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Cultured Marble

Limestone Investment Package

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">Jamaica has large quantities of limestone reserves and high-purity limestone.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.	<ul style="list-style-type: none">Increasing stability in the regionIncreasing transparency both in governments and local authoritiesInflation stabilityDecreasing unemployment levels

The Value-Added Opportunity	Sustainable Growth Factors
<ul style="list-style-type: none"> Increased growth in limestone consumption in the Americas region presents an opportunity for Jamaica. The cost of labour in Jamaica represent one of the lowest in the Americas for accounting to the IDB Labour market division. 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). 	<ul style="list-style-type: none"> Strong relationship with international development partners Increasing access to regional and world markets 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. Growth is being driven by a more stable and increasing income and lower debt levels

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 Cultured Marble.

Table 2: Summary of Cultured Marble

Product	Description	Application/Industries
Cultured Marble	Cultured Marble is a mixture of resin and limestone that is combined with pigments to produce a wide range of colours and realistic, natural looking patterns.	<ul style="list-style-type: none"> Construction Home Decor Kitchen and bathroom products such as bathtubs, sinks, countertops, backsplashes, wall panels, shower walls and shower pans

Financial Highlight

An assessment of the valued-added production for Cultured Marble in Jamaica indicates that for a total production of 300 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 85.2% to 122.5% and net present value (NPV) range from US\$18.6M to US\$19.2M 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

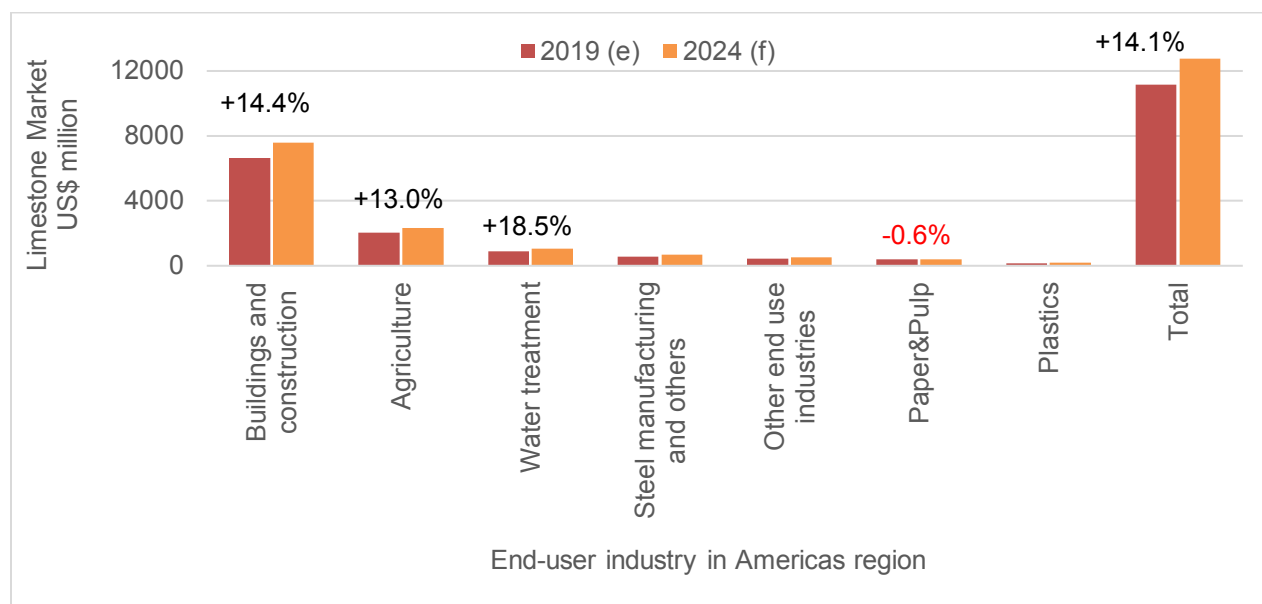
	Portland (Average)	Trelawny (Average)	St. Elizabeth (Average)
Calcium Carbonate, CaCO₃ (%)	>99	>99	>98
Magnesia, MgO (%)	~0.60	~0.2	~0.3
Silica, SiO₂ (%)	<0.20	0.50	<0.20
Iron oxide, Fe₂O₃ (%)	<0.10	0.05	0.20
Aluminium Oxide Al₂O₃ (%)	<0.10	<0.15	0.35

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

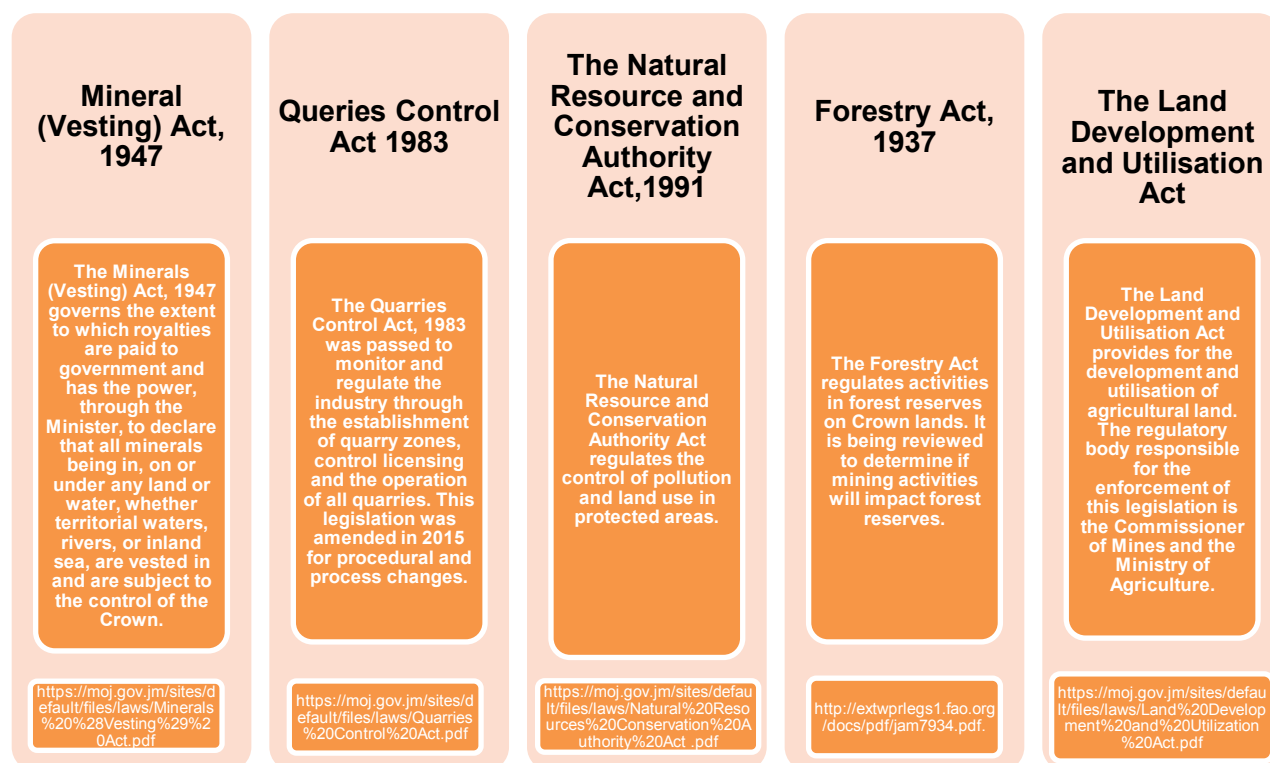
Rank	Importers	Quantity Imported in 2018 (Million Tonnes)	Percentage of Global Import by quantity	Import Value in 2018 Million US\$
1	India	22.85	39.6%	453.63
2	Germany	3.65	6.3%	43.11
3	Bangladesh	3.61	6.3%	43.23
4	Taiwan	3.21	5.6%	64.38
5	Kuwait	2.94	5.1%	31.74

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"> • Jamaica has large quantities of limestone reserves and high-purity limestone. • 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. • Increased growth in limestone consumption in the Americas region presents an opportunity for Jamaica. • The cost of labour in Jamaica represent one of the lowest in the Americas for accounting to the IDB Labour market division. • 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). 	<ul style="list-style-type: none"> • Increasing stability in the region • Increasing transparency both in governments and local authorities • Inflation stability • Decreasing unemployment levels • Strong relationship with international development partners • Increasing access to regional and world markets • 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. • Growth is being driven by a more stable and increasing income and lower debt levels

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

Source: Statin, Bank of Jamaica

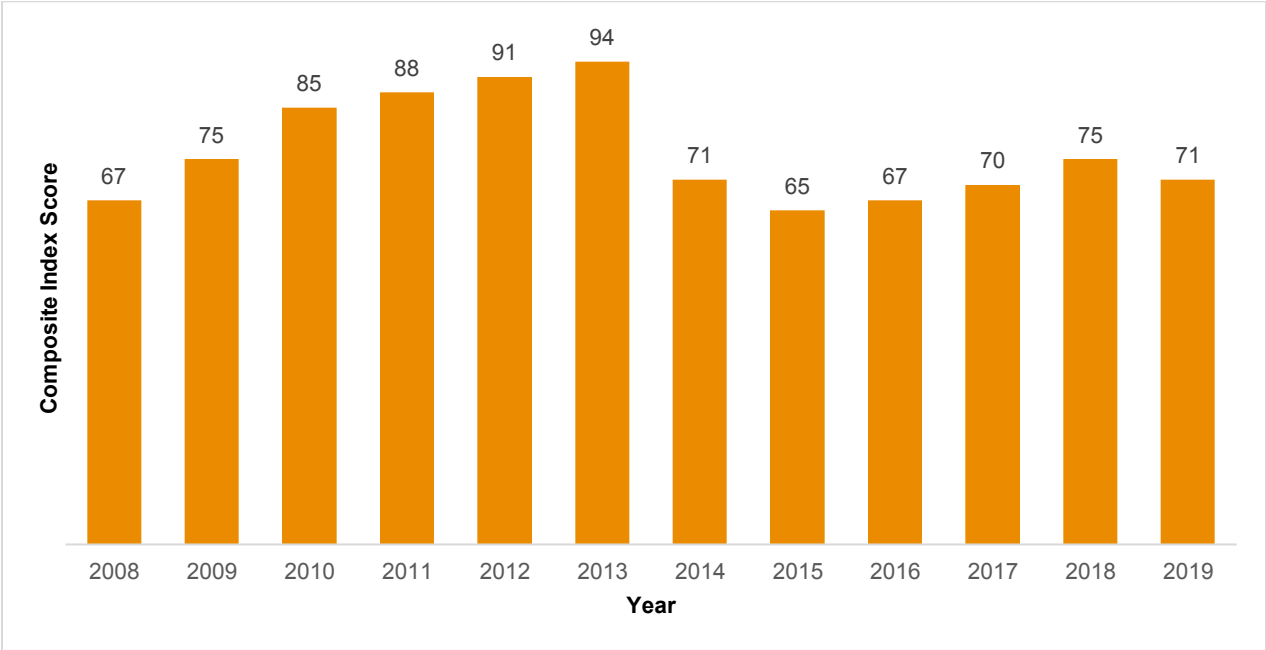
Table 8: Jamaica's credit rating by leading Credit Rating Agencies (CRA)

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

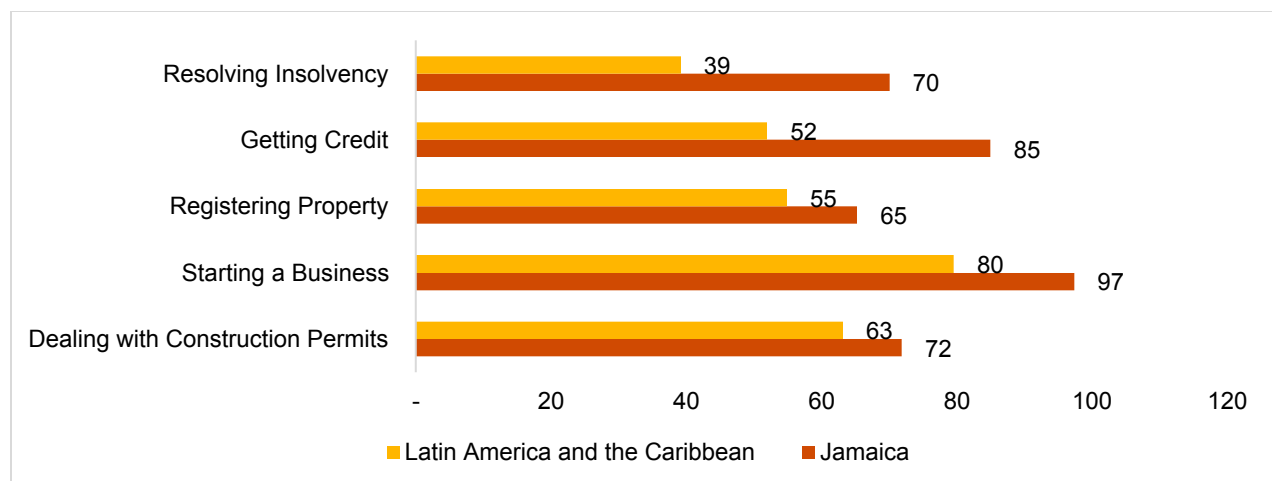


Source: The World Bank

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"> • 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% • 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).

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

The European Partnership Agreement
<ul style="list-style-type: none">• The accords immediate duty-free/quota-free market access for CARIFORUM goods into the EU except sugar.
Caribbean Basin Initiative (CBI)
<ul style="list-style-type: none">• 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.
Caribbean-Canada Trade Agreement (CARIBCAN)
<ul style="list-style-type: none">• 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.
Caribbean Single Market Economy (CSME)
<ul style="list-style-type: none">• 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.

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 modernisation 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
Weathering	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.
Erosion	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.
Staining	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.
Crumbling	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 – Cultured Marble

Overview

Cultured Marble is a mixture of resin and limestone that is combined with pigments to produce a wide range of colours and realistic, natural looking patterns. Limestone fillers and resin occupy ~72% and ~25% respectively of the total cast weight of the product, while gelcoat, catalyst, and pigment occupy the remaining 3%. The mixture is cast in moulds to create pieces such as bathtubs, sinks, countertops, backsplashes, mouldings and trim, shower walls and shower pans.



Figure 6: Typical representations of Cultured Marble



Key Applications of Cultured Marble

Cultured Marble is used in the following products described in the table below.

Table 11: Key Applications of Cultured Marble

Product		Uses
Kitchen		Cultured Marble is used in residential and commercial properties for kitchen products such as sinks, countertops, backsplashes, mouldings and trim.
Bath		Cultured Marble is used in residential and commercial properties for bathtub, shower walls and shower pans, as well as vanity tops and sinks.

Product	Uses
<p data-bbox="180 226 349 254">Accessories</p> 	<p data-bbox="1024 226 1468 380">Cultured Marble is used in residential and commercial properties in bathrooms as soap and shampoo holders, window trims and shower seats.</p>

Production Process

The production process for Cultured Marble is detailed in the table below.

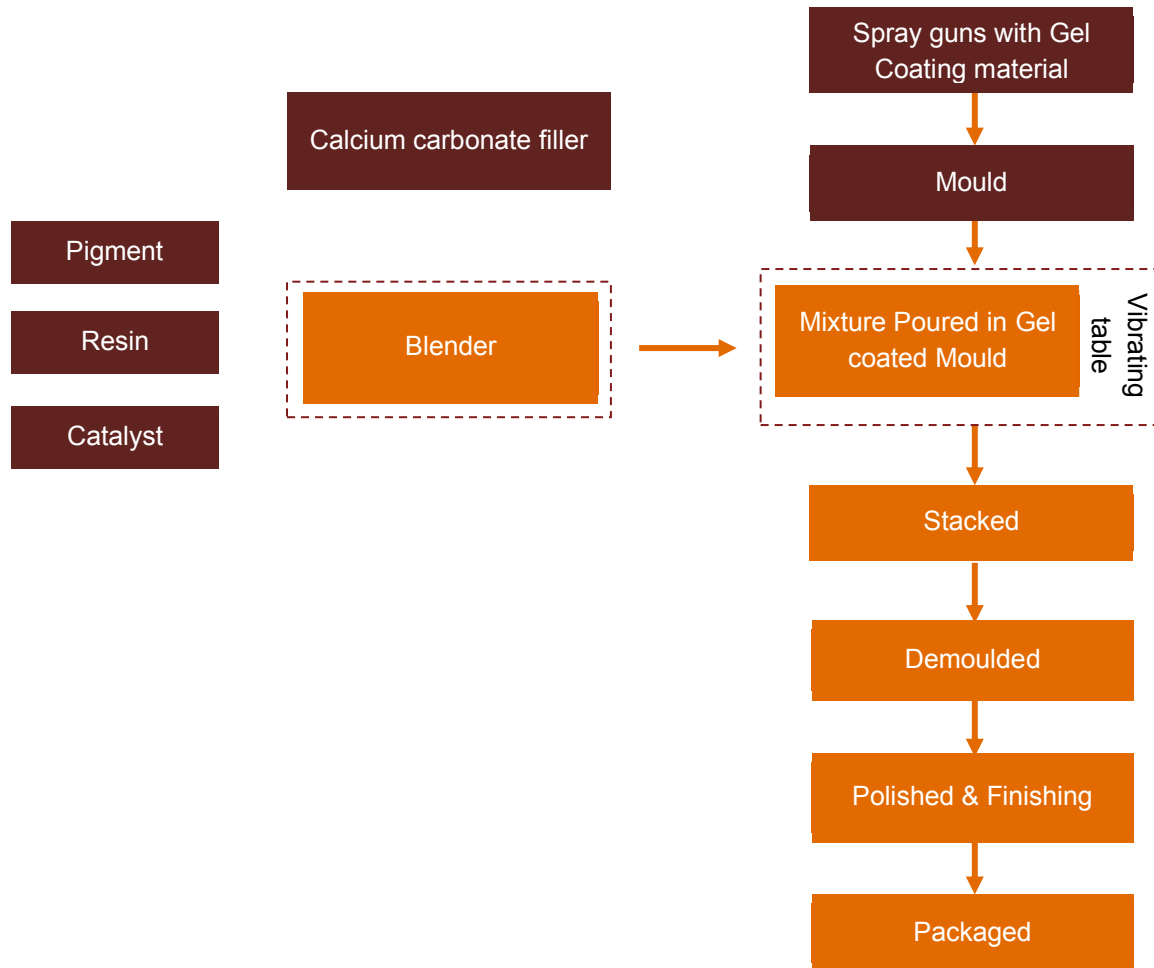
Table 12: Production Process of Cultured Marble

Production	Process
Crushed Limestone	Crushed and milled limestone (calcium carbonate filler) is used in the production of Cultured Marble products. This calcium carbonate filler accounts for ~72% by weight of the cast products. The calcium carbonate filler is procured directly from the market.
Coating the Mould	Gel coating, a type of polyester, is sprayed using a spray gun on the casting mould. The mould is then used for manufacturing the cast polymer products. After the coating, the mould is left to cure. The gel coat ensures cosmetic surface and durability. It also helps in protecting against the external environment and ensures chemical resistance, water resistance, and weathering resistance. The type and shape of the final product depends on the type of mould being used in the manufacturing process.
Preparation of Mix	Casting resin, which is a mixture of polymer, reactive monomer, promoter, inhibitors and special additives, is mixed with calcium carbonate fillers to make the matrix. The matrix is made using a blending machine and is poured into the mould. The matrix is pigmented to achieve the desired colour. Catalysts such as Methyl Ethyl Ketone Peroxide (MEKP), 2,4-Pentadione Peroxide (2,4-PDO), Cumene Hydroperoxide (CHP), are also used to harden the polyester resin mix into a solid mass.
Pouring Matrix into the Mould	The matrix consisting of a mixture of calcium carbonate filler, pigment, resin and catalyst is poured on the cured gel coated mould structure, placed on a vibrating table to ensure evenness of the flow of matrix and removal of air bubbles. The mould is then left to cure in a storage rack.
Finishing and Packaging	Post curing, de-moulding is done, and the product is processed for the desired aesthetic look through trimming, sanding and polishing. Products are then packaged for dispatch to the end user.

Process Flow

The key steps involved in the production of Cultured Marble are reflected in the figure below.

Figure 7: Production process flow for Cultured Marble



Waste Generation and Pollutants in a Cultured Marble Production Line

The conversion of limestone to Cultured Marble leads to generation of waste and pollutants mainly in the form of air/dust emissions, wastewater generation, solid waste generation and noise pollution. Although, these pollutants are not significant or hazardous at a national or global level, they can be a source of pollution within the 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 the National Environment and Planning Agency (NEPA).

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

- **Air pollution (Particulate Matter (PM) and gaseous pollutants)**
 - Dust generated during raw material handling and its storage.
 - Spraying of gel coat on mould.

- Fumes or dust generated during matrix preparation.
 - Dust generated during cutting & polishing of final products for achieving desired surface properties.
 - Gaseous emissions due to the use of diesel engine operated Heavy Earth Moving Machinery (HEMM).
- **Wastewater generation**
 - Washing out of fine limestone particles (stored in the yard) in drainage line may lead to the deterioration of water quality if it gets mixed with natural water streams or ground water table.
 - Wastewater generated due to the use of water stream for cooling of trimming/cutting blades and removal of dust produced during the cutting & trimming process.
 - Water used for washing of heavy machineries or equipment drains to wastewater stream resulting in generation of high pH and suspended solids.
 - Storm or rainwater may carry dust particles settled on the floor or chemicals spilled on the floor along with it and may result in wastewater generation and pollute ground water table.
- **Solid waste generation**
 - Solid waste generated during handling and storage of raw material.
 - Undersize material generated after cutting/trimming blocks to desired shape & size.
 - Broken pieces of mould and broken/rejected Cultured Marble product.
- **Noise pollution**
 - During vibration of table used for distributing the poured matrix evenly on the mould.
 - During blending of raw materials to form matrix.
 - During trimming, polishing of the moulded product.
 - During HEMM operation for transportation.

General Industry Best Practices for Minimising Environmental Footprint of Cultured Marble Operations

In the processing of Cultured Marble, intact rocks are mined and transported to processing plants where they are cut and polished to produce finished products per the desired end-use specifications and then dispatched to the end-user. In the production of Cultured Marble 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 national or global level, they can be a source of pollution within communities in which the operation resides.

Table 13: General industry best practices for minimising environmental footprint

Focus area (Emissions)	Good Industrial Practices (Control Measures)
Particulate Matter or Dust	<ul style="list-style-type: none"> ● Store raw material in covered enclosures. ● Use an enclosed shed for equipment such as the mixer, vibrating table and trimming and polishing equipment. ● Store raw material and the waste generated during the process in an environment protected from wind and weather conditions. ● Use a dust extraction system in conjunction with fume hoods and

	<p>enclosures for trapping dust from equipment/processes.</p> <ul style="list-style-type: none"> • Conduct regular checks to monitor for spillage or leakage of oil/chemicals from any equipment and perform regular maintenance. • Use a vacuum type or brush type sweeper to curb dust on roads and pavement. • Use proper personal protective equipment (PPE) such as gloves, safety goggles and respiratory masks. • Install air quality detectors to keep a regular check on the air quality and take preventive measures accordingly.
Industrial Wastewater	<ul style="list-style-type: none"> • Investigate the landscape, geology and groundwater in the area. • Utilise surveillance and continuous monitoring of ground water quality. • Use techniques such as sedimentation using thickeners or clarifiers to remove suspended solid particles. • Use neutralisation methods (Effluent Treatment Tank) for pH adjustment before water recirculation into the process. • Design a proper drainage system for the collection and processing of rainwater. • Monitor plant drainage and disposal measuring the pH level, conductivity, solid dissolution, hardness, calcium and sulfide content.
Solid Waste	<ul style="list-style-type: none"> • Plan disposal route and standard operating procedures (SOP) based on environmental regulations and dispose of waste by identifying disposal areas (wherever permissible). • Maintain systems to keep the record of quantity, origin, nature and frequency of waste being disposed. • Use dust generated or screened out material during the process for construction work at site along with aggregates or for soil stabilisation work. • Segregate and recycle waste back into the process for the reduction of environmental footprint. • Develop storage areas away from watercourses and sensitive boundaries. • Designate appropriate storage facilities for substances which require special treatment such as for substances that are flammable, sensitive to heat or light. • Inspect storage containers and dumps regularly for compliance.
Noise	<ul style="list-style-type: none"> • Design appropriate acoustics to limit the amount of noise which reaches nearby communities. • Select machinery (equipment and HEMMs) which generates the least noise (where financially feasible). • Use silencers for fans and room enclosures for mill operators and noise barriers. • Use of PPE like noise cancelling ear headphones. • Select a site away from communities (if possible) otherwise install outdoor silencers at site to prevent noise from affecting local people. • Install noise level sensors for continuous monitoring. • Conduct periodic checks on the HEMMS.

Equipment Required for Cultured Marble Production

The type of equipment required for production of Cultured Marble includes:

- Wash tank
- Gel coating cart
- Spray booth
- Spray gun
- Vibration table
- Blender
- Mixing vessel
- Mobile mould cart
- Various moulds (for wall panels, corner tub, wash closet, hot tubs, wash basin, countertops etc.)
- Gel coat spray system
- Pneumatic clay extruder
- Waxing tool
- Air polisher/ grinder
- Hole saw
- Caulking gun
- Pot scraper

4.0 Potential Markets for Jamaican Cultured Marble 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 14: Limestone import in Americas and CARICOM

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

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).

Cultured marble products are mainly used to build products such as wash basins, sinks, vanities, countertops, walk-in showers, and bathtubs. The final product mainly depends on the type of mould and raw materials being used in the manufacturing process. In order to assess the demand for Cultured Marble products, Harmonised System (HS) Code: 6910¹ for similar or substitutable ceramic products has

¹ Product: HS Code: 6910: Ceramic sinks, washbasins, washbasin pedestals, baths, bidets, water closet pans, flushing cisterns, urinals and similar sanitary fixtures (excluding soap dishes, sponge holders, tooth-brush holders, towel hooks and toilet paper holders)

been used as a proxy reference to provide an understanding of the potential demand for Cultured Marble products across regions.

Cultured Marble Market from a Global Perspective

Per ITC Trade map data, global imports of ceramic products which can be substituted by Cultured Marble products were estimated at US\$7,463 million in 2019, an increase of more than 30% from the value imported in 2017. In the past five years, between 2015 to 2019, the import value of ceramic products has shown a compound annual growth rate (CAGR) of around 15%. The key global importers of ceramic products by value are presented in the table below:

Table 15: Global import statistics of Ceramic Products

Country	2017	2018	2019
	Value, US\$ Million	Value, US\$ Million	Value, US\$ Million
World	5,654	6,254	7,463
USA	1,185	1,352	1,388
Germany	412	438	417
Vietnam	33	38	388
UAE	75	64	333
France	274	291	314
UK	289	291	306
Canada	213	212	221
Spain	167	188	195
South Korea	151	161	155

Source: ITC Trade map accessed on 1st May 2020

Global imports of ceramic products including sinks, washbasins, baths, bidets, and shower pans are led by Europe which accounted for 34% of the global import in 2019. Europe is followed by Asia and the Americas region accounting for 32% and 26% share of global imports respectively.

The USA is the biggest importer of products under HS code 6910 accounting for 19% of global imports in 2019. Imports into the USA has increased by 17% between 2017 to 2019 in absolute terms.

Global exports are driven by mainly China which accounts for 68% of total exports of ceramic products followed by Mexico which contributes to 4% of the global trade. Germany, Italy, Turkey and Thailand are other major exporters which together contribute around 10%, to the global trade.

About 66% of the USA's imports are supplied by China followed by Mexico which contributes 32% to the total imports in USA. Mexico which is the 2nd largest exporter of the product, supplies 94% of its exports to USA. It can be observed from the trade statistics that if an exporter exists in the vicinity, the USA market would prefer to import the product from the country provided it meets quality specifications.

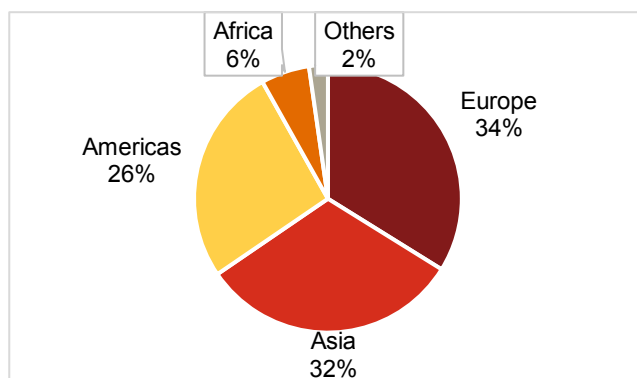


Figure 8: Share of ceramic product imports in 2019

Ceramic Products Market from a Regional Perspective

Per ITC Trade map data, the imports of substitute ceramic products has grown at a CAGR of 8.4% between 2017 to 2019 in the Americas region.

Table 16: Americas' import statistics of Ceramic Products

Country	2017	2018	2019
	Value, US\$ Million	Value, US\$ Million	Value, US\$ Million
America Aggregation	1,677	1,887	1,970
USA	1,185	1,352	1,388
Canada	213	212	221
Mexico	47	58	58
Colombia	17	17	56
Panama	14	41	36
Chile	26	33	34

Source: ITC Trade map accessed on 1st May 2020

Imports of ceramic products (similar to Cultured Marble products) in the Americas region is driven by the USA which accounted 70% of the regional import demand followed by Canada which accounted for more than 11% of the regional import. The major North American markets of USA, Canada and Mexico accounted for 85% of the total Americas imports. China is a leading supplier of ceramic products into the region.

The major suppliers of the product to the Americas region are segmented in the table below:

Table 17: Major suppliers of Ceramic Products to the Americas

S.N.	Supplier by geography	Value in 2019 (in US\$ million)
Suppliers within the Americas region		
1	Mexico	471
2	Brazil	38
3	USA	35
4	Colombia	18
5	Ecuador	18
6	Others within the Americas region	33
	Total	613
Suppliers outside the Americas region		
1	China	1,081
2	Thailand	58
3	India	40
4	Vietnam	27
5	Turkey	22
6	Others outside the Americas region	90
	Total	1,319

Source: ITC Trade map accessed on 1st May 2020

Approximately 33% of the Americas imports are sourced from within the Americas; while, 67% of the total Americas region imports are supplied by countries outside of the region. China is the leading exporter and

accounted for 82% of the total imports into the region in 2019. The total import market of the Americas for ceramic products was estimated at US\$1,970 million in 2019. Jamaica’s central location and proximity, coupled with availability of vast limestone may enable it to penetrate the regional import market and assist it in increasing its share of exports, provided it can scale up and be cost competitive with other export competitors within as well as outside the region.

Potential Markets in Caribbean Community (CARICOM)

CARICOM accounts for less than 1% of the total ceramic product import value in the Americas region. Albeit, low in import share, CARICOM’s import was estimated at US\$21 million in 2019. Jamaica is the leading importer in the CARICOM region and accounted for a quarter of total imports into the region. Other key importers included Trinidad and Tobago, Guyana, Haiti, the Bahamas and Suriname. Together, these key importing countries accounted for 56% of the total imports into CARICOM, in addition to Jamaica’s imports worth almost 25% of the total imports in 2019. Trinidad and Tobago was the lone exporter of the product in 2019 in CARICOM.

Table 18: CARICOM’s import statistics of Ceramic Products

Country	2017	2018	2019
	Value, US\$ Million	Value, US\$ Million	Value, US\$ Million
CARICOM Aggregation	24.7	20.9	21.1
Jamaica	5.8	5.6	5.3
Trinidad and Tobago	3.9	2.8	3.0
Guyana	1.2	1.0	2.9
Haiti	3.6	2.3	2.7
Bahamas	3.5	3.6	1.8

Source: ITC Trade map accessed on 1st May 2020

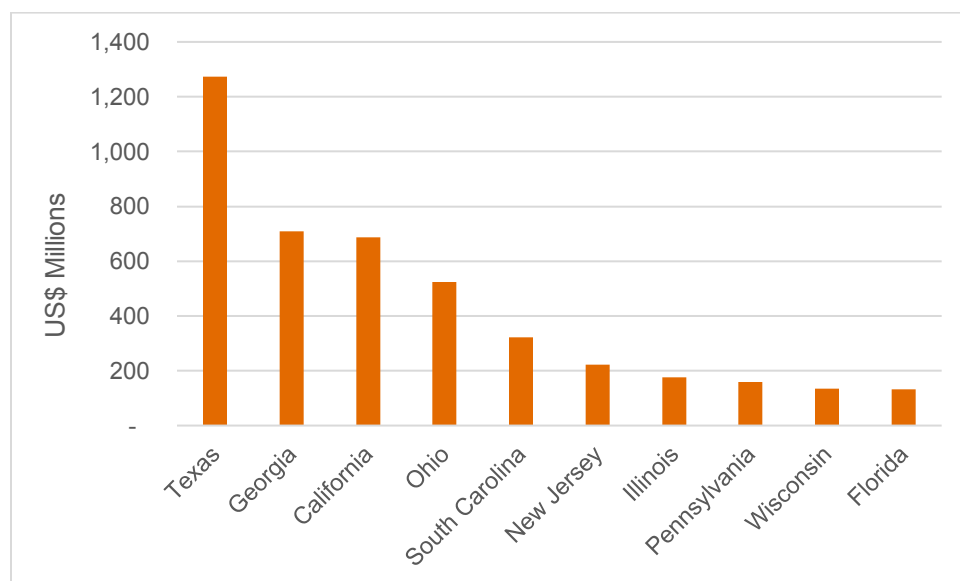
The import dependency of Jamaica in ceramic products gives an opportunity for local producers to substitute the imports. In addition, easier access (trade partnership) to the CARICOM markets can allow Jamaica to capture the entire nearby market which has an estimated total import value of about US\$21 million.

Potential Markets in United States

The chart below represents the top ten (10) states that import substitute ceramic products of Cultural Marbles², these states represent 88.3% of total demand/importation within the US. These importers import mainly from countries such as China, Mexico, Thailand, India, Vietnam, Turkey and Italy and are done by companies who are solely importers and distributors.

² Due to the lack of an HS code for Cultured Marble, HS code 6910 has been used which is a substitute to cultured marble products. HS Code 6910 incorporates Ceramic Sinks, Wash Basins, Wash Basin Pedestals, Baths, Bidets, Water Closet Pans, Flushing Cisterns, Urinals and Similar Sanitary Fixtures

Figure 9: Top 10 importers of Cultured Marble



Cultured Marble End Use Industries and Market Forecasts

Cultured Marble 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 Cultured Marble. As assessed in study of demand markets, USA is leading markets in the region with maximum construction activity.

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

- 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.³ 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.

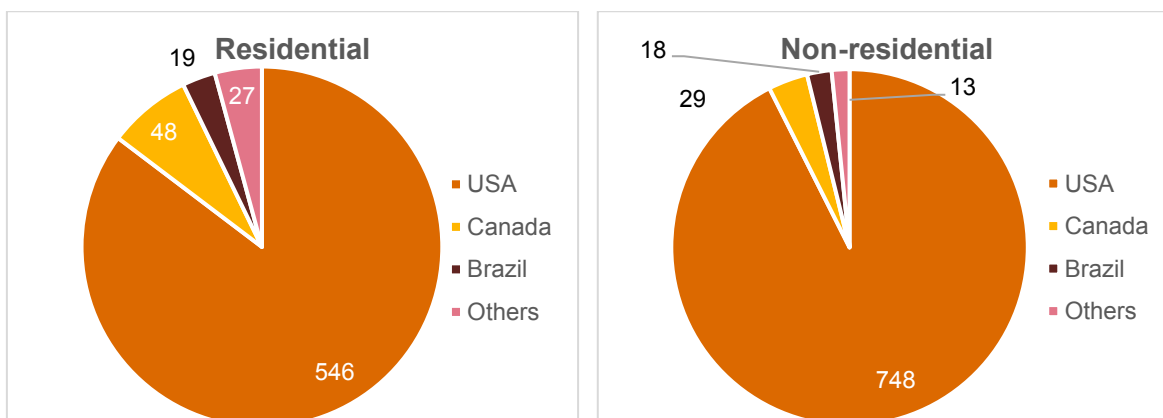
Assessment of Residential and Commercial Construction industry in Americas Region

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.

³ United States Census Bureau

Figure 10: The Americas Construction Industry in US\$ Billion (2018)



Source: MarketLine (EMIS)

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.

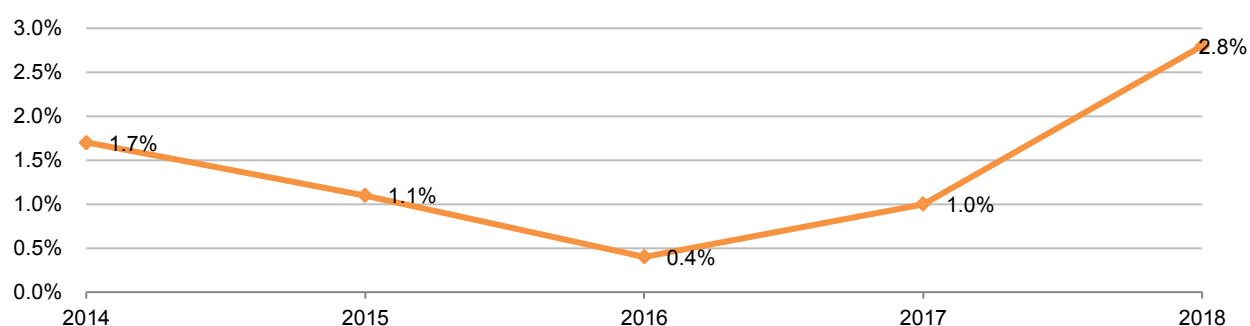
Brazil accounts for 2.2% of the Americas commercial construction sector. The Brazilian commercial construction sector grew by 0.6% in 2018 to reach a value of US\$18.3 billion. The sector's growth is

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 11: 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 cultured marble is expected in the region. Therefore, the long-term benefits of investing in the value-added production of cultured marble 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 19: Americas limestone market by buildings and construction segment (in US\$ million)

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

Source: Mordor Intelligence

Strengths, Weaknesses, Opportunities and Threats (SWOT) Analysis

To assess the growth potential of Cultured Marble 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 Cultured Marble.

Figure 12: Summary SWOT Analysis for Jamaica’s Cultured Marble 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 are growing, and will have the liquidity to finance the growth potential and ongoing initiatives.

Table 20: Scenario 1: Summary Incremental Financial Performance

Projected Incremental Financial Performance					
(In US\$M)	Year 1	Year 2	Year 3	Year 4	Year 5
Revenue	3.4	3.5	3.6	3.6	3.7
% Growth	N/A	2.0%	2.0%	2.0%	2.0%
EBITDA	1.9	1.9	2.0	2.0	2.1
% Sales	55.0%	55.4%	55.7%	56.1%	56.4%
Net Income	1.3	1.3	1.4	1.4	1.5
% sales	38.2%	38.6%	39.0%	39.4%	39.8%
Net Debt	0.6	0.5	0.4	0.3	0.2

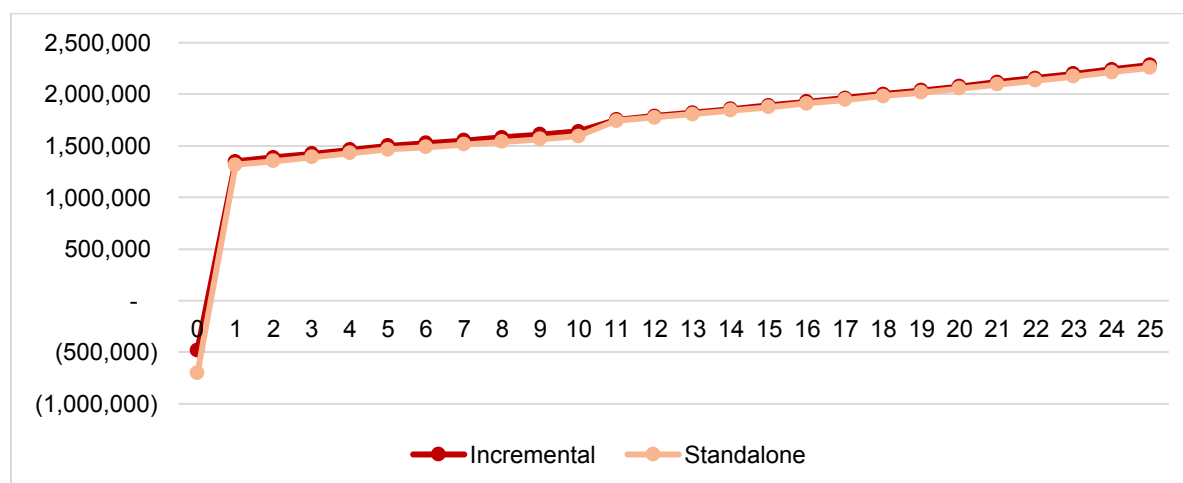
For Cultured Marble the projected average net income margin generated is expected be in excess of 35% and will be adequate finance assume debt.

Table 21: Scenario 2: Summary Standalone Financial Performance

Projected Standalone Financial Performance					
(In US\$M)	Year 1	Year 2	Year 3	Year 4	Year 5
Revenue	3.4	3.5	3.6	3.6	3.7
% Growth	N/A	2.0%	2.0%	2.0%	2.0%
EBITDA	1.9	1.9	2.0	2.0	2.1
% Sales	54.8%	55.2%	55.6%	55.9%	56.2%
Net Income	1.3	1.3	1.3	1.4	1.4
% sales	36.7%	37.1%	37.6%	38.0%	38.5%
Net Debt	0.9	0.8	0.6	0.5	0.4

For Cultured Marble the projected average net income generated will be in excess of 35% and will be adequate finance assume debt.

Figure 13: Forecasted Cash Flow



Net cashflow in Year 0 of (US\$0.5 million) includes investment in incremental setup of US\$1.0 million and debt finance US\$0.7 million (60%). The average cash position over the projected period will be +US\$1.8 million.

Net cashflow in Year 0 of (US\$0.7 million) includes investment in standalone setup of US\$1.5 million and debt finance US\$1.1 million (60%). The average cash position will be +US\$1.7 million.

Investment Cost

The investment required for to produce 300 tonnes of Cultured Marble on a standalone (start-up) basis and an incremental basis is US\$ 1.5 million and US\$1.0 million respectively. (See Appendix 1 for details).

Revenue Forecast

Cultured Marble is projected to be sold at a cost USD\$189 for Wall Panel, USD\$89 for Wash Basin and Low-Profile Water Closet (LOPROWC) and USD\$3,746 for a Bathtub 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 Cultured Marble 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 22 below shows a five (5) year analysis of a start-up operation. The production of Cultured Marble on a stand-alone basis is expected to yield a net profit of US\$1,253,143 in year one (1) and this is projected to increase to US\$1,423,063 by year five (5). Gross and net profit margins are forecasted to average 67% and 38% respectively over the 5-year period.

Table 22: Proforma financial performance for Cultured Marble on a stand-alone basis

Amounts in USD\$'	Year 1	Year 2	Year 3	Year 4	Year 5
Revenue:					
Wall Panel	298,835	304,811	310,908	317,126	323,468
Wash Basin	234,880	239,577	244,369	249,256	254,242
LOPROWC	105,688	107,801	109,957	112,156	114,400
BathTub	2,779,105	2,834,687	2,891,380	2,949,208	3,008,192
Total Revenue	3,418,507	3,486,877	3,556,614	3,627,747	3,700,302
Cost of Sale:					
Total Cost of Sales	1,162,135	1,172,535	1,183,319	1,194,503	1,206,100
Gross profit	2,256,371	2,314,342	2,373,295	2,433,244	2,494,202
Total operations Expenses	381,808	389,444	397,233	405,177	413,281
EBITDA	1,874,564	1,924,898	1,976,063	2,028,067	2,080,921
Net Profit / (losses)	1,253,143	1,293,710	1,336,125	1,379,151	1,423,063

Scenario 2: Incremental Basis (existing limestone operation)

Table 23 below shows a five (5) year analysis on an incremental basis. The production of Cultured Marble on an incremental basis is expected to yield a net profit of US\$1.31 million in year one (1) and this is projected to increase to US\$1.47 million by year five (5). Gross and net profit margins are forecasted to average 67% and 39% respectively over the 5-year period.

Table 23: Proforma financial performance for Cultured Marble on an incremental basis

Amounts in USD\$'	Year 1	Year 2	Year 3	Year 4	Year 5
Revenue:					
Wall Panel	298,835	304,811	310,908	317,126	323,468
Wash Basin	234,880	239,577	244,369	249,256	254,242
LOPROWC	105,688	107,801	109,957	112,156	114,400
BathTub	2,779,105	2,834,687	2,891,380	2,949,208	3,008,192
Total Revenue	3,418,507	3,486,877	3,556,614	3,627,747	3,700,302
Cost of Sale:					
Total Cost of Sales	1,162,135	1,172,535	1,183,319	1,194,503	1,206,100
Gross profit	2,256,371	2,314,342	2,373,295	2,433,244	2,494,202
Total operations Expenses	375,973	383,492	391,162	398,985	406,965
EBITDA	1,880,398	1,930,850	1,982,133	2,034,259	2,087,237
Net Profit / (losses)	1,305,749	1,345,515	1,386,743	1,428,590	1,471,247

Return on Investment

On an indicative basis over a projected duration of 25 years, the internal rate of return (IRR) could range from 85.2% to 122.5% and net present value (NPV) range from US\$18.6M to US\$19.2M on a standalone and incremental basis respectively when future cash flows were discounted using a discount rate of 14.3%.

Table 24: Investment appraisal results

Scenario	NPV	IRR	Payback Period
Stand-Alone Basis	US\$18.6M	85.2%	2.1 years
Incremental basis	US\$19.2M	122.5%	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 21 below.

Table 25: Sensitivity Analysis – Impact of Change in Sales growth

Scenario	NPV	IRR	Payback Period (years)	NPV	IRR	Payback Period (years)
	Stand-Alone Basis			Incremental Basis		
-0.75	-10.6	-	15.8	-9.9	-	16.0
-0.50	-7.6	-	14.8	-6.9	-	15.2
-0.25	1.5	45.6%	-	2.2	83.6.0%	-
0.00	18.6	85.2%	-	19.2	122.5%	-
+0.25	52.1	114.5%	-	52.7	154.0%	-
+0.50	111.1	140.6%	-	111.8	182.6%	-
+0.75	206.2	165.0%	-	207.2	209.2%	-

Key Assumptions

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

Input	Inputs/ Assumptions	Source for Information
Production Capacity	Peak production capacity has been considered to be 300 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.
Sales Volume	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 Cultured Marble end user products.	
Revenue	US\$189 for a wall panel, US\$89 for a wash basin and low profile water closet and US\$3,746 for a bathtub per unit. 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
Cost of Sales	Raw Material US\$ 2.0 per tonne Variable Labour US \$2.0 per unit	Average cost is determined by market survey of operators for cost to produce limestone within the local market.
Operational Expense	US\$ 1.28 to US\$1.30 per unit (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)
Financing Option	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
Land Cost	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 Cultured Marble. The land estimate typically includes area required for plant facility, workshop, storage area, waste dump, worker camps, etc.
Equipment Cost	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.
Processing Capital Cost	Processing and packaging lime kiln, hydration and carbonation unit along with supporting plant and equipment has been considered under processing capital cost for Cultured Marble.	For Cultured Marble 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.
Power	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.
Infrastructure	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.
Laboratory	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.
Contingency	A 5% contingency on total capital cost is applied to cover the budgetary effect of project threats or uncertainties.	-

Table 26: Estimated capital expenditure for a Cultured Marble Plant

#	Description	Stand alone Capital Cost (US\$ Millions)	Incremental Capital Cost (US\$ millions)
1.	Land cost	0.01	0.01
2.	Equipment cost (truck, wheel loader, etc.)	0.48	0.32
3.	Processing set-up cost	0.40	0.40
4.	Power cost	0.16	-
5.	Infrastructure cost	0.34	0.22
6.	Contingency @5%	0.07	0.05
Total Estimated Capital Expenditure		1.47	1.00

Source: PwC Analysis

Table 27: Summary Pro Forma Income Statement Summary – Incremental Basis

Cultured Marble						
Income Statement Summary						
Incremental Case						
		Year 1	Year 2	Year 3	Year 4	Year 5
	Income	3,418,507	3,486,877	3,556,614	3,627,747	3,700,302
	Cost of Sales	1,162,135	1,172,535	1,183,319	1,194,503	1,206,100
	Gross Margin	2,256,371	2,314,342	2,373,295	2,433,244	2,494,202
Operational expense						
	Staff cost	93,806	95,682	97,596	99,547	101,538
	Technical consultancy	9,381	9,568	9,760	9,955	10,154
	Insurances	12,046	12,287	12,533	12,783	13,039
	Logistics and transfers	26,381	26,909	27,447	27,996	28,556
	Equipment	50,386	51,393	52,421	53,470	54,539
	Plant Expenses	102,852	104,909	107,007	109,147	111,330
	Power	30,024	30,624	31,237	31,861	32,498
	Other Utilities	6,542	6,672	6,806	6,942	7,081
	Advertising services	20,964	21,384	21,811	22,247	22,692
	Security services	4,690	4,784	4,880	4,977	5,077
	Other Expenses	17,854	18,211	18,575	18,946	19,325
	Total Operational Expense	374,924	382,423	390,071	397,873	405,830

	Environmental	1,048	1,069	1,091	1,112	1,135
	Depreciation	96,367	96,367	96,367	96,367	96,367
	Loan Interest	43,032	40,463	36,775	33,105	29,208
		140,448	137,899	134,233	130,584	126,709
	Profit Before Taxes	1,740,999	1,794,020	1,848,991	1,904,787	1,961,662
	Taxes	435,250	448,505	462,248	476,197	490,416
	Net Income	1,305,749	1,345,515	1,386,743	1,428,590	1,471,247

Source: PwC Analysis

Table 28: Summary Pro Forma Income Statement Summary – Standalone Basis

Cultured Marble					
Income Statement Summary					
Standalone Case					
	Year 1	Year 2	Year 3	Year 4	Year 5
Income	3,418,507	3,486,877	3,556,614	3,627,747	3,700,302
Cost of Sales	1,162,135	1,172,535	1,183,319	1,194,503	1,206,100
Gross Margin	2,256,371	2,314,342	2,373,295	2,433,244	2,494,202
Operational expense					
Staff cost	93,806	95,682	97,596	99,547	101,538
Technical consultancy	9,381	9,568	9,760	9,955	10,154
Insurances	17,603	17,955	18,314	18,680	19,054
Logistics and transfers	26,381	26,909	27,447	27,996	28,556
Equipment	50,386	51,393	52,421	53,470	54,539
Plant Expenses	102,852	104,909	107,007	109,147	111,330
Power	30,024	30,624	31,237	31,861	32,498
Other Utilities	6,542	6,672	6,806	6,942	7,081
Advertising services	20,964	21,384	21,811	22,247	22,692
Security services	4,690	4,784	4,880	4,977	5,077
Other Expenses	18,131	18,494	18,864	19,241	19,626
Total Operational Expense	380,759	388,374	396,142	404,065	412,146
Environmental	1,048	1,069	1,091	1,112	1,135
Depreciation	140,823	140,823	140,823	140,823	140,823
Loan Interest	62,884	59,129	53,740	48,376	42,681
	204,755	201,021	195,654	190,311	184,639
Profit Before Taxes	1,670,857	1,724,946	1,781,499	1,838,868	1,897,417

Taxes	417,714	431,237	445,375	459,717	474,354
Net Income	1,253,143	1,293,710	1,336,125	1,379,151	1,423,063

Source: PwC Analysis

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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)
Paper and Pulp	403.62	406.53	410.59	408.35	405.87	-0.12%
Water Treatment	761.01	806.11	850.26	886.88	1,051.24	3.46%
Agriculture	1,821.85	1,901.76	1,981.71	2,046.36	2,312.14	2.47%
Plastics	150.77	157.51	163.96	169.22	190.44	2.39%
Building and Construction	6,105.74	6,247.16	6,464.50	6,642.60	7,601.84	2.73%
Steel Manufacturing and Other Industries (including Energy)	493.14	527.14	557.89	579.96	687.40	3.46%
Others	384.94	405.76	425.77	441.45	501.47	2.58%
Total	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)
Paper and Pulp	19,179.25	18,901.78	18,595.46	18,263.53	17,847.98	0.46%
Water Treatment	36,609.73	37,772.54	38,884.27	39,960.22	46,038.91	2.87%
Agriculture	73,742.33	74,963.56	76,211.45	77,535.55	85,583.14	1.99%
Plastics	6,853.15	6,997.10	7,127.19	7,253.24	7,949.25	1.85%
Building and Construction	449,940.35	450,210.95	456,097.43	461,806.59	17,059.20	2.29%
Steel Manufacturing and Other Industries (including Energy)	25,226.35	26,403.56	27,363.07	27,990.61	32,276.74	2.89%
Others	17,488.10	17,902.65	18,297.19	18,693.00	20,736.89	2.10%
Total	629,039.25	633,152.13	642,576.06	651,502.74	727,492.11	2.23%