improper storage/disposal of top-soil, overburden and other waste rocks.
  - Use of improper mining techniques and not following proper sequence for mine backfilling & mine closure plan.
  - Erosion of suspended dust particles to nearby area and their sedimentation on fertile soil.
  - Spillage of fuel or petrochemical leakages i.e. diesel/oil used in operation.

- **Groundwater table contamination & wastewater generation**
  - Mining activity such as removal of blocks using wire sawing involves huge water requirement which affects both surface and ground water.
  - Large amounts of dust & suspended particles generated in mining may block the fissures and cracks in the surface which inhibits the flow of surface to groundwater and hence, may lead to reduction in groundwater table.
  - Drainage of water from landfills to ground table may lead to contamination with toxic material.
  - Mixing of mining/plant drainage water into natural water bodies leading to their contamination.
  - Wastewater generated due to the constant use of water stream for cooling of cutting/sawing blades and removal of dust produced during the cutting & polishing process.
  - Water used for washing of heavy machineries or equipment reports to wastewater stream. Process wastewater with high pH and suspended solids may be generated.
  
- **Solid waste generation**
  - Discarded/unused stone, around 50-80% of the total mined material remain as waste as deemed unfit for the commercial use for the making of Dimension Stone.
  - A major part of generated waste is discarded at the mine site in the form of boulders or fine powder and are dumped in nearby areas.
  - Undersized excess waste material generated after cutting/trimming blocks to desired shape & size.
  - Waste generated along with process water during polishing of the blocks.
  
- **Noise pollution**
  - During drilling and blasting as well as cutting of stone.
  - During HEMM operation for transportation.
  - During processing of limestone blocks in plant.

## General Industry Best Practices for Minimising Environmental Footprint of Dimension Stone Operations

In processing of Dimension stone, intact rocks are mined and transported to processing plants where they are cut and polished to produce finished products as per the desired specifications and finally, product dispatch. In the production of dimension stone pollutants are generated that degrade soil and land, contaminate ground water, generate wastewater, generate solid waste and cause noise and air pollution.

Although these pollutants are not significant or hazardous at a nation or global level, they can be a source of pollution within communities in which the operation resides.

Focus area (Emissions)	Best Industrial Practices (Control Measures)
<b>Particulate Matter and Gaseous emission</b>	<ul style="list-style-type: none"> <li>• Monitor ambient air quality periodically</li> <li>• Ensure all saws and drilling machines have adequate dust catchment or air filtration systems</li> <li>• Use wet drilling to suppress dust emissions</li> <li>• Suppress fugitive dust emissions by using a vertical tube air filters or Dry Fog Dust Suppression System. The dust recovered from it can be re-circulated in the process</li> <li>• Manage access and haul roads by roadway misting, chemical suppressants, asphalt or concrete paving, washout area or</li> </ul>

Focus area (Emissions)	Best Industrial Practices (Control Measures)
	<p>aggregate surfaces</p> <ul style="list-style-type: none"> <li>• Develop thick plantation/vegetation around the mine/quarry or plant boundary to screen air emissions or to trap suspended dust particles</li> <li>• Store waste generated during process in an environment protected from wind and weather conditions</li> <li>• Use vacuum type or brush type sweepers to curb the dust on roads and pavements</li> <li>• Use fuel/energy efficient, advanced equipment in mines/quarries to decrease carbon emissions</li> <li>• Minimise transport distance by proper planning of quarry distance from plant</li> <li>• Sprinkle water regularly on haul and access roads and storage yards</li> <li>• Perform periodic maintenance of access and haul roads</li> <li>• Cover top of all tippers/trucks by tarpaulin sheets to avoid dust emission</li> <li>• Maintain all equipment properly to minimize PM and gaseous emissions</li> </ul>
<b>Soil &amp; Land Degradation</b>	<ul style="list-style-type: none"> <li>• Use Geographic Information System (GIS) with Remote Sensing for detecting &amp; analysing changes in land-use and land cover</li> <li>• Establish simultaneous backfilling and proper mine closure plan</li> <li>• Implement systematic and continuous mine reclamation process</li> <li>• Cultivate grass or proper vegetation on dumps to avoid/control soil erosion</li> <li>• Establish a green-belt around mine/plant boundary and systematically restore topsoil as a part of sustainable mine reclamation</li> <li>• Ensure no leakage and spills of petroleum by establishing and implementing an equipment maintenance plan</li> <li>• Maintain machinery by recycling motor oil and other lubricants regularly</li> <li>• Establish spill prevention and control measures per national, parish and local regulations</li> </ul>
<b>Solid waste</b>	<ul style="list-style-type: none"> <li>• Use accurate resource mapping and ensure maximum usable product recovery from mines/quarry</li> <li>• Use mined material for restoration or backfilling work</li> <li>• Prepare a system and maintain record of quantity, origin, nature and frequency of waste being disposed off</li> <li>• Use quarry &amp; plant waste in the construction &amp; aggregate industry (if they meet desired standards)</li> <li>• Use dust collected at mines or plants for construction work at site along with aggregates for soil stabilisation work</li> <li>• Plan a proper disposal route and prepare SOP based on environmental regulations before solid waste disposal</li> <li>• Locate storage areas away from watercourses and sensitive boundaries</li> </ul>
<b>Groundwater</b>	<ul style="list-style-type: none"> <li>• Investigate the landscape, geology and groundwater in the area.</li> </ul>

Focus area (Emissions)	Best Industrial Practices (Control Measures)
<b>contamination &amp; Wastewater generation</b>	<ul style="list-style-type: none"> <li>• Utilise surveillance and continuous monitoring of ground water quality.</li> <li>• Design proper drainage system along the haul roads or plant site for the collection of process and rain water into treatment tank</li> <li>• Treat waste/process water before re-usage or its disposal in the environment</li> <li>• Use techniques such as sedimentation using thickeners or clarifiers to remove suspended solid particles.</li> <li>• Use the neutralisation method for pH adjustment before water recirculation into the process or discharge into the environment</li> <li>• Prevent rainwater from coming in contact with solid waste to minimise the quantities of suspended material carried off site</li> <li>• Design maintenance workshops to avoid contamination of water by spilled fuel and lubricants</li> <li>• Plan &amp; dispose of saw dust, oil filters and soiled rags used for soaking oil spillages at a licensed hazardous material waste disposal site</li> <li>• Ensure no or minimal discharge of mine/plant water to nearby natural water bodies and if discharged then after proper treatment &amp; quality check</li> </ul>
<b>Noise emission</b>	<ul style="list-style-type: none"> <li>• Design appropriate acoustics to limit the amount of noise which reaches nearby communities.</li> <li>• Install vibration-dampening mounts and concrete foundations for the installation of heavy equipment such as crushers and mills.</li> <li>• Use a muffler in the grinding mill to arrest noise pollution.</li> <li>• Select machines which generate less noise (if practically feasible).</li> <li>• Use silencers for fans, room enclosures for mill operators and noise barriers.</li> <li>• Use of PPE like noise cancelling ear headphones.</li> <li>• Select a site away from communities (if possible) otherwise install outdoor silencers at site to prevent noise from affecting local people.</li> <li>• Install noise level sensors for continuous monitoring.</li> </ul>

## Equipment Required for Dimension Stone Production

The type of equipment required for production of Dimension stone includes:

- Mine equipment: Backhoe, Drill, Dozer, Trailer truck, Drill rig, Wire saw cutting machine, Wheel loader, Grader, Water tanker, Crane etc.
- Stone processing equipment: Circular sawing machine, Double blade edge cutting machine, Heavy duty polishing machine etc.
- Other Units - Weigh bridge, Diesel generator etc.

# 4.0 Potential Markets for Jamaican Dimension Stone and Competitive Profile

## Limestone trade in the Americas

The core markets for limestone exports from Jamaica are CARICOM, North America and South America. The import trend in prominent markets in North America, South America and CARICOM region presents an opportunity to Jamaica to enter the value-added market of limestone which is significant in terms of value.

**Table 13: Limestone import in Americas and CARICOM**

Markets	Total Limestone Import (in Million US\$)	Import of Aggregates and Stones (in Million US\$)
<b>USA</b>	99.9	13.0
<b>Canada</b>	79.2	11.5
<b>Mexico</b>	4.6	0.0
<b>Brazil</b>	29.5	6.9
<b>Chile</b>	81.3	0.0
<b>CARICOM excluding Jamaica</b>	5.2	0.6
<b>Total imports in the region</b>	<b>300</b>	<b>32</b>
<b>Jamaica's exports</b>	<b>3.8</b>	<b>3.78</b>

Source: ITC Trademap (accessed March 24, 2020)

The total value of imports of the studied markets in Americas was estimated at more than US\$300 million while Jamaica is currently exporting approximately US\$3.8 million (approximately 1% of the regional value).

## Calcareous<sup>1</sup> Stone Market from a Global Perspective

To access the existing market of Dimension Stone obtained from limestone, it is imperative to explicitly analyse the trade scenario of the Calcareous Stone Market in global perspective, in the Americas perspective and in a CARICOM perspective. Dimension Stone is also obtained out of marble and granite, however, analysing the entire universe of Dimension Stone will not be a true reflection of the market

<sup>1</sup> Characterised by high calcium carbonate content

potential of the product being discussed in the package, therefore calcareous stone is used. Calcareous stone is stone composed primarily of calcium carbonate.

For the analysis of potential markets of Dimension Stone market of limestone, Harmonised System (HS) code of 680292<sup>2</sup> and HS code 680229<sup>3</sup> were used. Per ITC Trade map data, global imports of the Dimension Stone market consisting of calcareous stone, were estimated at 1.18 million tonnes in 2019, valued at about US\$ 580 million. The imports are mainly driven by the USA which accounted for more than 25% of the global imports by value and more than 17% by quantity, in 2019.

The top five global importers of calcareous stones are presented in the table below:

**Table 14: Global import statistics of calcareous Dimension Stone product**

Country	2017		2018		2019	
	Quantity, thousand tonnes	Value, US\$ Million	Quantity, thousand tonnes	Value, US\$ Million	Quantity, thousand tonnes	Value, US\$ Million
<b>World</b>	1,542	689	1,440	653	1,184	580
<b>USA</b>	187	175	179	166	207	148
<b>Saudi Arabia</b>	300	57	255	42	266	47
<b>Canada</b>	NA	36	NA	39	NA	31
<b>Belgium</b>	91	32	86	30	71	26
<b>United Kingdom</b>	15	15	14	14	21	24

Source: ITC Trade map accessed on 28th April 2020; quantity imports for Canada and Australia are not available

The import market of calcareous stone is led by North America, particularly the USA which has historically led the imports of the product. Together, the USA and Canada accounted for more than 30% of the product's import, by value, in 2019. The USA is followed by Saudi Arabia, another key importing country. In 2019, Saudi Arabia imported US\$ 47 million worth of product, accounting for 8% of the global imports. The imports of key European markets such as Belgium, United Kingdom, the Netherlands, France and Switzerland were, together, worth US\$ 120 million and accounted for 21% of total global imports.

Key global exporters of monumental and calcareous stones include Portugal, Italy, Germany, Spain and Turkey. Brazil leads the exports in the Americas region, while in Asia, China is the leading exporter of the product.

## Calcareous Stone Market from a Regional Perspective

The Americas region has been selected for the assessment of a potential market for Dimension Stone (calcareous stone) for Jamaica's exports. Per ITC Trade map data, the Americas imported US\$ 195 million worth of calcareous stone in 2019, a 14.5% decrease from US\$ 229 million imported in 2018. The region contributed to around 34% of global imports by value in 2019. The leading importers in the Americas region and their import statistics are presented in the table below:

<sup>2</sup> Calcareous stone, in any form (excluding marble, travertine and alabaster, tiles, cubes and similar articles of subheading 6802.10, imitation jewellery, clocks, lamps and lighting fittings and parts thereof, original sculptures and statuary, setts, curbstones and flagstones)

<sup>3</sup> Monumental or building stone and articles thereof, simply cut or sawn, with a flat or even surface (excluding marble, travertine, alabaster, granite and slate, those with a completely or partly planed, sand-dressed, coarsely or finely ground or polished surface, tiles, cubes and similar articles of subheading 68021000, setts, curbstones and flagstones)

**Table 15: America's import statistics of calcareous Dimension Stone product**

Country	2017		2018		2019	
	Quantity, thousand tonnes	Value, US\$ million	Quantity, thousand tonnes	Value, US\$ million	Quantity, thousand tonnes	Value, US\$ million
<b>Americas Aggregation</b>	NA	233	NA	229	NA	195
<b>USA</b>	187	175	179	166	207	148
<b>Canada</b>	NA	36	NA	39	NA	31
<b>Mexico</b>	NA	4	NA	3	NA	2
<b>Brazil</b>	3	2	5	3	4	2
<b>Costa Rica</b>	1	0	1	1	1	1
<b>Chile</b>	1	1	2	1	2	1

Source: ITC Trade map accessed on 28th April 2020

As stated in the global market assessment, the US market is largest importer of limestone-based Dimension Stone product. The Americas region accounts for around 34% of total calcareous stone imports in the world, driven primarily by the USA which accounts for 76% of the Americas imports. North America, including USA, Canada, and Mexico, accounted for 93% of the total regional imports of calcareous stone by value in 2019.

**Table 16: CARICOM import statistics of calcareous dimension stone product**

Country	2017		2018		2019	
	Quantity, tonnes	Value, US\$ thousand	Quantity, tonnes	Value, US\$ thousand	Quantity, tonnes	Value, US\$ thousand
<b>Caricom</b>	3,083	4,491	3,093	4,363	1,901	1,474
<b>Bahamas</b>	852	2463	1563	2956	1163	803
<b>Belize</b>	73	64	155	41	169	153
<b>Trinidad and Tobago</b>	420	173	263	112	345	105
<b>Antigua and Barbuda</b>	35	49	121	134	18	87
<b>Saint Kitts and Nevis</b>	407	488	101	486	119	82
<b>Guyana</b>	291	416	183	135	72	51
<b>Saint Vincent and the Grenadines</b>	159	238	18	27	117	46
<b>Dominica</b>	102	46	101	79	29	33
<b>Jamaica</b>	<b>451</b>	<b>394</b>	<b>223</b>	<b>235</b>	<b>23</b>	<b>30</b>
<b>Grenada</b>	26	32	130	52	47	28
<b>Barbados</b>	1	2	0	0	1	5
<b>Haiti</b>	0	0	5	6	21	4

The contribution of CARICOM in the import of Calcareous stone in Americas is less than 1% and Jamaica contributes to around 2% of the total import in the CARICOM.

The import market of calcareous stone in CARICOM is led by Bahamas which has historically led the imports of the product. In 2019 the Bahamas accounted for around 55% of the total imports in CARICOM.

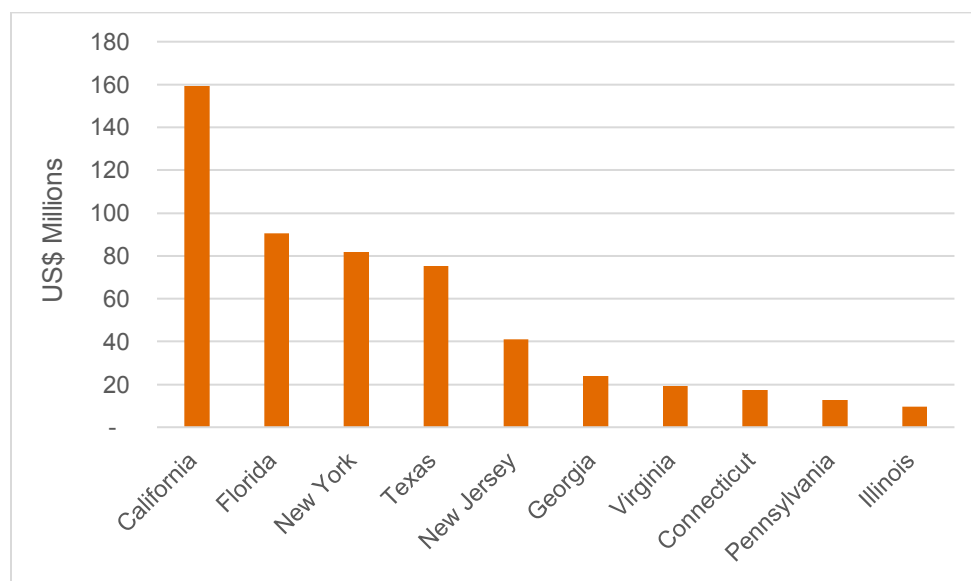


Belize, Trinidad and Tobago, Antigua and Barbuda and Saint Kitts and Nevis are other major importers. Together these 5 countries, account for around 84% of the total import in CARICOM.

### Potential Market in the United States

The chart below represents the top ten (10) states that import Calcareous Stone<sup>4</sup>, these states represent 84.5% of total demand/importation within the US. These importers import mainly from the international market (countries such as China, Italy, Portugal, Spain and Mexico) and are done by companies who are solely importers and distributors.

**Figure 8: Top 10 importers of Calcareous Stone**



**Table 17: Key Importers of Calcareous Stone**

Competitor	Location
Graymont Western US Inc	Salt Lake City, Utah
Eden Stone Co Inc	Eden, Wisconsin
Polycor Stone Corporation	Tate, Georgia

### End Use Industries and Market Forecasts

Dimension stone is primarily used in buildings and construction industry. Therefore, the growth trend of the same is analysed in order to assess the growth of demand of Dimension Stone. As assessed in study of demand markets, the USA is leading markets in the region accounting for more than 75% of imports of Dimension Stone in the Americas region in 2019.

The construction sector in North America has witnessed overall positive growth in recent years and is projected to grow further in coming years.

<sup>4</sup> For the analysis of imports of Calcareous stone products HS code 680292 and 680229 are used.

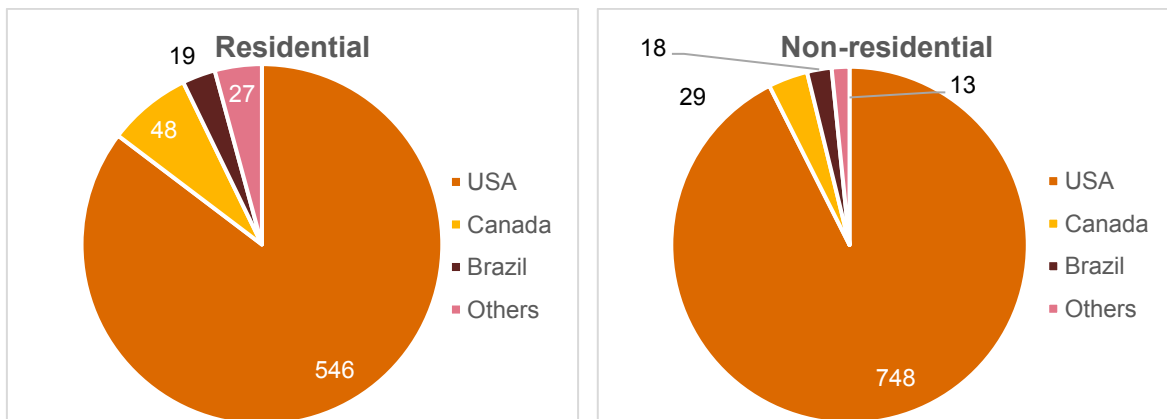
- In the USA construction spending has increased from US\$ 788 billion in 2011 to US\$ 1,192 billion in 2016 to US\$ 1,294 billion in 2018, showing continuous growth.<sup>5</sup> Further, the value of new construction is expected to reach US\$ 1,396 billion by 2022.
- In Canada construction spending has increased from US\$ 183 billion in 2016 to US\$ 196 billion in 2018. The value of new construction is expected to reach US\$ 223 billion by 2022.
- Latin America has seen a recent downfall in construction industry due to financial and political reasons but is expected to recover in coming years. The Latin American construction industry is expected to grow by 2.6% during 2020-2023 time period.

### Assessment of Residential and Commercial Construction industry in the Americas Region

The total value of the residential construction market in the Americas stood at US\$640 billion and the USA leads the market, accounting for more than 85% of the total residential construction industry market by value, followed by Canada (7.7%), Brazil (3%) and Mexico.

The total value of the commercial construction market in the Americas stood at US\$808 billion and the USA leads the market, accounting for more than 92% of the total market by value, followed by Canada (3.5%), Brazil (2.2%) and Mexico.

**Figure 9: The Americas Construction Industry in US\$ Billion (2018)**



Source: MarketLine (EMIS)

<sup>5</sup> United States Census Bureau

## **USA**

The US residential construction sector grew by 2.7% in 2018 to reach a value of US\$546.2 billion and is expected to have a value of US\$704.3 billion, an increase of 28.9% in 2023. The projected growth is expected to be led by infrastructure development and residential construction segments.

The US commercial construction sector grew by 4.7% in 2018 to reach a value of US\$ 747.8 billion accounting for more than 90% of the Americas total. Between 2014-18, the commercial industry saw a growth with CAGR of 4.3%. In the coming years, it is expected to rise by 22.3% from 2018 to reach US\$ 914.7 billion in 2023.

## **Canada**

Canada accounts for 7.7% of the Americas residential construction sector value as of 2018. Residential construction is the largest segment of the construction industry in Canada, accounting for 63% of the industry's total value. The Canadian residential construction sector grew by 5.3% in 2018 to reach a value of US\$ 48.5 billion. The sector has grown at CAGR of more than 5% between 2014-18. The performance of the sector is expected to grow with an anticipated CAGR of 5% for till 2023, which is expected to drive the sector to a value of US\$ 61.8 billion by 2023.

Canada accounts for 3.5% of the Americas commercial construction sector. In Canada the commercial construction sector grew by 3.8% in 2018 to reach a value of US\$28.5 billion. Between 2014-18, the commercial industry saw a growth of CAGR of 2.1% and is expected to be worth US\$43.0 billion in 2023, a rise of 50% since 2018.

## **Brazil**

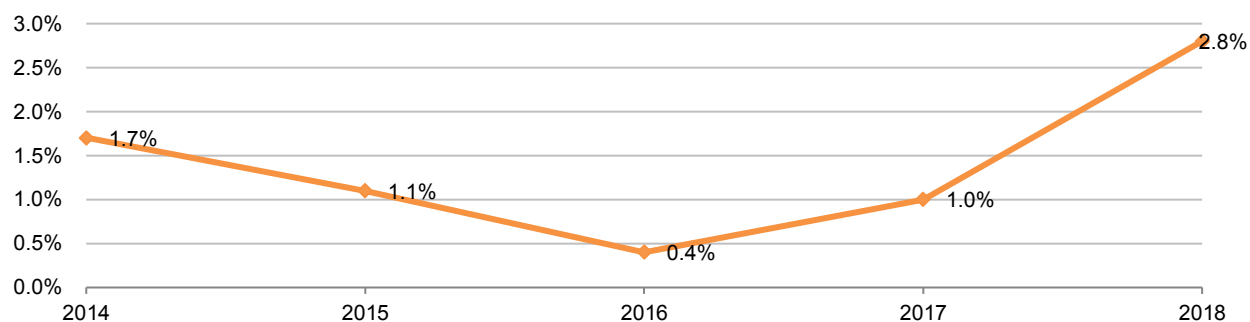
Brazil accounts for approximately 3% of the Americas residential construction sector by value. The residential segment accounts for more than 51% of the total domestic construction industry. In 2018, the residential construction market in Brazil stood at a value of US\$19.2 billion. With economic growth gaining traction in the medium term, demand for both residential and commercial real estate is expected to continue to increase, backed by solid demand and supply fundamentals. The Brazilian residential construction market is expected to be valued US\$20.2 billion in 2023, a rise of 5.2% since 2018.

Brazil accounts for 2.2% of the Americas commercial construction sector. The Brazilian commercial construction sector grew by 0.6% in 2018 to reach a value of US\$18.3 billion. The sector's growth is projected to increase, with an estimated CAGR of 2.2% between 2018-23, which is expected to drive the sector to a valuation of US\$20.4 billion by 2023.

## **Jamaica**

Across CARICOM there has been a surge in construction, with a number of public and private sector led residential and non-residential project being undertaken. In Jamaica, within the parishes of Kingston and St. Andrew, several housing and commercial high-rise building were being erected. These include the new corporate offices of the Ministry of Foreign Affairs and Foreign Trade and the expansion of GraceKennedy's head office in downtown Kingston; hotel and housing developments; and road projects. Infrastructural works are being undertaken by the National Water Commission (NWC) and the National Works Agency (NWA) across the country.

**Figure 10: Growth Rates for the Jamaican Construction Industry**



Despite robust construction activities and billions of dollars in higher expenditure during the first half of June 2018, contribution of the industry to the growth of the Jamaican economy remains weak because more than 90% of raw material for some projects are imported. Due to the growth in the construction industry locally and in major demand markets in proximity to Jamaica, in addition to the demand in CARICOM, growth in demand of dimension stone is expected in the region. Therefore, the long-term benefits of investing in the value-added production of dimension stone is viable.

### Investment opportunity: Growth in the key end use industry

Per Mordor Intelligence report, expected growth in limestone-based buildings and construction industries in America region is expected to reach US\$ 7,602 million in 2024, a 14% increase from 2019 value of US\$ 6,643 million. The growth in limestone-based buildings and construction industry in key geographies in the Americas region are summarised below:

**Table 18: Americas limestone market by buildings and construction segment (in US\$ million)**

Geographies	2016	2017	2018	2019 (est.)	2024 (f)	% Growth (2019-2024)
<b>Americas</b>	6,106	6,247	6,465	6,643	7,602	14%
<b>North America</b>	3,660	3,828	3,989	4,119	4,655	13%
<b>South America</b>	2,446	2,419	2,476	2,524	2,947	17%
<b>United States</b>	2,257	2,375	2,486	2,568	2,872	12%
<b>Canada</b>	269	271	271	267	265	-1%
<b>Mexico</b>	911	948	987	1,026	1,197	17%
<b>Brazil</b>	1,399	1,322	1,319	1,319	1,478	12%
<b>CARICOM</b>	223	234	245	257	321	25%

Source: Mordor Intelligence

## Strengths, Weaknesses, Opportunities and Threats (SWOT) Analysis

To assess the growth potential of Dimension Stone in Jamaica, a SWOT analysis was conducted. The high-level results of the analysis are contained in the figure below. Findings and primary source interviews and surveys suggest Jamaica is in a strong position to be able to develop the limestone value added industry due to availability of limestone raw material and export potential in nearby region. In addition, there are opportunities in bringing in new types of financing agreements as well as incentivising new entrants with Special Economic Zones (SEZ) for the manufacture of Dimension Stone.

**Figure 11: Summary SWOT Analysis for Jamaica’s Dimension Stone industry**



# 5.0 Financial Highlights

The following discussion contains forward-looking statements that involve risks and uncertainties. A potential investor’s actual results may differ materially from those discussed in the forward-looking statements as a result of various factors. Although JAMPRO and its independent advisors, believe that in making any such statements its expectations are based on reasonable assumptions, such statements may be influenced by factors that could cause actual outcomes and results to be materially different from those projected. Prospective investors are cautioned not to place undue reliance on these forward-looking statements, which speak only as of the dates on which they have been made and should conduct their own due diligence. Future events or circumstances could cause actual results to differ materially from or anticipated results.

## Financial Highlights

A financial assessment of the valued-added production for Dimension Stone in Jamaica was conducted under two scenarios, that is (i) on a standalone basis (start-up) and (ii) an incremental basis (existing limestone operation). The financial result shows that the business models is growing, and will have the liquidity to finance the growth potential and ongoing initiatives.

**Table 19: Scenario 1: Summary Incremental Financial Performance**

Projected Incremental Financial Performance					
(In US\$M)	Year 1	Year 2	Year 3	Year 4	Year 5
Revenue	1.5	1.5	1.6	1.7	1.8
% Growth	N/A	5.2%	5.2%	5.2%	5.2%
EBITDA	0.7	0.7	0.8	0.9	0.9
% Sales	46.6%	48.0%	49.4%	50.8%	52.2%
Net Income	0.4	0.4	0.5	0.5	0.6
% sales	24.9%	26.6%	28.4%	30.1%	31.7%
Net Debt	0.9	0.7	0.6	0.5	0.3

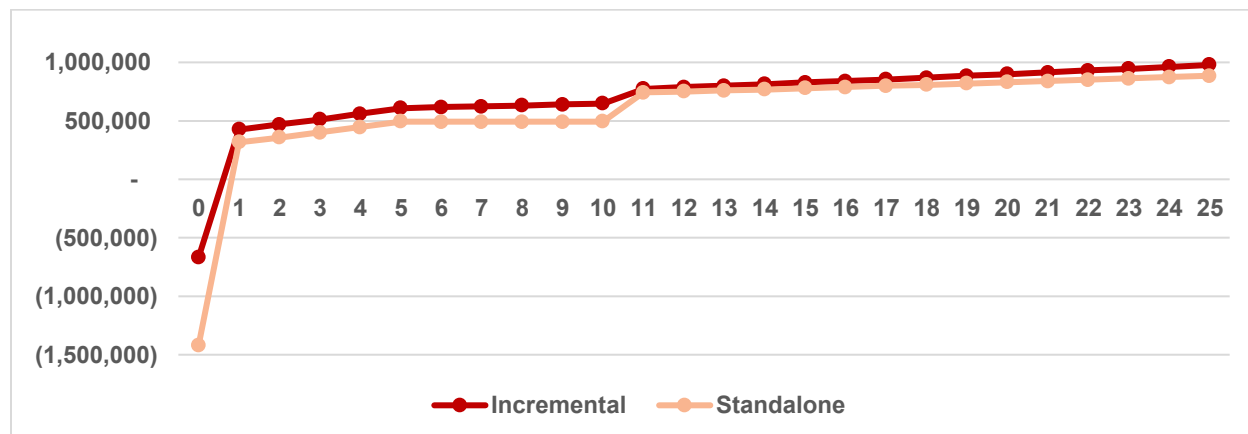
For Dimension Stone the projected net income margin generated is expected to be in excess of 25% and is expected to be adequate finance assumed debt.

**Table 20: Scenario 2: Summary Standalone Financial Performance**

Projected Standalone Financial Performance					
(In US\$M)	Year 1	Year 2	Year 3	Year 4	Year 5
Revenue	1.5	1.5	1.6	1.7	1.8
% Growth	N/A	5.2%	5.2%	5.2%	5.2%
EBITDA	0.7	0.7	0.8	0.8	0.9
% Sales	45.2%	46.7%	48.2%	49.6%	51.0%
Net Income	0.2	0.2	0.3	0.3	0.4
% sales	12.5%	15.1%	17.6%	20.1%	22.4%
Net Debt	1.8	1.6	1.3	1.0	0.7

For Dimension Stone the projected net income margin generated is expected to be in excess of 15% and is expected to be adequate finance assumed debt.

**Figure 12: Forecasted Cash Flow**



Net cashflow in Year 0 of (US\$0.7 million) includes investment in incremental setup of US\$1.7 million and debt finance US\$1.0 million (60%). The average cash position over the projected period will be +US\$0.8 million.

Net cashflow in Year 0 of (US\$1.4 million) includes investment in standalone setup of US\$3.5 million and debt finance US\$2.1 million (60%). The average cash position will be +US\$0.7 million.

### Investment Cost

The investment required for to produce 30,000 tonnes of Dimension Stone on a standalone (start-up) basis and an incremental basis is US\$ 3.5 million and US\$1.7 million respectively. (See Appendix 1 for details).

### Revenue Forecast

Dimension Stone is projected to be sold at a cost USD\$36 per tonne in year one (1). Growth in sales is expected to remain between 3.5%-4% in line with market CAGR. For consistency, the price of Dimension Stone has been increased in line with the current price inflation within the Americas that produce and sell similar value-added products.

### Projected Profit and Loss

#### Scenario 1: Stand-Alone Basis (start-up)

Table 21 below shows a five (5) year analysis of a start-up operation. The production of Dimension Stone on a stand-alone basis is expected to yield a net profit of US\$182,916 in year one (1) and this is projected to increase to US\$400,678 by year five (5). Gross and net profit margins are forecasted to average 91% and 18% respectively over the 5-year period.

**Table 21: Proforma financial performance for Dimension Stone on a stand-alone basis**

Amounts in USD\$'	Year 1	Year 2	Year 3	Year 4	Year 5
<b>Revenue:</b>					
Unit Sales (tonne)	41,125	41,700	42,284	42,876	43,476
Price per (tonne)	35.5	36.9	38.2	39.6	41.1
<b>Total Revenue</b>	<b>1,461,852</b>	<b>1,537,163</b>	<b>1,616,355</b>	<b>1,699,626</b>	<b>1,787,187</b>
<b>Cost of Sale:</b>					
Raw material	67,157	69,614	72,162	74,805	77,545
Variable Labour	67,157	69,614	72,162	74,805	77,545
<b>Total Cost of Sales</b>	<b>134,313</b>	<b>139,228</b>	<b>144,324</b>	<b>149,610</b>	<b>155,090</b>
<b>Gross profit</b>	<b>1,327,538</b>	<b>1,397,935</b>	<b>1,472,030</b>	<b>1,550,017</b>	<b>1,632,097</b>
<b>Total operations Expenses</b>	666,495	679,824	693,421	707,289	721,435
<b>EBITDA</b>	<b>661,044</b>	<b>718,111</b>	<b>778,609</b>	<b>842,727</b>	<b>910,662</b>
<b>Net Profit / (losses)</b>	<b>182,916</b>	<b>231,394</b>	<b>284,916</b>	<b>341,115</b>	<b>400,678</b>

**Scenario 2: Incremental Basis (existing limestone operation)**

Table 22 below shows a five (5) year analysis on an incremental basis. The production of Dimension Stone on an incremental basis is expected to yield a net profit of US\$363,407 in year one (1) and this is projected to increase to US\$566,211 by year five (5). Gross and net profit margins are forecasted to average 91% and 28% respectively over the 5-year period.

**Table 22: Proforma financial performance for Dimension Stone on an incremental basis**

Amounts in USD\$'	Year 1	Year 2	Year 3	Year 4	Year 5
<b>Revenue:</b>					
Unit Sales (tonne)	41,125	41,700	42,284	42,876	43,476
Price per (tonne)	35.5	36.9	38.2	39.6	41.1
<b>Total Revenue</b>	<b>1,461,852</b>	<b>1,537,163</b>	<b>1,616,355</b>	<b>1,699,626</b>	<b>1,787,187</b>
<b>Cost of Sale:</b>					
Raw material	67,157	69,614	72,162	74,805	77,545
Variable Labour	67,157	69,614	72,162	74,805	77,545
<b>Total Cost of Sales</b>	<b>134,313</b>	<b>139,228</b>	<b>144,324</b>	<b>149,610</b>	<b>155,090</b>
<b>Gross profit</b>	<b>1,327,538</b>	<b>1,397,935</b>	<b>1,472,030</b>	<b>1,550,017</b>	<b>1,632,097</b>
<b>Total operations Expenses</b>	646,760	659,695	672,889	686,347	700,074
<b>EBITDA</b>	<b>680,779</b>	<b>738,240</b>	<b>799,141</b>	<b>863,670</b>	<b>932,024</b>
<b>Net Profit / (losses)</b>	<b>363,407</b>	<b>409,174</b>	<b>458,683</b>	<b>510,895</b>	<b>566,211</b>

**Return on Investment**

On an indicative basis over a projected duration of 25 years, the internal rate of return (IRR) could range from 4.8% to 30.3% and net present value (NPV) range from US\$5.4M to US\$7.3M on a standalone and incremental basis respectively when future cash flows were discounted using a discount rate of 14.3%



**Table 23: Investment appraisal results**

Scenario	NPV	IRR	Payback Period
Stand-Alone Basis	US\$5.4M	4.8%	4.3 years
Incremental basis	US\$7.3M	30.3%	1.6 years

## Sensitivity Analysis

A sensitivity analysis was conducted to ascertain the variability and vulnerability of the investment to macro or micro environmental factors. The result is presented in Table 24 below.

**Table 24: Sensitivity Analysis – Impact of Change in Sales growth**

Scenario	NPV	IRR	Payback Period (years)	NPV	IRR	Payback Period (years)
	<b>Stand-Alone Basis</b>			<b>Incremental Basis</b>		
-0.75	-3.6	-39.7%	-	-1.9	-42.6%	-
-0.50	-3.2	-36.4%	-	-1.4	-35.3%	-
-0.25	-1.3	-20.6%	-	0.4	-7.0%	13.0
0.00	5.4	4.8%	4.3	7.3	30.3%	1.6
+0.25	24.1	32.9%	2.1	26.2	69.1%	1.0
+0.50	66.5	61.6%	1.4	69.1	108.3%	-
+0.75	150.8	90.4%	1.2	154.0	147.6%	-

## Key Assumptions

To assess the indicative feasibility of the production of Dimension Stone as a value-added product in Jamaica, the following key assumptions were made:

Input	Inputs/ Assumptions	Source for Information
<b>Production Capacity</b>	Peak production capacity has been considered to be 30,000 tonnes per annum	The peak production capacity is considered based on typical start-up level plant set-up or an incremental build up to an existing operation.
<b>Sales Volume</b>	Sales volume is estimated at 95% of production level. It is assumed that the Jamaica could take 0.1% of the market share of the sales volumes within the Americas for Dimension Stone end	

	user products.	
<b>Revenue</b>	US\$36 per tonne. Growth in revenues are expected to remain at 2% plus indexation in line with market CAGR.	This represent average prices derived from primary researched in North America and the Caribbean
<b>Cost of Sales</b>	Raw Material US\$ 2.0 per tonne Variable Labour US \$2.0 per tonne	Average cost is determined by market survey of operators for cost to produce limestone within the local market.
<b>Operational Expense</b>	US\$ 14.53 to US\$15.0 per tonne (includes: Environment Management Cost, Power Cost, Plant Cost, Admin Cost, Logistics and Transfers, Advertising and Corporate Social Responsibility, Other Utilities, Other Expenses)	This represents the average cost derived from primary market research. (see Appendix 6.2)
<b>Financing Option</b>	Debt Vs Equity Mix of 60%/40%. Interest rate 6% Debt tenure- 10 years.	These assumptions represent cost to finance investment both on a start-up and incremental level. Capital Expenditure (CAPEX) replacement is assumed to be financed by working capital thereafter.



# JAMPRO

TRADE & INVESTMENT JAMAICA

## **Role of JAMPRO**

JAMPRO is the national trade and investments promotions agency in Jamaica. One of our key functions is the packaging and promotion of investment opportunities and the conversion of investment prospects into viable projects. JAMPRO was first established in 1988 to stimulate, facilitate and promote the development of trade and industry, export and investment activities in all sectors of the island's economy. The agency drives this process through focusing on a number of targeted sectors which include tourism.

JAMPRO works closely with local and global entrepreneurs seeking to tap into the many investment and trade opportunities in Jamaica. In facilitating both local and foreign direct investment, JAMPRO guides investors through the necessary processes and offers support in partnership with key government agencies and ministries, even after their investments are operational.

JAMPRO also provides an array of services to the export community – including export registration and provides export development advice and export promotion (exposure for goods and services entering the export markets).

# 6.0 Appendices

## 6.1. Appendix 1: Financial Model

Input	Inputs/ Assumptions	Source for Information
<b>Land Cost</b>	Land acquisition cost has been arrived at based on cost of each hectare of land as obtained through primary research (US\$ 30,000/hectare).	Where the mine/ quarry establishments will already be there plant set-up, one (1) hectare of additional land has been considered for Dimension Stone. The land estimate typically includes area required for plant facility, workshop, storage area, waste dump, worker camps, etc.
<b>Equipment Cost</b>	The vehicles required for transportation within plant premises will be procured. The vehicles considered for capital investment includes truck and wheel loader. Further, it is considered that for in-bound and out-bound logistics, hired vehicles will be used and the associated costs will be covered in operating expenses.	For truck and wheel loader, the landed cost in Jamaica is estimated after considering the equipment cost in the USA with provisioning and contingencies added for transportation cost and duties. No additional cost is considered for these for where facility already exist.
<b>Processing Capital Cost</b>	Cutting, processing and packaging along with supporting plant and equipment has been considered under processing capital cost for Dimension Stone.	For Dimension Stone the processing equipment has been assumed to be procured from China (due to lower procurement cost of the required equipment when compared to the procurement cost from the USA) with provisioning and contingencies added for transportation and duties.
<b>Power</b>	It is considered that power will be available from grid. However, in case of power cuts, the plant will be operated using a diesel generator.	It is considered that grid connection will already be in the establishment along with backup generators and hence no incremental cost is taken for power connection/ set-up for financial analysis.
<b>Infrastructure</b>	This will cover the necessary infrastructure required for operations covering shed, laboratory facilities and other relevant infrastructure facilities.	The infrastructure cost is based on typical industry standard costs for additional infrastructure required for setting up of the value-added plants.
<b>Laboratory</b>	A laboratory is considered for testing basic mineral content and size. A capital expenditure of US\$ ~0.43 Million would be sufficient for basic grade testing in Jamaica.	Based on industry standard cost for basic laboratory testing equipment.
<b>Contingency</b>	A 5% contingency on total capital cost is applied to cover the budgetary effect of project threats or uncertainties	-

**Table 25: Estimated capital expenditure for a Dimension Stone Plant**

#	Description	Stand alone Capital Cost (US\$ Millions)	Incremental Capital Cost (US\$ millions)
1.	Land cost	0.54	0.11
2.	Equipment cost (truck, wheel loader, etc.)	1.45	0.62
3.	Processing set-up cost	0.65	0.44
4.	Power cost	0.24	0.24
5.	Infrastructure cost	0.32	-
6.	Logistics	0.18	0.18
7.	Contingency @5%	0.17	0.08
<b>Total Estimated Capital Expenditure</b>		<b>3.55</b>	<b>1.67</b>

Source: PwC Analysis

**Table 26: Summary Pro Forma Income Statement Summary – Incremental Basis**

Dimension Stone						
Income Statement Summary						
Incremental Case						
	Year 1	Year 2	Year 3	Year 4	Year 5	
Income	1,461,852	1,537,163	1,616,355	1,699,626	1,787,187	
Cost of Sales	134,313	139,228	144,324	149,610	155,090	
<b>Gross Margin</b>	<b>1,327,538</b>	<b>1,397,935</b>	<b>1,472,030</b>	<b>1,550,017</b>	<b>1,632,097</b>	
<b>Operating expense</b>						
Staff cost	249,260	254,245	259,330	264,517	269,807	
Technical consultancy	24,926	25,425	25,933	26,452	26,981	
Maintenance Services	25,642	26,155	26,678	27,212	27,756	
Insurances	16,695	17,029	17,369	17,717	18,071	
Logistics and transfers	39,378	40,166	40,969	41,789	42,625	
Equipment	169,399	172,787	176,243	179,767	183,363	
Power	47,645	48,598	49,570	50,562	51,573	
Other Utilities	3,689	3,763	3,838	3,915	3,993	
Advertising services	25,642	26,155	26,678	27,212	27,756	
Security services	12,463	12,712	12,967	13,226	13,490	
Other Expenses	30,737	31,352	31,979	32,618	33,271	
<b>Total Operating Expense</b>	<b>645,478</b>	<b>658,387</b>	<b>671,555</b>	<b>684,986</b>	<b>698,686</b>	
Environmental	1,282	1,308	1,334	1,361	1,388	
Depreciation	136,595	136,595	136,595	136,595	136,595	
Loan Interest	59,641	56,079	50,969	45,881	40,480	
	<b>197,518</b>	<b>193,983</b>	<b>188,898</b>	<b>183,837</b>	<b>178,463</b>	
<b>Profit Before Taxes</b>	<b>484,543</b>	<b>545,566</b>	<b>611,577</b>	<b>681,193</b>	<b>754,948</b>	
<b>Taxes</b>	<b>121,136</b>	<b>136,391</b>	<b>152,894</b>	<b>170,298</b>	<b>188,737</b>	

<b>Net Income</b>	<b>363,407</b>	<b>409,174</b>	<b>458,683</b>	<b>510,895</b>	<b>566,211</b>
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Source: PwC Analysis

**Table 27: Summary Pro Forma Income Statement Summary – Standalone Basis**

<b>Dimension Stone</b>					
<b>Income Statement Summary</b>					
<b>Standalone Case</b>					
	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>
Income	1,461,852	1,537,163	1,616,355	1,699,626	1,787,187
Cost of Sales	134,313	139,228	144,324	149,610	155,090
<b>Gross Margin</b>	<b>1,327,538</b>	<b>1,397,935</b>	<b>1,472,030</b>	<b>1,550,017</b>	<b>1,632,097</b>
<b>Operating expense</b>					
Staff cost	249,260	254,245	259,330	264,517	269,807
Technical consultancy	24,926	25,425	25,933	26,452	26,981
Maintenance Services	25,642	26,155	26,678	27,212	27,756
Insurances	35,490	36,200	36,924	37,662	38,416
Logistics and transfers	39,378	40,166	40,969	41,789	42,625
Equipment	169,399	172,787	176,243	179,767	183,363
Power	47,645	48,598	49,570	50,562	51,573
Other Utilities	3,689	3,763	3,838	3,915	3,993
Advertising services	25,642	26,155	26,678	27,212	27,756
Security services	12,463	12,712	12,967	13,226	13,490
Other Expenses	31,677	32,310	32,957	33,616	34,288
<b>Total Operating Expense</b>	<b>665,212</b>	<b>678,517</b>	<b>692,087</b>	<b>705,929</b>	<b>720,047</b>
Environmental	1,282	1,308	1,334	1,361	1,388
Depreciation	290,373	290,373	290,373	290,373	290,373
Loan Interest	126,783	119,213	108,348	97,534	86,052
	<b>418,438</b>	<b>410,893</b>	<b>400,055</b>	<b>389,267</b>	<b>377,813</b>
<b>Profit Before Taxes</b>	<b>243,888</b>	<b>308,526</b>	<b>379,888</b>	<b>454,821</b>	<b>534,237</b>
<b>Taxes</b>	<b>60,972</b>	<b>77,131</b>	<b>94,972</b>	<b>113,705</b>	<b>133,559</b>
<b>Net Income</b>	<b>182,916</b>	<b>231,394</b>	<b>284,916</b>	<b>341,115</b>	<b>400,678</b>

Source: PwC Analysis

## 6.2. Appendix 2: Excerpts from Mordor Intelligence Report

**Americas Limestone Market, By End-user Industry, 2016-2024 (in US\$ Million)**

End-user Industry	2016	2017	2018	2019 (est.)	2024 (f)	(%) CAGR (2019-2024)
<b>Paper and Pulp</b>	403.62	406.53	410.59	408.35	405.87	-0.12%
<b>Water Treatment</b>	761.01	806.11	850.26	886.88	1,051.24	3.46%
<b>Agriculture</b>	1,821.85	1,901.76	1,981.71	2,046.36	2,312.14	2.47%
<b>Plastics</b>	150.77	157.51	163.96	169.22	190.44	2.39%
<b>Building and Construction</b>	6,105.74	6,247.16	6,464.50	6,642.60	7,601.84	2.73%
<b>Steel Manufacturing and Other Industries (including Energy)</b>	493.14	527.14	557.89	579.96	687.40	3.46%
<b>Others</b>	384.94	405.76	425.77	441.45	501.47	2.58%
<b>Total</b>	10,121.08	10,451.96	10,854.68	11,174.84	12,750.40	2.67%

**Americas Limestone Market, By End-user Industry, 2016-2024 (in kilometric tonnes)**

End-user Industry	2016	2017	2018	2019 (est.)	2024 (f)	(%) CAGR (2019-2024)
<b>Paper and Pulp</b>	19,179.25	18,901.78	18,595.46	18,263.53	17,847.98	0.46%
<b>Water Treatment</b>	36,609.73	37,772.54	38,884.27	39,960.22	46,038.91	2.87%
<b>Agriculture</b>	73,742.33	74,963.56	76,211.45	77,535.55	85,583.14	1.99%
<b>Plastics</b>	6,853.15	6,997.10	7,127.19	7,253.24	7,949.25	1.85%
<b>Building and Construction</b>	449,940.35	450,210.95	456,097.43	461,806.59	17,059.20	2.29%
<b>Steel Manufacturing and Other Industries (including Energy)</b>	25,226.35	26,403.56	27,363.07	27,990.61	32,276.74	2.89%
<b>Others</b>	17,488.10	17,902.65	18,297.19	18,693.00	20,736.89	2.10%
<b>Total</b>	629,039.25	633,152.13	642,576.06	651,502.74	727,492.11	2.23%

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## Trade Agreements

Jamaica has negotiated trade agreements with the world's major trading powers such as the European Union, Canada, and the United States, as well as in our important domestic CARICOM markets. These trade pacts provide a range of opportunities for Jamaican exporters. The main trade agreements that Jamaica is party to include:

### Figure 5: Summary of Key Trade Agreements

<b>The European Partnership Agreement</b>
<ul style="list-style-type: none"><li>• The accords immediate duty-free/quota-free market access for CARIFORUM goods into the EU except sugar.</li></ul>
<b>Caribbean Basin Initiative (CBI)</b>
<ul style="list-style-type: none"><li>• The CBI comprises the Caribbean Basin Economic Recovery Act of 1983 (CBERA) and the Caribbean Basin Trade Partnership Act of 2000 (CBPTA). The CBI Act was established by the US in 1984 to provide economic aid to Jamaica (and 23 other countries in the Caribbean and Central America) through the waiver of tariff benefits. Most products manufactured or grown in CBI beneficiary countries are eligible for duty-free entry into the United States.</li></ul>
<b>Caribbean-Canada Trade Agreement (CARIBCAN)</b>
<ul style="list-style-type: none"><li>• CARIBCAN is a preferential arrangement guaranteeing duty free access to Canada for a wide range of products excluding textiles and apparel, footwear, luggage and handbags, leather garments, lubricating oils and methanol.</li></ul>
<b>Caribbean Single Market Economy (CSME)</b>
<ul style="list-style-type: none"><li>• Established by CARICOM to create economies of scale in the region. It offers Jamaicans the right to establish a business in another territory in the CSME without restriction. Jamaican goods that have already entered a CSME country will also be eligible for export/import into another CSME territory without duty. Capital from Jamaica can also 11 circulate freely in other CSME countries. Jamaica has also negotiated and signed Free Trade Agreements (FTA) with Argentina, Colombia and the Dominican Republic.</li></ul>

## Potential risks and constraints

Jamaica has a world class quality and abundant quantities of limestone. The limestone in Jamaica is readily accessible but there is a need for evaluation of reserves along with improved mining techniques, upgraded state-of-the-art machinery and equipment and modernization process. The industry also faces several risks to the limestone market such as:

- Inadequate record keeping
- High cost of energy
- Lack of bulk shipping of products
- Lack of security of the precious material

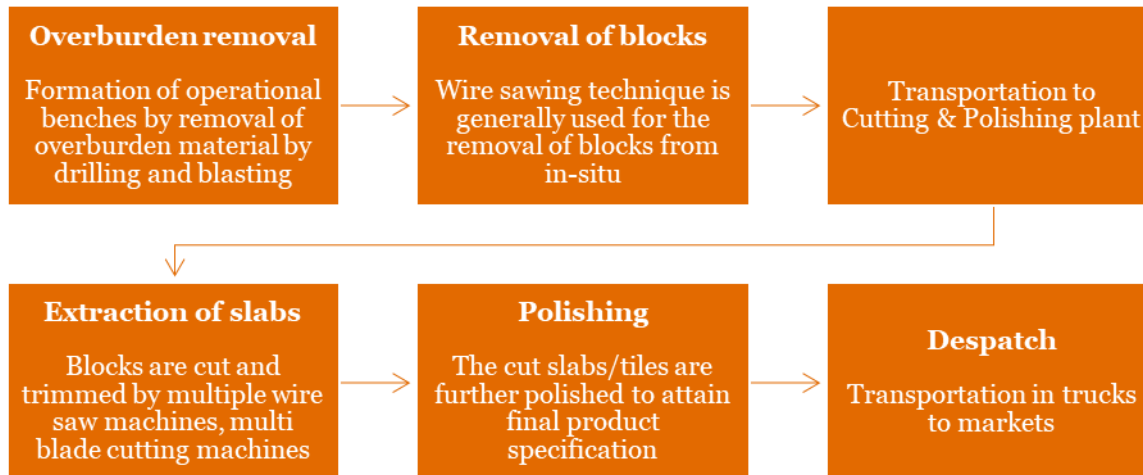
The Jamaican government is willing to provide an enabling environment to reduce these risks and have started the process through active engagement with stakeholders, implementing the Draft Minerals Policy and improving access to finance. JAMPRO has a specialist to assist investors and market players with entering the value-added industry.

The table below highlights common issues associated with limestone and respective factors used to mitigate them.

## Process Flow

The key steps involved in the production of Dimension Stone are reflected in the figure below.

**Figure 7: Production process flow for Dimension Stone**



## Waste Generation and Pollutants in a Dimension Stone Production Line

Due to the mechanical dry nature of the production process, waste and pollutants are generated mainly in the form of dust (consisting of Particulate Matter (PM)) and noise. In addition to waste/ pollutants generated from the direct production process, drainage channels around the processing plant & storage yard area and pollution due to machinery may also cause environmental disturbances.

Although these pollutants are not significant or hazardous at a nation or global level, they can be a source of pollution within communities in which the operation resides.

Therefore, best industry practices shall be followed during the plant operation to minimise or control pollution within permissible limits as regulated by NEPA.

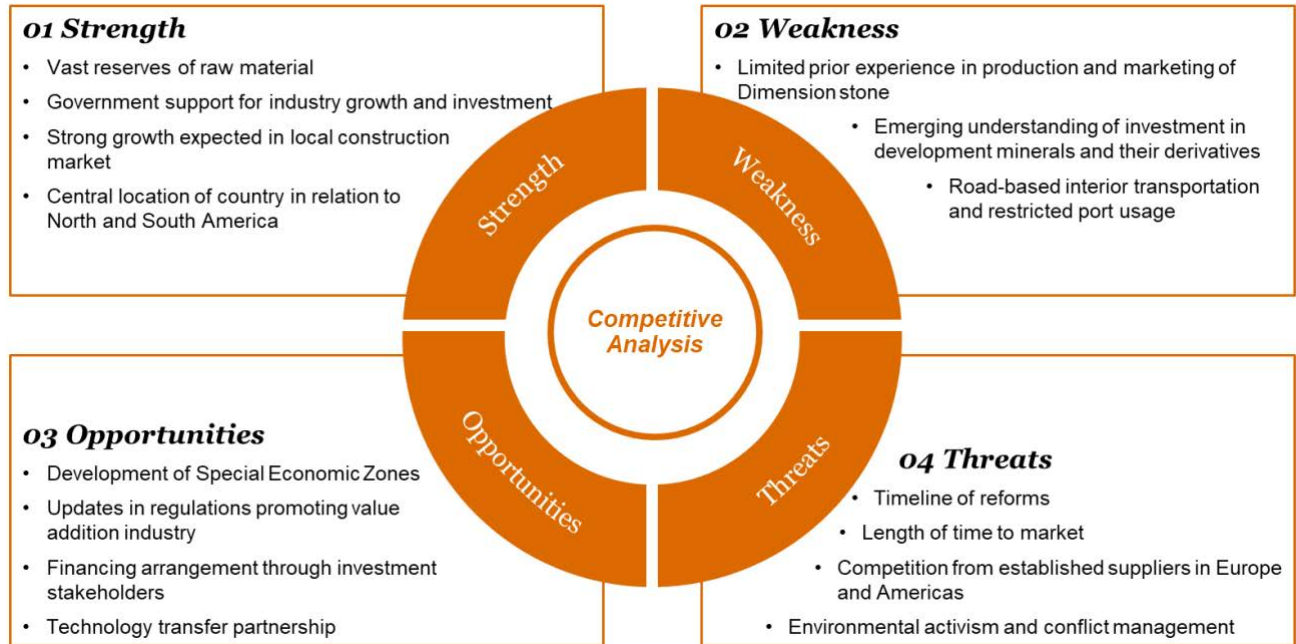
Some of the key areas leading to the generation of unwanted wastes in the production line of Dimension Stone are stated below:

- **Air pollution (PM and gaseous pollutants)**
  - Dust generated during mining activities such as drilling, blasting and other mining operations.
  - Fugitive dust emissions during transportation of staff & material over mine access roads/haul roads.
  - Gaseous emissions due to the use of diesel engine operated Heavy Earth Moving Machinery (HEMM).
  - Dust generated during cutting & polishing of blocks at processing facility.
  
- **Soil & Land degradation**
  - Improper storage/disposal of top-soil, overburden and other waste rocks.
  - Use of improper mining techniques and not following proper sequence for mine backfilling & mine closure plan.
  - Erosion of suspended dust particles to nearby area and their sedimentation on fertile soil.
  - Spillage of fuel or petrochemical leakages i.e. diesel/oil used in operation.

## Strengths, Weaknesses, Opportunities and Threats (SWOT) Analysis

To assess the growth potential of Dimension Stone in Jamaica, a SWOT analysis was conducted. The high-level results of the analysis are contained in the figure below. Findings and primary source interviews and surveys suggest Jamaica is in a strong position to be able to develop the limestone value added industry due to availability of limestone raw material and export potential in nearby region. In addition, there are opportunities in bringing in new types of financing agreements as well as incentivising new entrants with Special Economic Zones (SEZ) for the manufacture of Dimension Stone.

**Figure 11: Summary SWOT Analysis for Jamaica’s Dimension Stone industry**



**Table 25: Estimated capital expenditure for a Dimension Stone Plant**

#	Description	Stand alone Capital Cost (US\$ Millions)	Incremental Capital Cost (US\$ millions)
1.	Land cost	0.54	0.11
2.	Equipment cost (truck, wheel loader, etc.)	1.45	0.62
3.	Processing set-up cost	0.65	0.44
4.	Power cost	0.24	0.24
5.	Infrastructure cost	0.32	-
6.	Logistics	0.18	0.18
7.	Contingency @5%	0.17	0.08
<b>Total Estimated Capital Expenditure</b>		<b>3.55</b>	<b>1.67</b>

Source: PwC Analysis

**Table 26: Summary Pro Forma Income Statement Summary – Incremental Basis**

Dimension Stone						
Income Statement Summary						
Incremental Case						
	Year 1	Year 2	Year 3	Year 4	Year 5	
Income	1,461,852	1,537,163	1,616,355	1,699,626	1,787,187	
Cost of Sales	134,313	139,228	144,324	149,610	155,090	
<b>Gross Margin</b>	<b>1,327,538</b>	<b>1,397,935</b>	<b>1,472,030</b>	<b>1,550,017</b>	<b>1,632,097</b>	
<b>Operating expense</b>						
Staff cost	249,260	254,245	259,330	264,517	269,807	
Technical consultancy	24,926	25,425	25,933	26,452	26,981	
Maintenance Services	25,642	26,155	26,678	27,212	27,756	
Insurances	16,695	17,029	17,369	17,717	18,071	
Logistics and transfers	39,378	40,166	40,969	41,789	42,625	
Equipment	169,399	172,787	176,243	179,767	183,363	
Power	47,645	48,598	49,570	50,562	51,573	
Other Utilities	3,689	3,763	3,838	3,915	3,993	
Advertising services	25,642	26,155	26,678	27,212	27,756	
Security services	12,463	12,712	12,967	13,226	13,490	
Other Expenses	30,737	31,352	31,979	32,618	33,271	
<b>Total Operating Expense</b>	<b>645,478</b>	<b>658,387</b>	<b>671,555</b>	<b>684,986</b>	<b>698,686</b>	
Environmental	1,282	1,308	1,334	1,361	1,388	
Depreciation	136,595	136,595	136,595	136,595	136,595	
Loan Interest	59,641	56,079	50,969	45,881	40,480	
	<b>197,518</b>	<b>193,983</b>	<b>188,898</b>	<b>183,837</b>	<b>178,463</b>	
<b>Profit Before Taxes</b>	<b>484,543</b>	<b>545,566</b>	<b>611,577</b>	<b>681,193</b>	<b>754,948</b>	
<b>Taxes</b>	<b>121,136</b>	<b>136,391</b>	<b>152,894</b>	<b>170,298</b>	<b>188,737</b>	

<b>Net Income</b>	<b>363,407</b>	<b>409,174</b>	<b>458,683</b>	<b>510,895</b>	<b>566,211</b>
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Source: PwC Analysis

**Table 27: Summary Pro Forma Income Statement Summary – Standalone Basis**

<b>Dimension Stone</b>					
<b>Income Statement Summary</b>					
<b>Standalone Case</b>					
	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>
Income	1,461,852	1,537,163	1,616,355	1,699,626	1,787,187
Cost of Sales	134,313	139,228	144,324	149,610	155,090
<b>Gross Margin</b>	<b>1,327,538</b>	<b>1,397,935</b>	<b>1,472,030</b>	<b>1,550,017</b>	<b>1,632,097</b>
<b>Operating expense</b>					
Staff cost	249,260	254,245	259,330	264,517	269,807
Technical consultancy	24,926	25,425	25,933	26,452	26,981
Maintenance Services	25,642	26,155	26,678	27,212	27,756
Insurances	35,490	36,200	36,924	37,662	38,416
Logistics and transfers	39,378	40,166	40,969	41,789	42,625
Equipment	169,399	172,787	176,243	179,767	183,363
Power	47,645	48,598	49,570	50,562	51,573
Other Utilities	3,689	3,763	3,838	3,915	3,993
Advertising services	25,642	26,155	26,678	27,212	27,756
Security services	12,463	12,712	12,967	13,226	13,490
Other Expenses	31,677	32,310	32,957	33,616	34,288
<b>Total Operating Expense</b>	<b>665,212</b>	<b>678,517</b>	<b>692,087</b>	<b>705,929</b>	<b>720,047</b>
Environmental	1,282	1,308	1,334	1,361	1,388
Depreciation	290,373	290,373	290,373	290,373	290,373
Loan Interest	126,783	119,213	108,348	97,534	86,052
	<b>418,438</b>	<b>410,893</b>	<b>400,055</b>	<b>389,267</b>	<b>377,813</b>
<b>Profit Before Taxes</b>	<b>243,888</b>	<b>308,526</b>	<b>379,888</b>	<b>454,821</b>	<b>534,237</b>
<b>Taxes</b>	<b>60,972</b>	<b>77,131</b>	<b>94,972</b>	<b>113,705</b>	<b>133,559</b>
<b>Net Income</b>	<b>182,916</b>	<b>231,394</b>	<b>284,916</b>	<b>341,115</b>	<b>400,678</b>

Source: PwC Analysis

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