Minerals and Secondary Aggregate Technical Planning Group
AMMR 2021 Technical Report on 2020 Minerals Data

Status of the Technical Report

This is the 10th Annual Mineral Monitoring Report (AMMR 2021) since the original was published in September 2012. It is published as the official Government statement on minerals, including mineral reserves and need. It is intended to advise the interpretation of need within the Isle of Man Strategic Plan 2016 policies: Minerals Policy 1 and Waste Policy 1.

The data used in this Report is provided from information on primary aggregate sales submitted to Government by the mineral operators and is compiled from half yearly mining lease returns. It covers the period from 1st December 2019 to 30th November 2020.

The AMMR is supported by baseline geological data and historical information contained within the former Department of Economic Development's Minerals Resources Plan 2010.

Report Summary

Primary Aggregate Sales

- Total primary aggregate sales for 2020 were 309,480 tonnes compared to 261,410 tonnes in 2019. This is an overall increase of 48,070 tonnes from 2019.
- Sand and gravel sales increased by 20,280 tonnes relative to 2019.
- Hard rock aggregate sales increased by c. 27,840 tonnes compared to 2019.
- During 2020, the contribution to the Island's hard rock primary aggregate supply was split 57:43 between the commercial and government operated quarries.
- The use of locally sourced crushed limestone as an agricultural fertilizer decreased yet again from 1,950 tonnes in 2019 to 1,134 tonnes in 2020, a decrease of 816 tonnes.
- As a consequence of the worldwide pandemic of the coronavirus, the Isle of Man Government imposed the first lockdown on 27th March 2020 which resulted in the closure of all quarries for several weeks in March/April. Despite the disruption in aggregate sales during this period, the demand for aggregates in 2020 by the construction sector exceeded 300,000 tonnes for the first time since 2011.

Reserves

- The total planned reserves of sand and gravel as of 30th November 2020 are c. 1,606,500 tonnes.
- The hard rock planned reserves (all quarries) amount to c. 3,606,600 tonnes.

Landbanks

- As of 30th November 2020, the landbank for Sand & Gravel (based on a 10-year average) stands at **15 years**.
- The equivalent Hard Rock landbank (including Government reserves) is **19.5 years**. When Government reserves are excluded, the landbank reduces to **11 years**.

- Having given due consideration to the short-term demand of aggregates based on the annual aggregates demand over the past three years, the landbank for Sand & Gravel is **16 years**, the Hard Rock landbank (including Government reserves) is **20 years** and **11 years** when Government reserves are excluded.

- At the time of publishing of this AMMR, uncertainty exists surrounding the future supply of aggregates from Billown Quarry. Whilst Colas have yet to activate the planning permission for the quarry extension, they have as recently as February 2021 indicated that they have every intention to implement plans to extend the quarry workings in the near future which would release c. 600,000 tonnes of graded/bitumen affinity aggregate to augment the Hard Rock landbank. Nevertheless, should the quarry extension not proceed, given the limited tonnage of limestone remaining at the quarry which could see aggregate supply cease on a permanent basis in the next 12 months, then the construction sector will need to source Billown's contribution of graded/bitumen affinity and Type 1 aggregate from other sources. This would place added pressure on the existing operations to increase their operations to meet demand.

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1. Sale of Primary Minerals

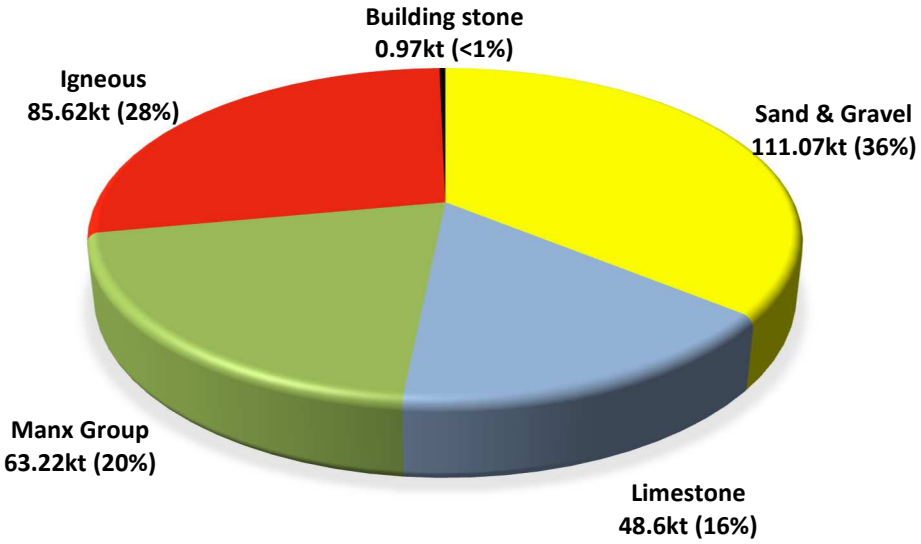
1.1 All mineral operators provide information on the actual tonnage of primary mineral sold (in the form of sand and gravel, crushed rock and building stone between 1st December 2019 and 30th November 2020). This information was provided to the Department of Environment, Food and Agriculture (DEFA).

1.2 Data on quarry and ancillary mineral extraction is available dating back to 1993 which has been used to calculate the rolling 10-year averages of sand and gravel (S&G) and hard rock (HR) (see Section 5 - Forecast Need for Minerals).

Table 1: Summary of Primary Aggregate & Building Stone Sales 2018 – 2020

	2018	2019	2020
Mineral Operation	**Tonnes ('000)**	**Tonnes ('000)**	**Tonnes ('000)**
Ballaharra Sand Pit	**9.93**	**7.41**	**8.55**
Point of Ayre	**82.48**	**83.38**	**102.52**
Billown Quarry	**39.93**	**51.81**	**48.60**
Cringle Quarry (Crushed Rock)	**31.88**	**31.60**	**51.71**
Cringle Quarry (Building Stone)	**0.94**	**0.51**	**0.57**
Earystane Quarry (Crushed Rock)	**2.74**	**2.39**	**11.51**
Earystane Quarry (Building Stone)	**0.29**	**0.20**	**0.30**
Pooil Vaaish Quarry (Crushed Rock)	**0.32**	**0.00**	**0.0**
Pooil Vaaish Quarry (Building Stone)	**0.06**	**0.06**	**0.10**
Poortown Quarry (crushed rock - Government Sales)	**36.24**	**20.92**	**42.33**
Poortown Quarry (crushed rock - Private Sales)	**25.18**	**40.71**	**16.77**
Stoney Mountain Quarry (crushed rock - Government Sales)	**10.35**	**12.80**	**23.94**
Stoney Mountain Quarry (crushed rock - Private Sales)	**12.65**	**9.57**	**2.58**
Ancillary Mining Total	**0.00**	**0.00**	**0.00**
TOTAL	**252.99**	**261.41**	**309.48**

Figure 1 2020 Sales of Primary Aggregate



Primary Mineral Extraction by Mineral Type: Sand and Gravel; Limestone; Manx Group; Igneous

Table 2: Total Sales as Primary Aggregate 2011 – 2020 *('000 tonnes)*

Mineral Type	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Sand & Gravel	146.98	101.8	94.66	98.80	101.01	116.99	108.13	92.41	90.79	111.07
Limestone	83.73	72.74	57.86	51.84	57.87	50.06	48.87	40.25	51.81	48.60
Manx Group	59.94	22.91	15.35	24.29	34.24	26.95	37.28	34.62	34.00	63.22
Igneous	100.2	89.17	110.26	100.45	93.23	91.67	85.69	84.43	84.04	85.62
TOTAL	**390.85**	**286.62**	**278.13**	**275.38**	**286.35**	**285.67**	**279.97**	**251.71**	**260.64**	**308.51**

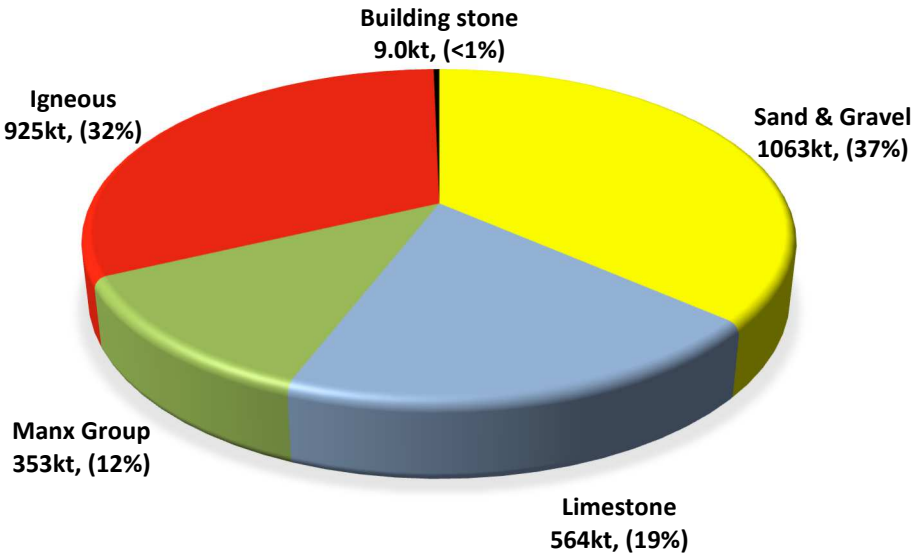
Table 3: Total Sales as Building Stone 2011 – 2020 *('000 tonnes)*

Mineral Type	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Limestone	0.36	0.12	0.06	0.00	0.00	0.00	0.04	0.06	0.06	0.10
Manx Group	0.77	0.66	0.65	0.40	0.72	0.99	1.53	1.23	0.71	0.87
TOTAL	**1.13**	**0.78**	**0.71**	**0.40**	**0.72**	**0.99**	**1.57**	**1.28**	**0.77**	**0.97**

Table 4: Total Sales Primary Agg & Building Stone 2011 – 20120 *('000 tonnes)*

Mineral Type	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Primary Agg	390.85	286.62	278.13	275.38	286.35	285.67	279.97	251.71	260.64	308.51
Building Stone	1.13	0.78	0.71	0.4	0.72	0.99	1.57	1.28	0.77	0.97
TOTAL	**391.98**	**287.4**	**278.84**	**275.78**	**287.07**	**286.66**	**281.54**	**252.99**	**261.41**	**309.48**

Figure 2: Total 10 Year Sales of Primary Aggregate and Building Stone (tonnes) 2011 to 2020



2. End Use of Extracted Minerals

2.1 Extracted minerals can be processed into aggregate products which are suitable for a variety of end uses. The range of potential aggregate end uses is, in general, determined by the mineralogy of the S&G and Hard Rock.

2.2 Data on mineral end-use over time can, where available, provide a useful indication of the demand for specific mineral products on Island. While at the strategic level forecasting the need for S&G and Hard Rock is based on a ten-year average annual sales, a more detailed interpretation of product end-use can advise the assessment of individual mineral planning applications.

2.3 For analysis purposes, the demand for minerals has been subdivided into the following categories:

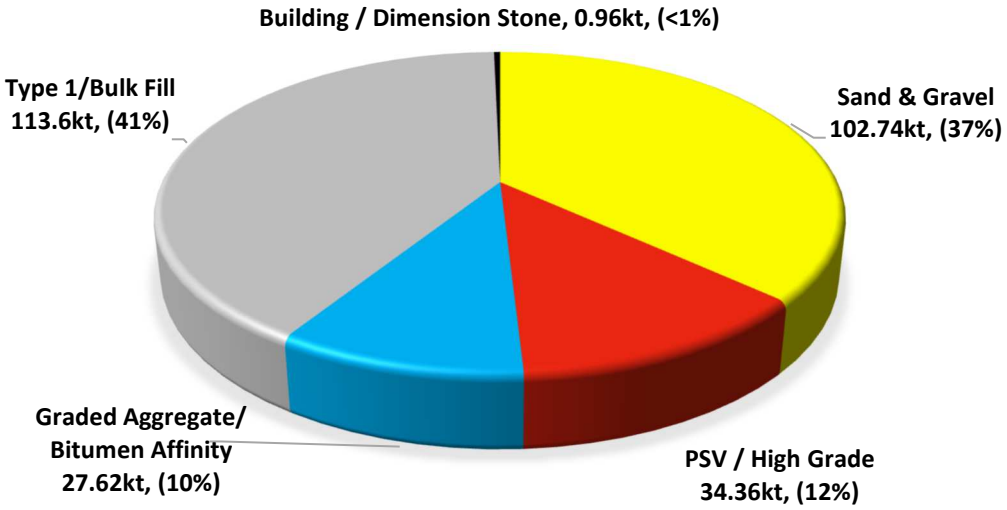
- Sand and Gravel
- Polished Stone Value (PSV) / High grade aggregates
- Graded aggregates / bitumen affinity
- Type 1 and Bulk Fill
- Building and Dimension stone

2.4 Table 5 below illustrates the variations in product categories over the past 7 years.

Table 5: Aggregate Sales by Subcategories 2014 – 2020 *('000 tonnes)*

Product Category	2014	2015	2016	2017	2018	2019	2020	Total	7yr Average
Sand & Gravel	98.80	101.01	116.99	108.12	92.41	90.79	111.07	**719.19**	102.74
PSV / High Grade	37.11	25.11	32.06	28.76	32.21	40.58	44.68	**240.51**	34.36
Graded Aggregate/ Bitumen Affinity	30.22	34.53	27.59	20.94	19.42	31.68	28.95	**193.33**	27.62
Type 1 and Bulk Fill	109.25	125.70	109.03	122.15	107.66	97.59	123.81	**795.19**	113.60
Building / Dimension Stone	0.40	0.72	0.99	1.57	1.28	0.77	0.97	**6.70**	0.96
TOTAL	**275.78**	**287.07**	**286.66**	**281.54**	**252.98**	**261.41**	**309.48**	**1955.00**	279.27

Figure 3: Percentile Summary of Aggregate Sales by Sub Categories (7-year average 2014-2020)

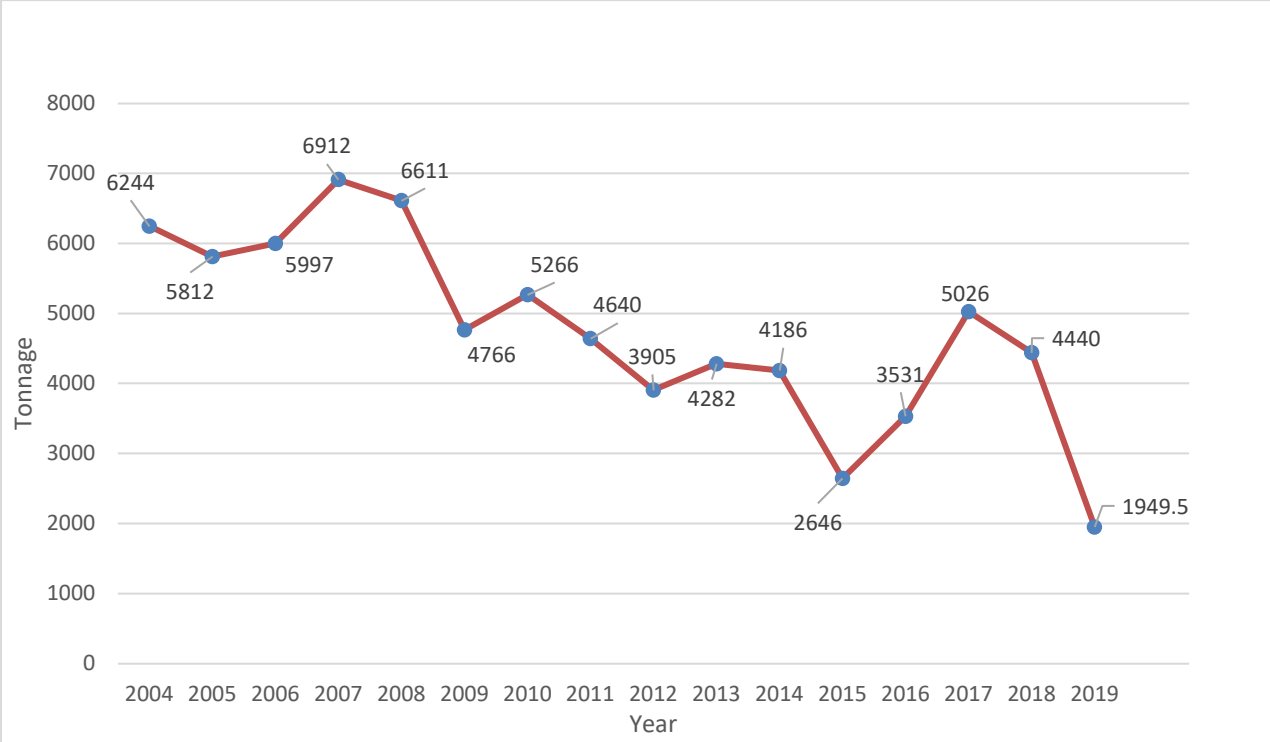


Agricultural Lime

2.5 All agricultural land used for crop production requires the soil to have a pH in the region of 5.8 to 6.2 to maintain good levels of production and ensure that any fertilisers applied are utilised efficiently. The majority of the Island's soils are acidic and therefore require the periodic application of lime to increase and/or maintain pH. Sources of lime used on the Island commonly includes crushed limestone and imported pelletised lime, historically crushed limestone has also been imported. Limestone used for agricultural purposes is not classified as an 'aggregate' for the purposes of forecasting need for Hard Rock. However, as the tonnage used is minimal in comparison with total aggregate sales it has not been excluded from the calculation of Hard Rock need.

2.6 The downward trend in demand for Agricultural lime has continued during 2020.

Figure 4: Agricultural Lime Production 2004 – 2020 (Billown Quarry)



3. Mineral Reserves

3.1 A mineral reserve is the tonnage of mineral that is permitted to be extracted from a mineral operation which has a valid planning permission. The respective mineral reserves have been calculated for each existing mineral operation. The mechanism for determining mineral reserves is based on two options:

a) any re-assessment of reserves carried out by the mineral operator; or
b) assessment of reserves based on the total tonnage of minerals permitted to be extracted by an approved planning permission and adjusted by deducting the total tonnage of sales between the date of activation of the planning permission and November 2019.

3.2 The reserve calculations have been undertaken by DEFA which collates information on annual mineral sales as part of the licencing of mineral extraction and collection of mineral royalties. The following mineral reserves reflect the situation at each mineral operation as at the end of November 2020.

TABLE 6: Sand and Gravel Reserves on 30th November 2020

	2017	2018	2019	2020
Operation	Tonnes	Tonnes	Tonnes	Tonnes
Point of Ayre	1,397,000	1,314,500	1,231,000	1,128,500
Ballaharra Sand Pit	504,150	494,200	486,800	478,250
Cronk y Scotty Sand Pit	17,200	0[1]	N/A	N/A
TOTAL	1,918,350	1,808,700	1,717,800	1,606,750[2]

Notes:
1 Excludes Cronk y Scotty reserves now the quarry has permanently closed.
2 Includes the silt content in the reserve

Sand and Gravel Proportions within Reserve

3.3 This latest edition of the AMMR estimates the proportion of sand and gravel making up the Island's permitted reserves at each operation.

Ballaharra Sand Pit

3.4 The proportion of gravel contained within the deposits has historically been very low and inconsistent. For the purpose of this estimate, the reserve is assumed to comprise 100% sand, i.e. 478,250 tonnes. Ballaharra sand has the properties to produce a building sand, concreting sand, pavior bedding sand and kiln dried pavior jointing sand. Any gravel is processed to produce 6mm and 14mm aggregate.

Point of Ayre

3.5 Evidence from previous site exploration indicates that the reserves comprise 46% gravel, 52% sand and 2% silt[1]. Therefore, of the remaining reserve, the quantities comprises approximately 519,000 tonnes of gravel, 587,000 tonnes of sand and 22,500 tonnes of silt. Once the clay and silt has been removed, the sand at Point of Ayre can be processed to produce a 0/2mm Building Sand, 0/4mm concrete sand, 0/6mm grit sand, sport turf sand and top dressing sand. The gravel content is crushed and screened to produce 4/10mm chippings, 10/20mm chippings as well as a 20mm sand and gravel mix and a 4/20mm gravel mix.

[1] Mineral Resources Plan 2010

Reserve Summary

Operation	Sand	Gravel	Total
Ballaharra	478,250	0	**478,250**
Annual Sales (10 year average)	11,500		
Remaining life of reserve	c. 42 yrs		
Point of Ayre	587,000	519,000	**1,106,000**
Annual Sales (10 year average)	43,000	50,000	
Remaining life of reserve	c. 13.6 yrs	c. 10.4 yrs	
			1,584,250[1]

Notes:
1. Excluding silt/clay content in Point of Ayre reserves

TABLE 7: Hard Rock Reserves on 30th November 2020

		2017	2018	2019	2020
Mineral	**Operation**	**Tonnes**	**Tonnes**	**Tonnes**	**Tonnes**
Limestone	Billown Quarry	18,756	39,000[1]	50,000	55,000[4]
	Pooil Vaaish Quarry	99,956	99,584	99,500	99,400
Manx Group	Cringle Quarry	1,083,596	1,050,781	820,000[3]	767,700
	Earystane Quarry	132,476	129,444	127,000	115,200
	Starch Mill Quarry	35,878	0[2]	N/A	N/A
Igneous	Poortown Quarry	624,305	562,881	501,000	441,800
	Stoney Mountain Quarry	2,198,987	2,175,982	2,154,000	2,127,500
TOTAL		**4,158,000**	**4,057,672**	**3,751,500**	**3,606,600**

Notes:
1. Readjusted reserve by Colas in 2016
2. Reserves at Starch Mill have been excluded from the Hard Rock landbank
3. Recent reserve estimate by Wardell Armstrong based on February 2019 topographical survey of quarry
4. Estimate based on recent discussions with Colas and DEFA

4. Forecast Need for Minerals, and Review of Mineral Production

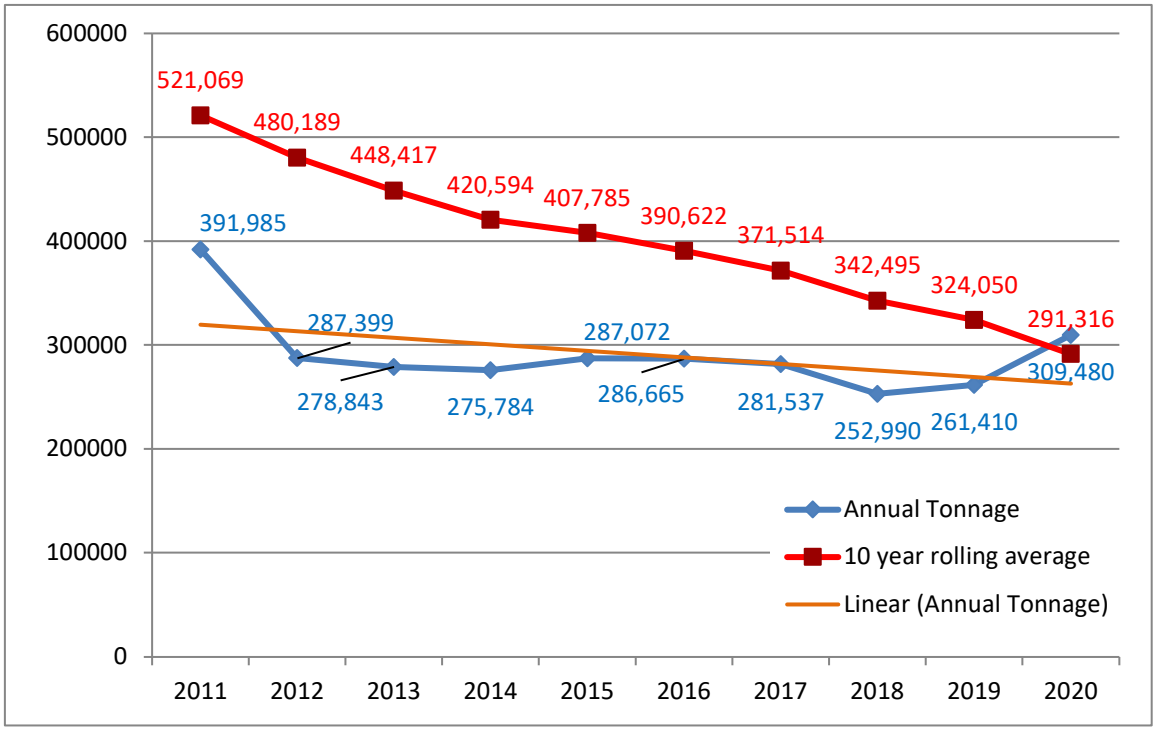
4.1 Key for business planning in the minerals industry is certainty about the availability of reserves. Forecasting need for minerals based on changes in measures of economic activity (e.g. GDP) has historically proven to be unreliable. Using a 10-year rolling average of annual aggregate sales from all quarries to forecast the future 12 months' minerals need is considered the most accurate method. This mitigates the potential of a one-off major infrastructure construction project to skew average aggregate demand.

4.2 Figure 5 below compares the actual annual primary aggregate sales of sand and gravel and hard rock (blue line) against the rolling 10-year annual aggregates demand (red line) since 2011.

4.3 The linear trend line (orange line) indicates the decrease in sales of primary aggregate since 2011. The spike in 10 year rolling average figure in 2011 is influenced by the one-off extraction of 274,000t of aggregate in 2010 for use in the airport runway extension and sourced from New Turkeyland Quarry.

4.4 The gap between forecast (10 yr. rolling average) and actual tonnage sales has continually narrowed over the past 10 years. In 2020, the annual sales and rolling 10 year average have crossed over and there is now correlation between these two data sets.

Figure 5: Comparison of Actual Aggregate Sales with Forecast Aggregate Sales Based on a 10-year rolling average



Forecast of Aggregate Need in 2021

4.5 The AMMR reports on mineral sales and reserves for all quarries on the Island. On the Isle of Man, the Government owns and operates two hard rock quarries, namely Poortown Quarry and Stoney Mountain Quarry. This is to ensure that the Island can meet its national need for highest grade aggregate and rock for Government infrastructure works.

4.6 Most of the high-quality aggregate produced from Poortown and the granite from Stoney Mountain is utilised by Government. However lower quality mineral from both Poortown and Stoney Mountain is supplied to the commercial sector which includes certain mineral operators. At present it is only possible to confirm the tonnage of aggregate used in DOI civil engineering works. In seeking to reflect the situation the AMMR currently reports the aggregate data including and excluding Government sales and reserves. It is acknowledged however that removing Government reserves entirely from the calculation of the Hard Rock landbank does not accurately represent the availability of aggregate to the commercial market.

Sand and Gravel

4.7 The forecast of the requirement for sand and gravel is based upon the average tonnage over the previous 10 years.

Table 8: Forecast of Need for Sand and Gravel in 2020 (10 years)

2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	10 Year Total Tonnes ('000)	10 Year Ave. Tonnes ('000)
147.0	101.8	94.7	98.8	101.0	117.0	108.1	92.41	90.79	111.07	1062.67	106.27

4.8 The annual sand and gravel requirement for 2021 using the 10-year aggregate forecast is c.**106,000 tonnes**. This represents a decrease of 4,000 tonnes compared to the 110,000 tonnes forecast for 2020.

Table 9: Forecast of Need for Sand and Gravel in 2021 (3 years)

2018	2019	2020	3 Year Total Tonnes ('000)	3 Year Ave. Tonnes ('000)
92.41	90.79	**111.07**	**294.27**	**98.09**

4.9 The annual sand and gravel requirement for 2021 using the 3-year aggregate forecast is c.**98,000 tonnes**. This represents an increase of 1,000 tonnes compared to the 97,000 tonnes forecast for 2020.

Hard Rock (aggregate/building stone)

4.10 Hard Rock (HR) quarries are operated on Island by both the commercial sector and by Government. To reflect how this impacts on commercial need for, and availability of, aggregate, the AMMR reports the aggregate data in a number of formats, including and excluding Government sales and reserves.

4.11 The forecast of the requirement for hard rock is also based upon the average tonnage over the previous 10 years.

Option A All Sales from all Hard Rock quarries

4.12 Based on a 10-year rolling average of annual aggregate/building stone sales from **all HR quarries,** including all sales (to private and commercial sectors) from Poortown (PT) and Stoney Mountain (SM) quarries.

Table 10: Forecast of Need – HR 2021 - All HR Quarries (10 years)

Mineral Type	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	10 Year Total Tonnes ('000)	10 Year Ave. Tonnes ('000)
Limestone	83.7	72.8	57.9	51.8	57.9	50.1	48.9	40.3	51.9	48.7	564.0	56.4
Manx Group	59.7	23.6	16.0	24.7	35.0	27.9	38.8	35.9	34.8	64.1	360.5	36.0
Igneous	100.2	89.2	110.3	100.4	93.2	91.7	85.7	84.4	84.0	85.7	924.8	92.5
TOTAL	**243.6**	**185.6**	**184.2**	**176.9**	**186.1**	**169.7**	**173.4**	**160.6**	**170.6**	**198.5**	**1849.3**	**184.9**

4.13 The total HR requirement for 2021 (based on all HR sales) using the 10-year aggregate forecast is **c.185,000 tonnes**. This represents a decrease of 29,000 tonnes compared to the 214,000 tonnes forecast for 2020.

Table 11: Forecast of Need – HR 2021 - All HR Quarries (3 years)

Mineral Type	2018	2019	2020	3 Year Total Tonnes ('000)	3 Year Ave. Tonnes ('000)
Limestone	40.3	51.9	48.7	140.9	47.0
Manx Group	35.9	34.8	64.1	134.8	44.9
Igneous	84.4	84.0	85.7	254.1	84.7
TOTAL	**160.6**	**170.6**	**170.6**	**529.8**	**176.6**

4.14 The total HR requirement for 2021 (based on all HR sales) using the 3-year aggregate forecast is **c.176,600 tonnes**. This represents an increase of 8,400 tonnes compared to the 168,200 tonnes forecast for 2020.

Option B Excluding All Sales from Poortown and Stoney Mountain Quarries

4.14 Based on a 10-year rolling average of annual aggregate/building stone sales from all HR quarries but excluding **all** sales from Poortown and Stoney Mountain quarries.

Table 12: Forecast of Need – HR in 2021 Excluding all sales from PT and SM (10 years)

Mineral Type	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	10 Year Total Tonnes ('000)	10 Year Ave. Tonnes ('000)
Limestone	83.7	72.8	57.9	51.8	57.9	50.1	48.9	40.3	51.9	48.7	564.0	56.4
Manx Group	59.7	23.6	16.0	24.7	35.0	27.9	38.8	35.9	34.8	64.1	360.5	36.0
TOTAL	**143.4**	**96.4**	**73.9**	**76.5**	**92.8**	**78.0**	**87.7**	**76.2**	**86.7**	**112.8**	**924.5**	**92.4**

4.15 The total HR requirement for 2021 (excluding sales from Poortown and Stoney Mountain) using the 10-year aggregate forecast is **c.92,400 tonnes**. This represents a decrease of 26,600 tonnes compared to the 119,000 tonnes forecast for 2020.

Table 13: Forecast of Need - HR in 2021 Excluding all sales from PT and SM (3 years)

Mineral Type	2018	2019	2020	3 Year Total Tonnes ('000)	3 Year Ave. Tonnes ('000)
Limestone	40.3	51.9	48.7	140.9	47.0
Manx Group	35.9	34.8	64.1	134.8	44.9
TOTAL	**76.2**	**86.7**	**112.8**	**275.7**	**91.9**

4.16 The total HR requirement for 2021 (excluding sales from Poortown and Stoney Mountain) using the 3-year aggregate forecast is **c. 92,000 tonnes**. This represents an increase of 8,500 tonnes compared to the 83,500 tonnes forecast for 2020.

Option C All Sales from All HR quarries excluding Poortown Quarry

4.17 Based on a 10-year rolling average of annual aggregate/building stone sales from **all HR quarries** including Stoney Mountain Quarry but excluding all sales (to private and commercial sectors) from Poortown (PT).

Table 14: Forecast of Need – HR 2021 - All HR Quarries excluding Poortown (10 years)

Mineral Type	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	10 Year Total Tonnes ('000)	10 Year Ave. Tonnes ('000)
Limestone	83.7	72.8	57.9	51.8	57.9	50.1	48.9	40.3	51.9	48.7	564.0	56.4
Manx Group	59.7	23.6	16.0	24.7	35.0	27.9	38.8	35.9	34.8	64.1	360.5	36.0
Igneous - SM	22.5	28.4	33.7	22.4	16.4	17.1	18.1	23.0	22.4	26.5	230.5	23.1
TOTAL	**165.9**	**124.8**	**107.6**	**98.9**	**109.2**	**95.1**	**105.8**	**99.2**	**109.1**	**139.3**	**1,155.0**	**115.5**

4.18 The total HR requirement for 2021 (based on all HR sales excluding Poortown Quarry) using the 10-year aggregate forecast is **c.115,500 tonnes**. This represents a decrease of 27,400 tonnes compared to the 142,900 tonnes forecast for 2020.

Table 15: Forecast of Need – HR 2021 - All HR Quarries excluding Poortown (3 years)

Mineral Type	2018	2019	2020	3 Year Total Tonnes ('000)	3 Year Ave. Tonnes ('000)
Limestone	40.3	51.9	48.7	140.9	47.0
Manx Group	35.9	34.8	64.1	134.8	44.9
Igneous - SM	23.0	22.4	26.5	71.9	24.0
TOTAL	**99.2**	**109.1**	**139.3**	**347.6**	**115.9**

4.19 The total HR requirement for 2021 (based on all HR sales excluding Poortown Quarry) using the 3-year aggregate forecast is **c.116,000 tonnes**. This represents an increase of 11,300 tonnes compared to the 104,700 tonnes forecast for 2020.

Table 16 Summary of Aggregate Need in 2021

Forecast annual need from:	Annual tonnage based on 10 years average sales	Annual tonnage based on 3 years average sales
Sand & Gravel quarries	**106,000**	**98,000**
Hard Rock quarries – all	**185,000**	**176,600**
Hard Rock quarries – excluding Government Quarries	**92,400**	**92,000**
Hard Rock quarries – excluding Poortown Quarry	**115,500**	**116,000**

5. Landbanks

5.1 A mineral landbank is defined as the stock of permitted reserves that have a valid planning permission. Landbanks are needed to ensure a continuous supply of minerals. Conventional advice is that minimum length of the landbank should reflect the time needed to obtain planning permission and bring the operations into full production. The landbank required for both HR and S&G is set at 10 years as agreed by the MSATPG.

5.2 It is acknowledged that landbanks are only an indication of the availability of minerals. The interpretation and management of landbanks should be based on considerations of real need and real supply taking into account factors such as: the nature and quality of the aggregate which may change within a quarry and over time; known constraints on the availability of consented reserves that might limit output over the landbank period; significant future increases in demand that can be forecast with reasonable certainty.

5.3 Whilst the hard rock landbank may indicate a sufficient amount of reserves remaining without the need for new planning applications to replenish depleted reserves, this may mask a situation where a shortfall in the availability of certain minerals, i.e. graded aggregates/bitumen affinity products may exist.

Classification

5.3 The standard protocol adopted by Aggregate Working Parties across the UK for classifying landbanks is by the two main mineral types HR and S&G. There is some sub-classification but this is for minerals with a specialised end use e.g. silica sand.

5.4 The option of sub-dividing the reserves of these two main mineral types was considered. For example, HR reserves could be sub-divided into high grade aggregate (PSV/ bitumen affinity), Type 1/graded aggregate, and building stone. However, the option was discounted as being both impracticable and imprecise. A HR reserve may produce a range of aggregate types due to local variations in mineralogy, weathering along faults lines, intrusions or bedding planes. Reserves can also be processed into a range of products according to demand. The landbank for HR on the Island is therefore calculated as follows:

$$\text{Landbank for Hard Rock} = \frac{\text{Total Mineral reserves remaining at Hard Rock quarries}}{\text{Average 10 year (or 3 year) annual mineral production}}$$

2020 Landbank Assessments on 30th November 2020

Sand and Gravel Landbank – 10 Year

Sand and Gravel Landbank of permitted reserves	=	1,584,250 tonnes[1]	
10-year forecast of annual production	=	106,000 tonnes	
Landbank Requirement (10 years)	=	1,060,000 tonnes	(i.e. 106,000 tonnes x 10 years)
Status of Landbank	=	524,250 tonnes	(SURPLUS)
S&G Landbank	=	**15.0 Years**	(i.e. 1,584,250 ÷ 106,000)

Notes
1. Excludes the silt content contained in the Point of Ayre reserve

Sand and Gravel Landbank – 3 years

Sand and Gravel Landbank of permitted reserves	=	1,584,250 tonnes	
3-year forecast of annual production	=	98,000 tonnes	
Landbank Requirement (3 years)	=	980,000 tonnes	(i.e. 98,000 tonnes x 10 years)
Status of Landbank	=	604,250 tonnes	(SURPLUS)
S&G Landbank	=	**16.2 Years**	(i.e. 1,584,250 ÷ 98,000)

Notes
1. Excludes the silt content contained in the Point of Ayre reserve

Observation

5.5 The sand and gravel landbank figure of 1,584,250 tonnes assumes the sand and gravel to be of equal proportion. However, this is not the situation in reality. On the basis that the mineral reserves at Ballaharra are effectively 100% sand, this means the Island's permitted gravel reserves are located at the Point of Ayre. This latest version of the AMMR estimates there to be approximately 519,000 tonnes is gravel at Point of Ayre, effectively 32% of the total sand and gravel landbank.

5.6 Because the proportion of sand and gravel can vary significantly throughout the Point of Ayre deposit, it is necessary for the operator to extract a higher tonnage of mineral per annum in order to generate sufficient quantity of gravel aggregate to meet the annual demand of 50,000 tonnes. Consequently, at this rate, the Island's permitted gravel reserves could be depleted in around 10 years.

5.7 To ensure continuity of aggregate supply, a lead in time of say 5 years to secure a new planning permission for an extension to the Point of Ayre Quarry would not be considered unreasonable. This allows sufficient time to complete the various environmental surveys, prepare a planning application and Environmental Statement, determination and possible public inquiry.
Hence, a planning application may be necessary within the next 4 – 5 years.

Hard Rock

5.8 HR quarries are operated on Island by both the commercial sector and by Government. To reflect how this impacts on commercial need for, and availability of, aggregate, the AMMR reports aggregate data including and excluding Government sales and reserves.

Option A: Hard rock Landbank all reserves and all sales – 10 Year

Hard Rock Landbank of permitted reserves	=	3,607,000 tonnes	
10-year forecast of annual production	=	185,000 tonnes	
Landbank Requirement	=	1,850,000 tonnes	(i.e. 185,000 tonnes x 10 years)
Status of Landbank	=	1,757,000 tonnes	**(SURPLUS)**
Hard Rock Landbank – all quarries	=	**19.50 Years**	(i.e. 3,607,000t ÷ 185,000t)

Option A: Hard rock Landbank all reserves and all sales – 3 Year

Hard Rock Landbank of permitted reserves	=	3,607,000 tonnes	
3-year forecast of annual production	=	176,600 tonnes	
Landbank Requirement	=	1,766,000 tonnes	(i.e. 176,600 tonnes x 10 years)
Status of Landbank	=	1,841,000 tonnes	**(SURPLUS)**
Hard Rock Landbank – all quarries	=	**20.40 Years**	(i.e. 3,607,000 ÷ 176,600t)

Option B: Hard Rock Landbank excluding reserves and sales for Poortown & Stoney Mountain -10 Year

Hard Rock Landbank of permitted reserves	=	1,037,300 tonnes	
10-year forecast of annual production	=	92,400 tonnes	
Landbank Requirement	=	924,000 tonnes	(i.e. 92,400 tonnes x 10 years)
Status of Landbank	=	113,300 tonnes	**(SURPLUS)**
Hard Rock Landbank excl PT & SM	=	**11.2 Years**	(i.e. 1,037,300t ÷ 92,400t)

Option B: Hard Rock Landbank excluding reserves and sales for Poortown & Stoney Mountain – 3 year

Hard Rock Landbank of permitted reserves	=	1,037,300 tonnes	
3-year forecast of annual production	=	92,000 tonnes	
Landbank Requirement	=	920,000 tonnes	(i.e. 92,000 tonnes x 10 years)
Status of Landbank	=	117,300 tonnes	**(SURPLUS)**
Hard Rock Landbank excl PT & SM	=	**11.3 Years**	(i.e. 1,037,300t ÷ 92,000t)

Option C: Hard rock Landbank excluding reserves and sales for Poortown – 10 Year

Hard Rock Landbank of permitted reserves	=	3,164,800 tonnes	
10-year forecast of annual production	=	115,500 tonnes	
Landbank Requirement	=	1,155,000 tonnes	(i.e. 115,500t x 10 years)
Status of Landbank	=	2,009,800 tonnes	**(SURPLUS)**
Hard Rock Landbank – all HR Excl. Poortown	=	**27.4 Years**	(i.e. 3,164,800t ÷ 115,500t)

Option C: Hard rock Landbank excluding reserves and sales for Poortown – 3 Year

Hard Rock Landbank of permitted reserves	=	3,164,800 tonnes	
3-year forecast of annual production	=	116,000 tonnes	
Landbank Requirement	=	1,160,000 tonnes	(i.e. 116,000 tonnes x 10 years)
Status of Landbank	=	2,004,800 tonnes	**(SURPLUS)**
Hard Rock Landbank – all HR Excl. Poortown	=	**27.3 Years**	(i.e. 3,164,800t ÷ 116,000t)

6. Need for Aggregate Reserves - 2021

6.1 A review of the landbanks indicates that as at November 2020:

a) The landbank of sand and gravel reserves provides another **15 years** of supply using the 10 year average sales analysis or **16 years** supply based on the 3 year average. On this basis there would appear to be no requirement to seek to identify further reserves of sand and gravel. However, a more detailed examination of the respective reserves at Point of Ayre suggest that the gravel element of the reserve could be exhausted in c. 10 years. Therefore, to ensure continuity of supply of gravel aggregate, a planning application for an extension to the operation at the Point of Ayre may need to be made within the next 5 years.

b) There is **no requirement** to seek to identify further reserves of Hard Rock for aggregate purposes if the reserves of the Government operated quarries are included as the landbank is c. **19.5 years** using the 10-year average sales analysis. The landbank based on 3-year average sales is c. **20.5 years**.

c) With the reserves of the Government quarries excluded, the 10 year and 3 year average landbank forecast for Hard Rock are identical at c. **11 years**.

d) The Hard Rock landbank with Poortown Quarry reserves excluded is c. **27 years** for both the average 10 years and 3 years landbank forecasts.

6.2 This assessment of need for aggregate does not take account of the need for agricultural lime which is a non-aggregate product (see Section 2.5).