



ISLE OF MAN GOVERNMENT
DEPARTMENT OF ENVIRONMENT, FOOD & AGRICULTURE

ANNUAL MINERALS MONITORING REPORT
YEAR 2023

(April 2023)



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EXECUTIVE SUMMARY

This is the 12th Annual Mineral Monitoring Report (AMMR 2023) since the original was published in September 2012. It is prepared by Wardell Armstrong 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 2021 to 30th November 2022.

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

Primary Aggregate Sales

- The total primary aggregate sales for 2022 (sand & gravel and hard rock) were c. 265,600 tonnes compared to c. 290,000 tonnes in 2021, an overall decrease of 24,300 tonnes from 2021.
- Sand and gravel sales decreased by c. 7,800 tonnes relative to 2021.
- Hard rock aggregate sales decreased by c. 16,500 tonnes compared to 2021.
- During 2022, the Island's hard rock primary aggregate supply was split 72%:27% between the commercial and government operated quarries.
- Of the c. 74,000 tonnes total sales from government run quarries, c. 37,400 tonnes (51%) were used for Government sources with 36,500 tonnes (49%) sold to the Private sector, of which c. 3,400 tonnes comprised PSV chippings supplied to Colas for use in their own coating plant.
- On Island production of Agricultural Lime has ceased in 2022. The Department of Environment, Food and Agriculture (DEFA) are securing alternative sources of Agricultural lime off island which will be subsidised for purchase.
- Building stone sales continued the downward trend experienced since 2017, with just over 500 tonnes collectively sold from Cringle, Earystane and Pooil Vaish quarries.

Reserves

- The total planned reserves of sand and gravel as of 30th November 2022 were **c. 1,022,000** tonnes.
- The hard rock planned reserves (all quarries) are **c. 3,845,400 tonnes** having been bolstered by the 600,000 tonnes of limestone as a result of the commencement of quarrying in the extension at Billown Quarry.

Landbanks

- As of 30th November 2022, the landbank for Sand & Gravel (based on a 10-year average) stands at **10 years**.
- The equivalent Hard Rock landbank including Government reserves (based on a 10-year average) is **22 years**. When Government reserves are excluded, the landbank reduces to **16 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 also **10 years**.
- The Hard Rock landbank including Government reserves (based on a 3-year average) is **21 years** and **14 years** when Government reserves are excluded.
- The landbank analysis has identified a need for further reserves of PSV stone, Coated aggregate and Sand and Gravel.

Key conclusions

- A reappraisal of the sand deposits at Ballaharra Quarry (as a consequence of observations at the quarry) has resulted in a significant reduction in the planned sand reserves. It is anticipated that a planning application for an extension to the quarry will need to be submitted within the next 12 months to ensure continuity of supply.
- At the Point of Ayre Quarry the proportion of gravel within the remaining mineral reserves is decreasing. The operator, Island Aggregates, must increase production to maintain an adequate supply of gravel to meet customer demand. This means the reserves are being depleted at a faster rate and so it is anticipated that a planning application to extend the operation will be required in the next 5 years.
- An updated reserve/resource assessment for Poortown Quarry is nearing completion which will give clarity as to the current landbank of PSV aggregates.

1 PRIMARY MINERAL SALES

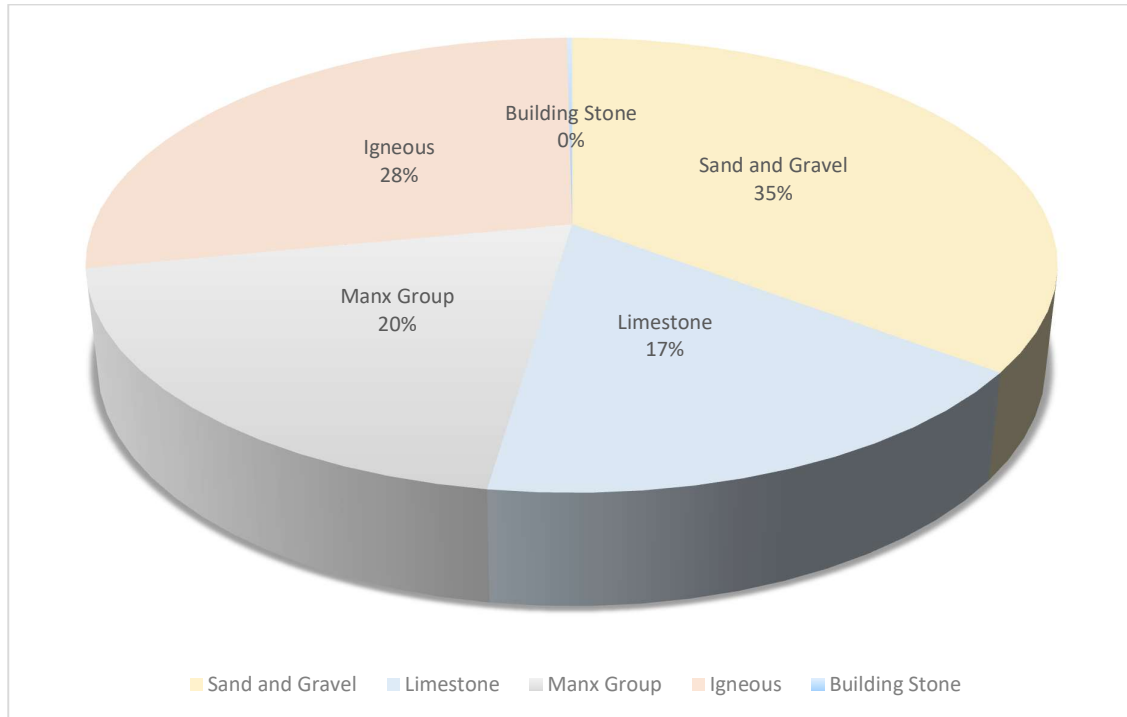
- 1.1 All mineral operators provide information on the actual tonnage of primary mineral sold (in the form of sand and gravel, crushed rock and building stone between 1 December 2021 and 30 November 2022). This information is provided on official royalty statements to the Department of Environment, Food 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 2020 – 2022

Mineral Type	Mineral Operation	2020	2021	2022
		Tonnes ('000)	Tonnes ('000)	Tonnes ('000)
Sand & Gravel	Ballaharra Sand Pit	8.55	9.26	7.76
	Point of Ayre	102.52	92.28	85.91
Limestone	Billown Quarry	48.60	38.79	45.26
	Pooil Vaaish Quarry (CR)	0.00	0.00	0.07
	Pooil Vaaish Quarry (BS)	0.10	0.19	0.09
Manx Formation	Cringle Quarry (CR)	51.71	53.98	51.27
	Cringle Quarry (BS)	0.57	0.05	0.31
	Earystane Quarry (CR)	11.51	4.50	0.76
	Earystane Quarry (BS)	0.30	0.29	0.15
Igneous	Poortown Quarry (CR-G)	42.33	49.44	29.55
	Poortown Quarry (CR-P)	16.77	17.13	31.19
	Stoney Mountain Quarry (CR-G)	23.94	20.84	7.83
	Stoney Mountain Quarry (CR-P)	2.58	3.25	5.45
	TOTAL	309.48	290.00	265.63

CR: Crushed Rock
BS: Building Stone
CR-G: Crushed rock - Government Sales
CR-P: Crushed Rock - Private Sales

Figure 1: Sales of Primary Aggregate in 2022



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

Table 2: Total Sales as Primary Aggregate 2013 – 2022 ('000 tonnes)

Mineral Type	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	10-year Ave.
Sand & Gravel	94.66	98.80	101.01	116.99	108.13	92.41	90.79	111.07	101.54	93.68	100.91
Limestone	57.86	51.84	57.87	50.06	48.87	40.25	51.81	48.60	38.79	45.34	49.13
Manx Group	15.35	24.29	34.24	26.95	37.28	34.62	34.00	63.22	58.49	52.03	38.05
Igneous	110.26	100.45	93.23	91.67	85.69	84.43	84.04	85.62	90.65	74.04	90.01
TOTAL	278.13	275.38	286.35	285.67	279.97	251.71	260.64	308.51	289.47	265.08	278.09

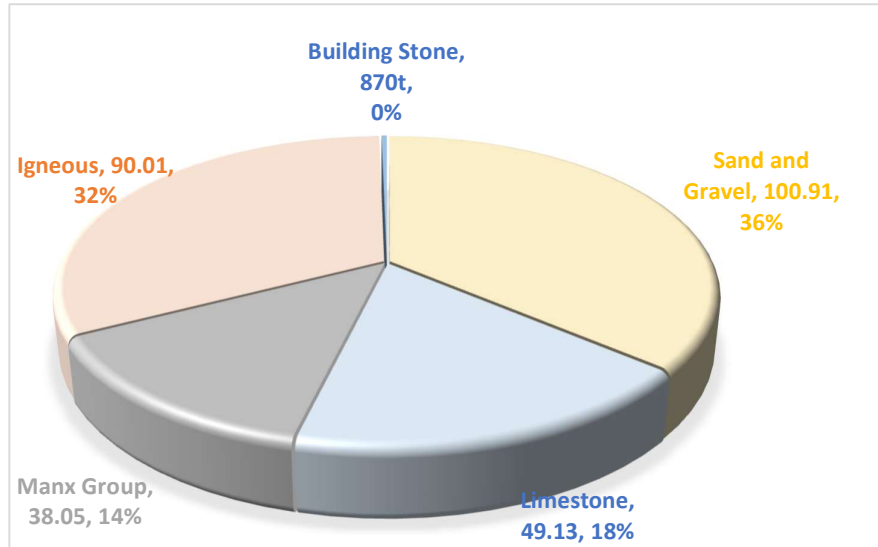
Table 3: Total Sales as Building Stone 2013 – 2022 ('000 tonnes)

Mineral Type	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	10-year Ave.
Limestone	0.06	0.00	0.00	0.00	0.04	0.06	0.06	0.10	0.19	0.09	0.06
Manx Group	0.65	0.40	0.72	0.99	1.53	1.23	0.71	0.87	0.34	0.47	0.79
TOTAL	0.71	0.40	0.72	0.99	1.57	1.28	0.77	0.97	0.53	0.55	0.85

Table 4: Total Sales Primary Agg & Building Stone 2013 – 2022 ('000 tonnes)

Mineral Type	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	10-year Ave.
Primary Agg	278.13	275.38	286.35	285.67	279.97	251.71	260.64	308.51	289.47	265.08	278.09
Building Stone	0.71	0.40	0.72	0.99	1.57	1.28	0.77	0.97	0.53	0.55	0.85
TOTAL	278.84	275.78	287.07	286.66	281.54	252.99	261.41	309.48	290.00	265.63	278.94

Figure 2: Total 10-year Sales of Primary Aggregate and Building Stone ('000 tonnes) 2013-2022



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 Sand and Gravel (S&G) and Hard Rock (HR).

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 HR is based on a ten-year average annual sale, 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

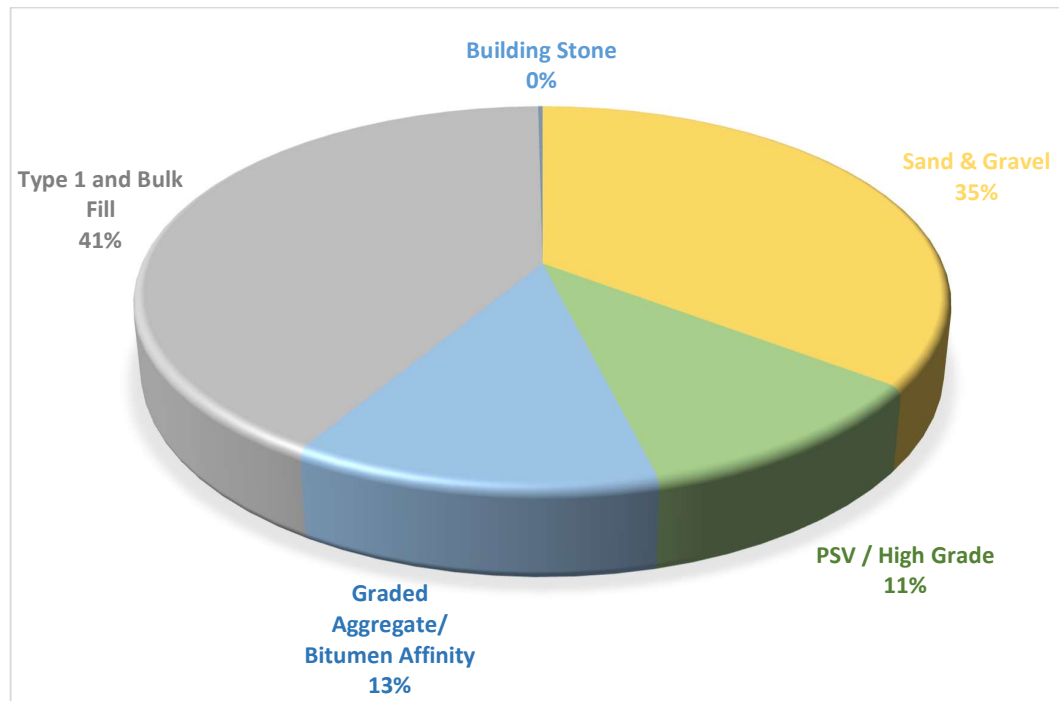
2.4 Table 5 below illustrates the variations in product categories over the past 5 years.

Table 5: Aggregate Sales by Subcategories 2018 – 2022 ('000 tonnes)

Product Category	2018	2019	2020	2021	2022	Total	5 Yr. Average
Sand & Gravel	92.41	90.79	111.07	101.54	93.67	489.48	97.896
PSV / High Grade	32.21	40.58	44.68	45.00*	28.81	146.28	29.256
Graded Aggregate/ Bitumen Affinity	19.42	31.68	28.95	19.40*	33.17	113.22	22.644
Type 1 and Bulk Fill	107.66	97.59	123.81	123.53*	109.43	438.49	87.698
Building Stone	1.28	0.77	0.97	0.53	0.55	4.1	0.82
TOTAL	252.98	261.41	309.48	290.00	265.63	1379.5	275.9

* estimated figures due to incomplete records for 2021

Figure 3: Percentile Summary of Aggregate Sales by Subcategories (5-year average) 2018 - 2022

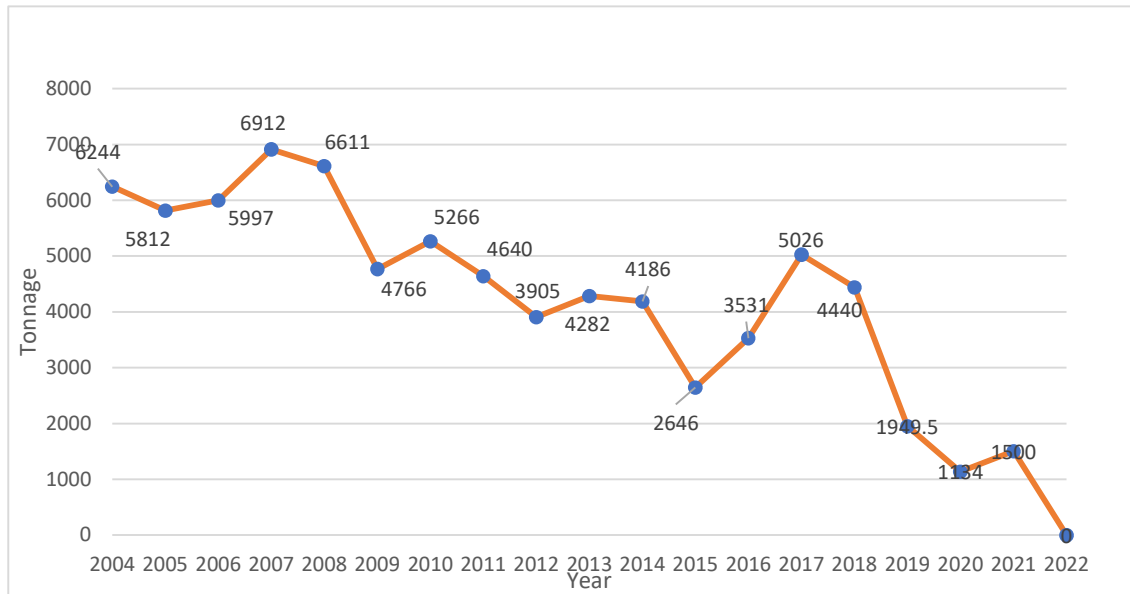


2.5 AGRICULTURAL LIME

- 2.5.1 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. Most of the Island's soils are acidic and therefore require the periodic application of lime to increase and/or maintain pH.
- 2.5.2 Limestone that is used for agricultural purposes is not classified as an 'aggregate' for the purposes of forecasting need for Hard Rock. Furthermore, as the agricultural lime tonnage is minimal in comparison with total aggregate sales it has not been allocated a product category in Table 5 and Figure 3 above but is included in the limestone sales.
- 2.5.3 Historically agricultural limestone has been sold by COLAS from Billown Quarry, however we have been unable to identify any agricultural lime sales from COLAS for 2022. The quarry has stated to the Department of Environment, Food & Agriculture (DEFA) that they can release approximately 1,000 of agricultural lime from stockpile however this is 20% of the estimated 5,000 tonnes per annum required.

2.5.4 DEFA have recently announced the introduction of the 'Agri-Environmental Initiatives Scheme' which was approved in May 2022 and will make available a 50% subsidy to farmers. The hope is that agricultural lime can be imported and stored at a suitable location whilst an on-island source is secured.

Figure 4: Agricultural Lime Production 2004 – 2022 (Billown Quarry)



3 MINERAL RESERVES

3.1 Introduction

3.1.1 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 30 November 2021.

3.1.2 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 of 30 November 2022.

3.2 Sand and Gravel Reserves

TABLE 6: Sand and Gravel Reserves on 30th November 2022

Operation	2020	2021	2022
	Tonnes	Tonnes	Tonnes
Point of Ayre	1,128,500 ¹	1,036,000 ¹	950,108 ¹
Ballaharra Sand Pit	478,250	80,000 ²	72,039
TOTAL	1,606,750	1,116,000	1,022,000
Notes:			
1 Includes the silt content in the reserve.			
2 Re-evaluation of Sand Reserves by Wardell Armstrong/Corletts (August 2021)			

3.2.1 The above table estimates the proportion of sand and gravel reserves at each operation.

Ballaharra Sand Pit

3.2.2 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. 72,000 tonnes.

3.2.3 Ballaharra sand has the properties to produce a building sand and a concreting sand. In addition sand is produced for more specialist uses such as equestrian sand, pavior bedding sand and kiln dried pavior jointing sand. Any gravel is processed to produce 6mm and 14mm aggregate.

3.2.4 Sand extraction has exposed the underlying glacial boulder clay which indicates that the remaining sand reserves become thinner as the excavations progress to the north. This led to a reappraisal of the sand reserves in 2021, based upon observations within the workings and historical boreholes. This resulted in a significant reduction of the remaining reserves for 2021 from 478,250 tonnes to 80,000 tonnes. It is anticipated that a planning application for an extension to the quarry will need to be submitted within the next 12 months to ensure continuity of supply.

Point of Ayre

3.2.5 Evidence from previous site exploration indicates that the reserves comprise 46% gravel, 52% sand and 2% silt¹. Therefore, of the remaining reserve, the quantities comprise approximately 437,000 tonnes of gravel, 494,000 tonnes of sand and 19,000 tonnes of silt.

3.2.6 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.

TABLE 7: Sand & Gravel Reserve Summary by Operation

Operation	Sand	Gravel	Total
Ballaharra			
Remaining reserves	72,239	0	72,239
Annual Sales (10-year average)	10,000		
Remaining life of reserve	c. 7. years		
Point of Ayre			
Remaining reserves	494,056	437,049	931,105
Annual Sales (10-year average)	46,600	47,900	(950,108 with 2% silt)
Remaining life of reserve	c. 10.5 years	c. 10.5 years	
TOTAL			1,022,346
Notes:			
1. Excluding silt/clay content in Point of Ayre reserves			

¹ Mineral Resources Plan 2010

HARD ROCK Reserves**TABLE 8: Hard Rock Reserves on 30th November 2022**

		2020	2021	2022
Mineral	Operation	Tonnes	Tonnes	Tonnes
Limestone	Billown Quarry	55,000	616,000 (1)	570,700
	Pooil Vaaish Quarry	99,400	99,000	98,800
Manx Group	Cringle Quarry	767,700	714,000	662,500
	Earystane Quarry	115,200	110,000	109,500
Igneous (3)	Poortown Quarry	441,800	375,000 (2)	314,200 (2)
	Stoney Mountain Quarry	2,127,500	2,103,000	2,089,700
TOTAL		3,606,600	4,017,000	3,845,400
Notes.				
1. Reserve increased by 600,000 tonnes due to the quarry extension approved under planning permission ref. 18/0161/B dated 9 th August 2018.				
2. Provisional figure, remaining reserves currently being assessed.				
3. Igneous reserves can include country rock				

4 FORECAST NEED FOR MINERALS, AND REVIEW OF MINERAL PRODUCTION

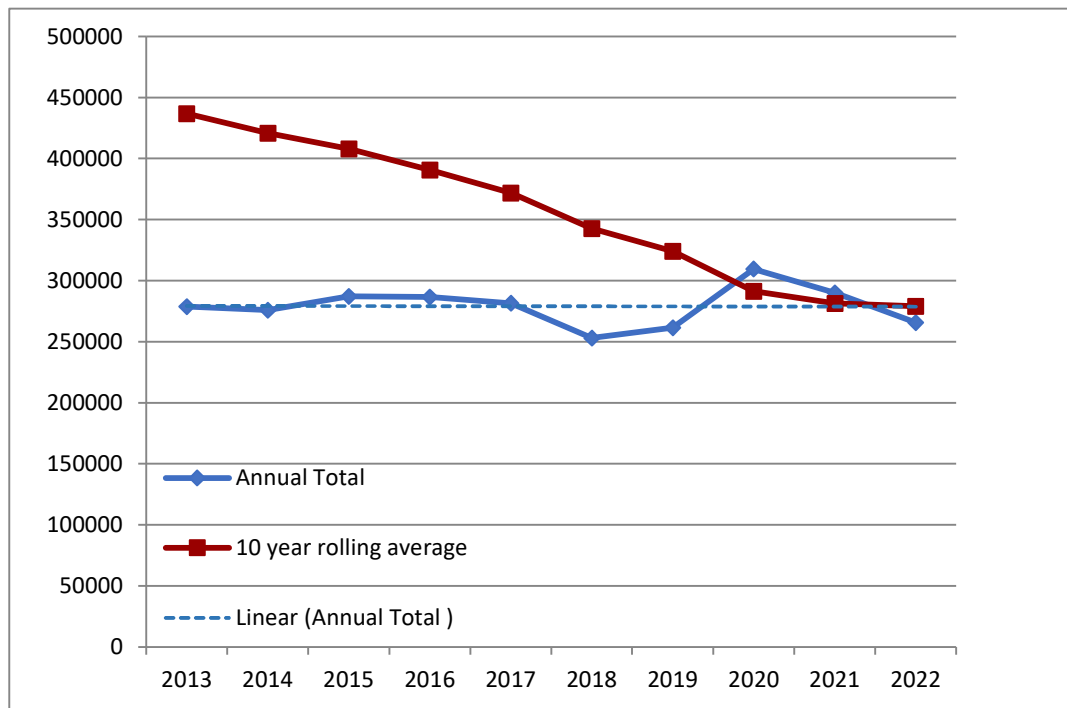
4.1 Introduction

4.1.1 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.

4.1.2 Figure 5 below compares the actual annual primary aggregate sales of sand & gravel and hard rock (blue line) against the rolling 10-year annual aggregates demand (red line) since 2013.

4.1.3 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.



4.2 Forecast of Aggregate Need in 2023

4.2.1 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.

4.2.2 The majority 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 providing aggregate to other mineral operators. 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 would not accurately represent the availability of aggregate to the commercial market.

4.3 Sand and Gravel

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

Table 9: Forecast of Need for Sand and Gravel in 2023 (10-years)

2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	10-year Total Tonnes ('000)	10-year Ave. Tonnes ('000)
94.7	98.8	101.0	117.0	108.1	92.4	90.8	111.1	101.5	93.67	1,009.08	100.9

4.3.2 The annual sand and gravel requirement for 2023 using the 10-year aggregate forecast is **c.100,900 tonnes**. This represents a decrease of 1,100 tonnes compared to the c. 102,000 tonnes forecast for 2022.

Table 10: Forecast of Need for Sand and Gravel in 2023 (3 years)

2020	2021	2022	3 Year Total Tonnes ('000)	3 Year Ave. Tonnes ('000)
111.1	101.5	93.67	306.28	102.1

4.3.3 The annual sand and gravel requirement for 2023 using the 3-year aggregate forecast is **c.102,100 tonnes**. This represents an increase of 1,100 tonnes compared to the 101,000 tonnes forecast for 2022.

4.4 Hard Rock (aggregate/building stone)

4.4.1 Hard Rock (HR) quarries are operated on Island by both the commercial sector and by Government. To reflect how this situation 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.

4.4.2 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

4.4.3 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 11: Forecast of Need – HR 2023 - All HR Quarries (10-years)

Mineral Type	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	10-year total Tonnes ('000)	10-year Ave. Tonnes ('000)
Limestone	57.9	51.8	57.9	50.1	48.9	40.3	51.9	48.7	38.8	45.4	491.7	49.2
Manx Group	16	24.7	35	27.9	38.8	35.9	34.8	64.1	58.8	52.5	388.5	38.9
Igneous	110.3	100.4	93.2	91.7	85.7	84.4	84	85.7	90.7	74.0	900.1	90.0
TOTAL	184.2	176.9	186.1	169.7	173.4	160.6	170.7	198.49	188.3	172.0	1780.3	178.0

4.4.4 The total HR requirement for 2022 (based on all HR sales) using the 10-year aggregate forecast is c.178,000 tonnes. This represents a decrease of c. 1,000 tonnes compared to the 179,000 tonnes forecast for 2022.

Table 12: Forecast of Need – HR 2023 - All HR Quarries (3 years)

Mineral Type	2020	2021	2022	3 Year total Tonnes ('000)	3 Year Ave. Tonnes ('000)
Limestone	48.7	38.8	45.4	132.9	44.3
Manx Group	64.1	58.8	52.5	175.4	58.5
Igneous	85.7	90.7	74.0	250.4	83.5
TOTAL	198.49	188.3	172.0	558.7	186.2

4.4.5 The total HR requirement for 2023 (based on all HR sales) using the 3-year aggregate forecast is **c.186,200 tonnes**. This represents an increase of 200 tonnes compared to the 186,000 tonnes forecast for 2022.

Option B Excluding All Sales from Poortown and Stoney Mountain Quarries

4.4.6 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 13: Forecast of Need – HR in 2023 Excluding all sales from PT and SM (10-years)

Mineral Type	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	10-year total Tonnes ('000)	10-year Ave. Tonnes ('000)
Limestone	57.9	51.8	57.9	50.1	48.9	40.3	51.9	48.7	38.8	45.4	491.7	49.2
Manx Group	16	24.7	35	27.9	38.8	35.9	34.8	64.1	58.8	52.5	388.5	38.8
TOTAL	73.9	76.5	92.9	78	87.7	76.2	86.7	112.8	97.6	97.9	880.2	88.0

4.4.7 The total HR requirement for 2023 (excluding sales from Poortown and Stoney Mountain) using the 10-year aggregate forecast is **c.88,000 tonnes**. This represents no variation when compared to the c. 88,000 tonnes forecast for 2021.

Table 14: Forecast of Need - HR in 2023 Excluding all sales from PT and SM (3 years)

Mineral Type	2020	2021	2022	3 Year total Tonnes ('000)	3-year Ave. Tonnes ('000)
Limestone	48.7	38.8	45.4	132.9	44.3
Manx Group	64.1	58.8	52.5	175.4	58.5
TOTAL	112.8	97.6	97.9	308.3	102.8

4.4.8 The total HR requirement for 2022 (excluding sales from Poortown and Stoney Mountain) using the 3-year aggregate forecast is **c. 102,000 tonnes**. This represents an increase of 3,000 tonnes compared to the 99,000 tonnes forecast for 2020.

Option C All Sales from All HR quarries excluding Poortown Quarry

4.4.9 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 15: Forecast of Need – HR 2023 - All HR Quarries excluding Poortown (10-years)

Mineral Type	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	10-year total Tonnes ('000)	10-year Ave. Tonnes ('000)
Limestone	57.9	51.8	57.9	50.1	48.9	40.3	51.9	48.7	38.8	45.4	491.7	49.2
Manx Group	16	24.7	35	27.9	38.8	35.9	34.8	64.1	58.8	52.5	388.5	38.8
Igneous	33.7	22.4	16.4	17.1	18.1	23	22.4	26.5	24.1	13.3	217.0	21.7
TOTAL	107.6	98.9	109.3	95.1	105.8	99.2	109.1	139.3	121.7	111.2	1097.2	109.7

4.4.10 The total HR requirement for 2023 (based on all HR sales excluding Poortown Quarry) using the 10-year aggregate forecast is **c.109,700 tonnes**. This represents a decrease of 1,300 tonnes compared to the 111,000 tonnes forecast for 2022.

Table 16: Forecast of Need – HR 2023 - All HR Quarries excluding Poortown (3 years)

Mineral Type	2020	2021	2022	3 Year total Tonnes ('000)	3-year Ave. Tonnes ('000)
Limestone	48.7	38.8	45.4	132.9	44.3
Manx Group	64.1	58.8	52.4	175.3	58.4
Igneous	26.5	24.1	13.3	63.9	21.3
TOTAL	139.3	121.7	111.1	372.1	124.0

4.4.11 The total HR requirement for 2023 (based on all HR sales excluding Poortown Quarry) using the 3-year aggregate forecast is **c.124,000 tonnes**. This represents an increase of c.1,000 tonnes compared to the 123,000 tonnes forecast for 2022.

Table 17 Summary of Aggregate Need in 2023

4.4.12 The annual forecasts in the table below have been rounded to the nearest thousand tonne.

Forecast annual need from:	Annual tonnage based on 10-years average sales Tonnes ('000)	Annual tonnage based on 3 years average sales Tonnes ('000)
Sand & Gravel quarries	100.9	102.1
Hard Rock quarries – all	178.0	186.2
Hard Rock quarries – excluding Government Quarries	88.0	102.8
Hard Rock quarries – excluding Poortown Quarry	109.7	124.0

4.5 Major Infrastructure projects

- 4.5.1 When assessing aggregate need it is useful to be aware of large infrastructure projects planned for the next 12-month period and the impact these may have on aggregate availability to ensure continuity of supply.
- 4.5.2 For example, the Department of Infrastructure completed several larger infrastructure projects in 2020, including completion of a large part of the works to redesign the road layout of the Promenade in Douglas. The effect of these large projects increased the tonnage extracted across the island for the 2020 royalty year by c.30,000 tonnes (11%) above the 10-year average of 279,000 tonnes and was also an increase of c.40,000 tonnes (18%) on the tonnage extracted in the 2019 royalty year.
- 4.5.3 Major infrastructure projects require significant amounts of aggregate which can place a strain on existing supplies and may lead to shortages in material availability if not managed correctly. In addition, if large infrastructure projects like this occur for several years consecutively, the uplift in aggregate need would result in available reserves being depleted at a faster rate.
- 4.5.4 To consider the aggregate needs of major infrastructure projects a review of planned and scheduled major infrastructure projects for 2023 has been undertaken.

The Isle of Man Department of Infrastructure lists the following as ongoing projects².

- St John's to Kirk Michael Heritage Trail
- Tromode Road Improvement Scheme
- Ballathan Junction Proposals

²: Source: <https://www.gov.im/about-the-government/departments/infrastructure/current-and-future-projects/>

- 4.5.5 It is considered that there is no requirement to include additional aggregate in the forecast of aggregate need to account for the above projects as these will fall within the general aggregate need for the island.

5 LANDBANKS

5.1 Introduction

5.1.1 A mineral landbank is defined as the total stock of permitted reserves that have a valid planning permission across all the operations and is used as a method to assess the availability of products at an island level. 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 Minerals and Secondary Aggregate Technical Planning Group.

5.1.2 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.

5.1.3 Whilst the hard rock landbank may indicate a sufficient amount of reserve 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**, e.g. graded aggregates/bitumen affinity products.

5.1.4 In the AMMR 2023, an attempt has been made to identify the landbank available for strategic products. It should be noted that the calculation includes some significant assumptions and should not be solely relied upon to assess landbank availability without more detailed investigations.

5.2 Classification

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

5.2.2 The landbanks for both sand and gravel and hard rock on the Island are calculated as follows:

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

5.3 2023 Landbank Assessments (as of 30th November 2022)

Sand and Gravel Landbank – 10-year

Sand and Gravel Landbank of permitted reserves	=	1,022,000 tonnes ¹	
10-year forecast of annual production	=	100,900 tonnes	
Landbank Requirement (10-years)	=	1,009,000 tonnes	(i.e. 100,900 tonnes x 10-years)
Status of Landbank	=	13,000 tonnes	(SURPLUS)
S&G Landbank	=	10.1 Years	(i.e. 1,022,000 ÷ 100,900)

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	=	1,022,000 tonnes ¹	
3-year forecast of annual production	=	102,000 tonnes	
Landbank Requirement (3 years)	=	1,020,000 tonnes	(i.e. 102,000 tonnes x 10-years)
Status of Landbank	=	2,000 tonnes	(SURPLUS)
S&G Landbank	=	c.10.0 Years	(i.e. 1,022,000 ÷ 102,000)

Notes

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

Observations

- 5.3.1 The sand and gravel landbank figure of 1,022,000 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 entirely at the Point of Ayre. This latest version of the AMMR estimates there to be approximately 437,000 tonnes is gravel at Point of Ayre, effectively 42% of the total sand and gravel landbank.
- 5.3.2 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 say 50,000 tonnes. Consequently, at this rate, the Island's permitted gravel reserves could be depleted in around 9.5 years.
- 5.3.3 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.

- 5.3.4 Hence, a planning application at Point of Ayre may be necessary within the next 4 – 5 years, if not sooner, in order to secure continuity of gravel supply.

Hard Rock

- 5.3.5 Hard rock quarries are operated on Island by both the commercial sector, i.e. Billown, Cringle, Earystane, Pool Vaish, and by Government, i.e. Poortown and Stoney Mountain.

- 5.3.6 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 subdivided into Options A, B and C, where:

- Option A: Island Hard Rock Landbank (including all hard rock reserves);
- Option B: Hard Rock Landbank excluding Government reserves; and
- Option C: Hard Rock Landbank excluding Poortown reserves.

- 5.3.7 Each of the above options are assessed based on the average 10-year demand and 3-year demand.

Option A1: Island hard rock Landbank (10-year average sales)

Hard Rock Landbank of permitted reserves	=	3,845,400 tonnes	
10-year forecast of annual production	=	178,000 tonnes	
Landbank Requirement	=	1,780,000 tonnes	(i.e. 178,000 tonnes x 10-years)
Status of Landbank	=	2,065,400 tonnes	(SURPLUS)
Hard Rock Landbank – all quarries	=	21.6 Years	(i.e. 3,845,400t ÷ 178,000t)

Option A2: Island hard rock Landbank (3-year average sales)

Hard Rock Landbank of permitted reserves	=	3,845,400 tonnes	
3-year forecast of annual production	=	186,000 tonnes	
Landbank Requirement	=	1,860,000 tonnes	(i.e. 186,000 tonnes x 10-years)
Status of Landbank	=	1,985,400 tonnes	(SURPLUS)
Hard Rock Landbank – all quarries	=	20.6 Years	(i.e. 3,845,400 ÷ 186,000t)

Option B1: Hard Rock Landbank excluding reserves and sales for Poortown & Stoney Mountain -10-year.

Hard Rock Landbank of permitted reserves	=	1,441,500 tonnes	
10-year forecast of annual production	=	88,000 tonnes	
Landbank Requirement	=	880,000 tonnes	(i.e. 88,000 tonnes x 10-years)
Status of Landbank	=	561,500 tonnes	(SURPLUS)
Hard Rock Landbank excl PT & SM	=	16.4 Years	(i.e. 1,441,500t ÷ 88,000t)

Option B2: Hard Rock Landbank excluding reserves and sales for Poortown & Stoney Mountain – 3 year.

Hard Rock Landbank of permitted reserves	=	1,441,500 tonnes	
3-year forecast of annual production	=	102,800 tonnes	
Landbank Requirement	=	1,028,000tonnes	(i.e. 102,800 tonnes x 10 years)
Status of Landbank	=	413,500 tonnes	(SURPLUS)
Hard Rock Landbank excl PT & SM	=	14.0 Years	(i.e. 1,441,500t ÷ 102,800t)

Option C1: Hard rock Landbank excluding Poortown reserves & sales (10 Year)

Hard Rock Landbank of permitted reserves	=	3,521,200 tonnes	
10-year forecast of annual production	=	109,700 tonnes	
Landbank Requirement	=	1,097,000 tonnes	(i.e. 109,700t x 10 years)
Status of Landbank	=	2,424,200 tonnes	(SURPLUS)
HR Landbank – all HR Excl. Poortown	=	32.1 Years	(i.e. 3,521,200t ÷ 109,700t)

Option C2: Hard rock Landbank excluding Poortown reserves & sales (3 Year)

Hard Rock Landbank of permitted reserves	=	3,521,200 tonnes	
3-year forecast of annual production	=	124,000 tonnes	
Landbank Requirement	=	1,240,000 tonnes	(i.e. 161,000 tonnes x 10 years)
Status of Landbank	=	2,281,200 tonnes	(SURPLUS)
HR Landbank – all HR Excl. Poortown	=	28.4 Years	(i.e. 3,521,200 t ÷ 124,000 t)

5.4 Landbank per product type

5.4.1 Data on the landbank for mineral end uses can provide a useful indication of the where landbanks need to be bolstered to allow production of strategic products such as concrete, coated stone and high PSV products. In the AMMR 2023, an attempt has been made to identify the landbank available for strategic products.

5.4.2 It should be noted that the calculation includes some significant assumptions and should not be solely relied upon to assess landbank availability without more detailed investigations. 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.

5.4.3 HR reserves were sub-divided into high grade aggregate (PSV/ bitumen affinity), Type 1 and bulk fill, graded aggregate and building stone. The proportional splits are based on:

- Any geological reports (where available),
- the split between outputs, Or
- site knowledge

5.4.4 The remaining reserve for each product type was then recombined by strategic product and divided by the average output for each product type. Table 17 illustrates the remaining reserve and landbank for each strategic product type.

Table 18 - Landbank by Product Type

Aggregate Subcategories	Operation	Status of Permitted Reserves ('000 tonnes)	Estimated Production Requirement ('000 tonnes)	Landbank
Sand	Point of Ayre	623.10	52.43	11.9 years
	Ballaharra Sand Pit			
Gravel	Point of Ayre	380.04	39.52	9.6 years
Building Stone	Pooil Vaaish	90.92	0.55	165.3 years
	Cringle			
	Earystane			
Graded Aggregate / Bitumen Affinity	Billown Quarry	418.19	33.16	12.6 years
PSV	Poortown	125.68	28.81	4.4 years
Type 1 Bulk Fill	Billown Quarry	3,210.61	109.42	29.3 years
	Pooil Vaaish			
	Cringle			
	Earystane			
	Poortown			
	Stoney Mountain			

- 5.4.5 The information available to inform Table 18 is sparse and for some sites uses the assumption that the remaining reserve is split in a comparable way to the outputs from each of the quarries. The reality is not as simple as this as there are several factors that impact the mineralogy and in turn the product types available. Proportionally there are higher outputs of Type 1 and Bulk Fill products produced when the required outputs of higher value products are being “chased” and will not necessarily reflect the proportional availability of the product types in the reserve.

6 SUMMARY OF NEED FOR AGGREGATE RESERVES DURING 2022

6.1 A review of the sand and gravel and hard rock landbanks indicates that as of 30th November 2022:

Sand and Gravel

- The landbank of sand and gravel reserves provides a further 10.1 years of supply using the 10-year average sales analysis or 10.0 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 9.6 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.
- Also, with the reduction in the sand reserves at Ballaharra there is likely to be a requirement for a planning application for an extension to the site to be submitted within the next 12 months.

Hard Rock

- With the commencement of quarrying at the Billown extension, the 600,000 tonnes of additional limestone means that there is no requirement to seek to identify further reserves of hard rock for Type 1 or Bulk fill purposes if the reserves of the Government operated quarries are included.
- The hard rock landbank is c. 21.6 years using the 10-year average sales analysis and 20.6 years based on 3-year average sales. With the reserves of the Government quarries excluded, the 10 year and 3-year average landbank forecast for Hard Rock are 16.4 and 14.0 years respectively. The Hard Rock landbank with Poortown Quarry reserves excluded is c. 32.1 years for based on 10-year average sales and c. 28.4 years for 3-year average.
- 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).
- However, even with the recent planning permission at Billown Quarry there is only 12.6 years of Graded Aggregate/Bitumen Affinity reserves available. Therefore to maintain a 10 year landbank of this product type further reserves of coated stone may need to be identified in the next 2 years.
- There is 4.4 years of PSV reserves available at Poortown Quarry. An updated reserve/resource assessment for Poortown Quarry is nearing completion. Following the reserve assessment there may be a need for more resources to be identified and a planning permission for their extraction to be submitted to ensure continuity of supply.

DRAWINGS