Local Development Plan 2032

Supplementary Document 8A

Minerals Development

Minerals Resource Analysis

Ards and North Down Borough Council

Contents

1.0 Introduction

1.1 The aim of this paper is to provide a preliminary assessment of the aggregate potential within Ards and North Down. This information has been compiled with assistance from Geological Survey Northern Ireland (GSNI). The assessment does not include analysis of quality of reserves or an analysis of potential depth of reserves, as this information is not available at this time.

1.2 Minerals are essential for the development of a modern economy, but their extraction is subject to environmental and other constraints. Bringing together minerals, environmental and other land-use information in an integrated system allows more effective and sustainable management strategies to be developed.

1.3 Following a commission from the Department of the Environment, the British Geological Survey and its counterpart, the Geological Survey of Northern Ireland, produced a Mineral Resources Map of Northern Ireland. The map is intended to assist strategic decision making in respect of mineral extraction and the protection of important mineral resources against sterilisation. Six digitally generated maps at a scale of 1:100 000 scale are now available. The map for County Down is available to view[1].

1.4 Figure 1, 'Mineral Resources in Ards and North Down', shows the distribution of aggregate resources within the District Council area, as produced by the BGS Mineral Resource Maps for Northern Ireland (2012). This map shows that Ards and North Down is predominantly sandstone, Greywacke.

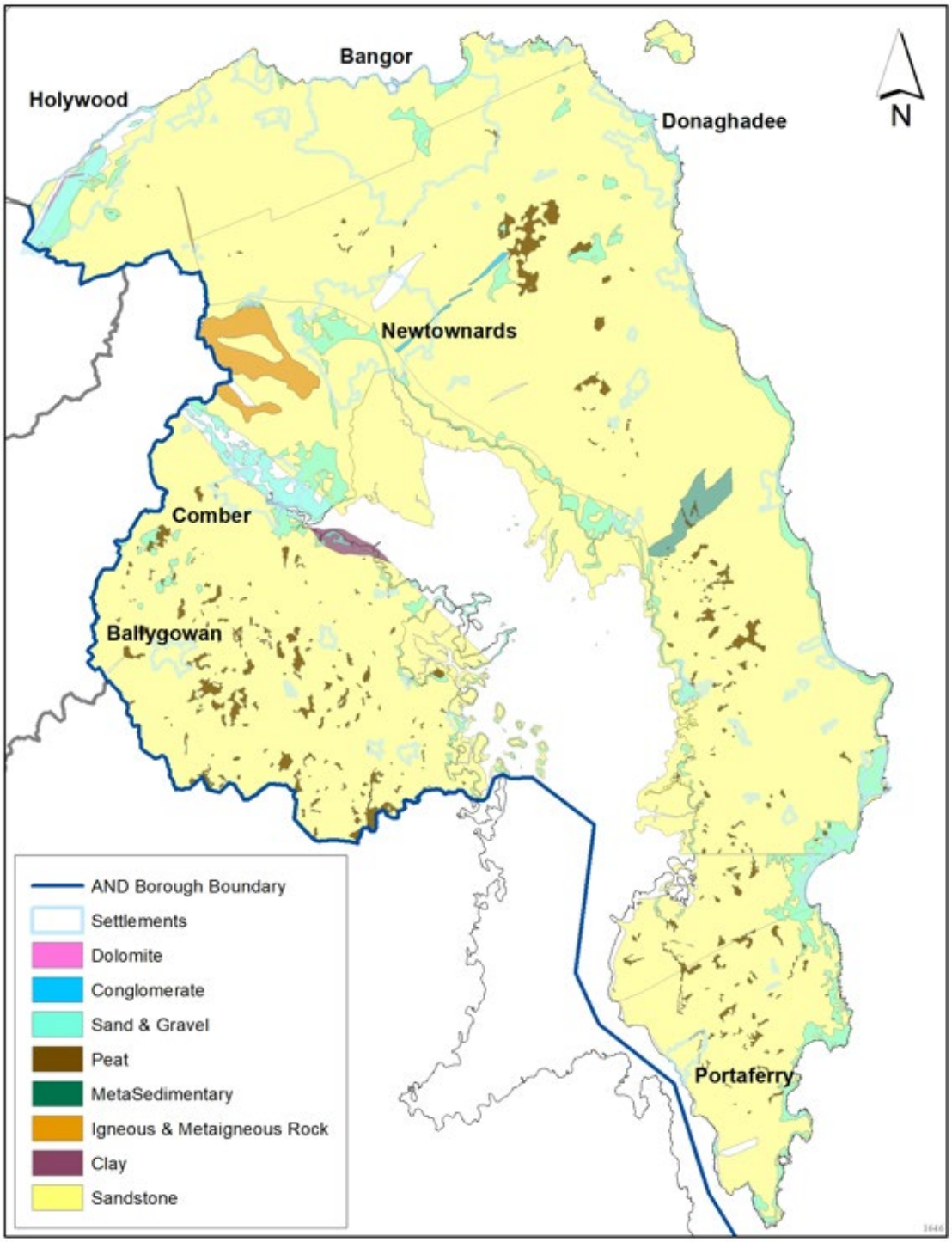
1.5 The suitability of a sandstone for aggregate uses, mainly depends on its strength, porosity and durability. Some sandstones (greywackes) also have a high polishing and abrasion resistance and are particularly valued for road surfacing, where they provide resistance to skidding. They are the premium products of the crushed rock quarrying industry.[2]

[1] https://nora.nerc.ac.uk/id/eprint/18981/1/Down_Belfast_Mineral_Final.pdf
[2] Mineral Planning Factsheets Construction aggregates (bgs.ac.uk)

1.6 The Borough contains quarries that extract high PSV stone for use as roadstone across the UK, exported through the port of Belfast.

1.7 Figure 1 indicates the location of the resources over the Borough as either continuous rock units or discrete, near surface packages. It does not take into consideration any infrastructure, dwellings or waterways. The Minerals Map did not explore the potential quality of the resource mapped. Locations of high PSV resource in particular is not known outside of current quarries. Sandstone is the sole resource extracted within Ards and North Down.

Figure 1 Mineral Resources in Ards and North Down



2.0 METHODOLOGY

2.1 There are locations where exploitation of the resource would be restricted or impossible (sterilised). In an effort to assist with decision making regarding policy relating to aggregate working, a mapping exercise was carried out using ArcGIS software to remove these unworkable areas from the resource packages to demonstrate the effect that this has on the availability of the resource (quantity) and the ability of the resource to be worked economical.

2.2 LPS datasets for house locations (the Pointer database), road network (at 1:50,000) and water body network (at 1:50,000) were sourced and combined into a single GIS feature. For the purpose of this exercise, each location in the Pointer database was buffered to 100m and each road and water body was buffered to 50m from the centreline, to create a network of locations where mineral extraction would not be permitted or possible. The resulting feature is pictured in Figures 2 and 3, showing a close up of the network of buffered locations (Figure 2) and the same location with the LPS air photography displayed (Figure 3) showing housing and road networks.

Figure 2

Figure 3

Figure 2 and 3 - Network of buffered locations and housing and road networks

2.3 Using the FME software package to automate the process, each of the resource polygons for the district council area was clipped in turn to excise the sterilised locations.

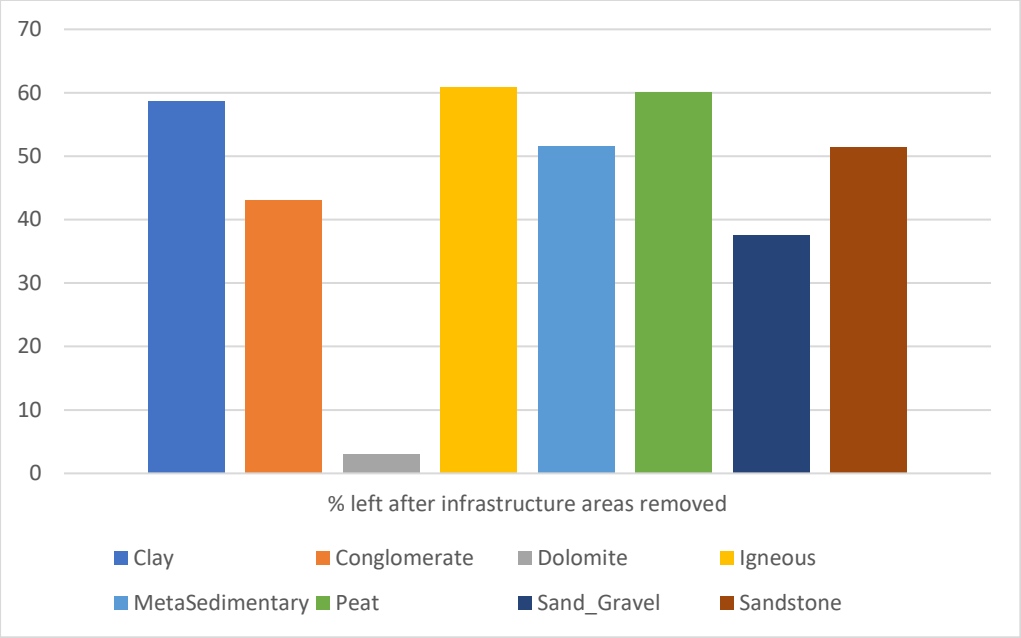
3.0 RESULTS

3.1 Table1 and Graph 1 show the effect of sterilisation through infrastructure on the mineral resources of Ards and North Down. The aerial extent of the before and after calculations on sandstone within the Borough is summarised in Graph 2.

Table 1: Resource reduction due to infrastructure sterilization

Resource	**% remaining after infrastructure areas removed**
Clay	58.67
Conglomerate	43.13
Dolomite	2.96
Igneous	60.88
MetaSedimentary	51.59
Peat	60.12
Sand Gravel	37.55
Sandstone	51.48

Graph 1 Resource reduction due to infrastructure sterilization

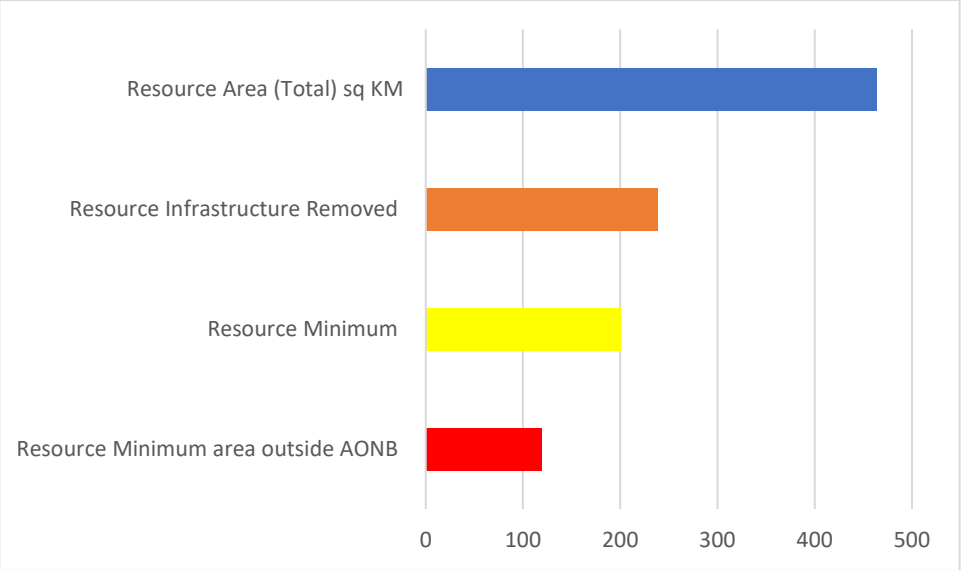


3.2 In most cases the reduction in availability of resource is at least 40%. Of note is the fact that the key resource for the Council area, Sandstone, is reduced by almost 50% (Table 1).

Table 2 shows the impact on sandstone resource in Ards and North Down

Resource Area (Total) sq. KM	464.2
Resource Infrastructure Removed	238.9
Resource Minimum	201.1
Resource Minimum area outside AONB	119.4

Graph 2 - The reduction in sandstone reserve when infrastructure and other constraints are removed



3.3 In Graph 2, the blue bar represents the coverage of sandstone resource area within Ards and North Down as indicated in the 2012 resource maps. The grey bar is the remaining resource pockets that are above the average size of the sandstone quarries in the Borough. The yellow bar is the resource pockets of the average size located outside the Strangford and Lecale Area of Outstanding Natural Beauty (AONB). The orange bar shows the resulting resource coverage after the infrastructure and water have been discounted (vertical scale in km2).

4.0 FRAGMENTATION

4.1 In addition to the reduction in resource availability resulting from the infrastructure sterilisation, additional loss will occur as a result of this exercise creating uneconomic land packages i.e., areas where the mineral is located but the size of the surface expression would prevent any viable operation extracting it.

4.2 This can be seen illustrated in Figure 3 where small parcels (coloured blue) are dispersed into the built-up area visible in the orthophotograph. To assess the impact that this has on the availability of the resource, this exercise was continued using the example of the sandstone resource.

4.3 To determine a cut off point for the size of individual polygons to be retained, the average size of the current sandstone operations in Ards and North Down Borough Council was calculated using the Ordnance Survey orthophotographs.

This number is approximately 0.28km2. All polygons in the data set that are produced by the removal of the infrastructure and water, which were smaller than this number were removed, and the aerial extent of the resulting polygons calculated.

4.4 This resulting number approximates the available sandstone resource in the Ards and North Down area that occurs as a large enough package to be economically worked. Most of the quarries extracting sand and gravel in Ards and North Down are long established and have extended over time, which increases the operating size average. Further analysis on commercial viability of sandstone quarry size could generate a smaller land package amount. In the absence of this detailed commercial information the average size was used.

5.0 STRANGFORD AND LECALE AONB

5.1 The final part of the exercise considers the location of Strangford and Lecale Area of Outstanding Natural Beauty (AONB) and the consideration of the protection that this high value landscape designation requires by Ards and North Down Borough Council.

5.2 When all the potential resource located (wholly or partially) within the limits of the AONB is removed the final area of sandstone available for extraction amounts to 119.4 km2. This figure represents a 74.38% reduction from the starting point of 464.2km2.

5.3 The bar chart in Figure 4 demonstrates this reduction visually and Figure 5 which follows, shows the effect on the aerial extent of the reduction at 1:10000 scale (Figure 5, A – C).

5.4 In Figure 5 (D) the area highlighted in green sits within the Strangford and Lecale AONB and illustrates the additional reduction that restricted development in this area would represent.

Figure 5A - Total Resource

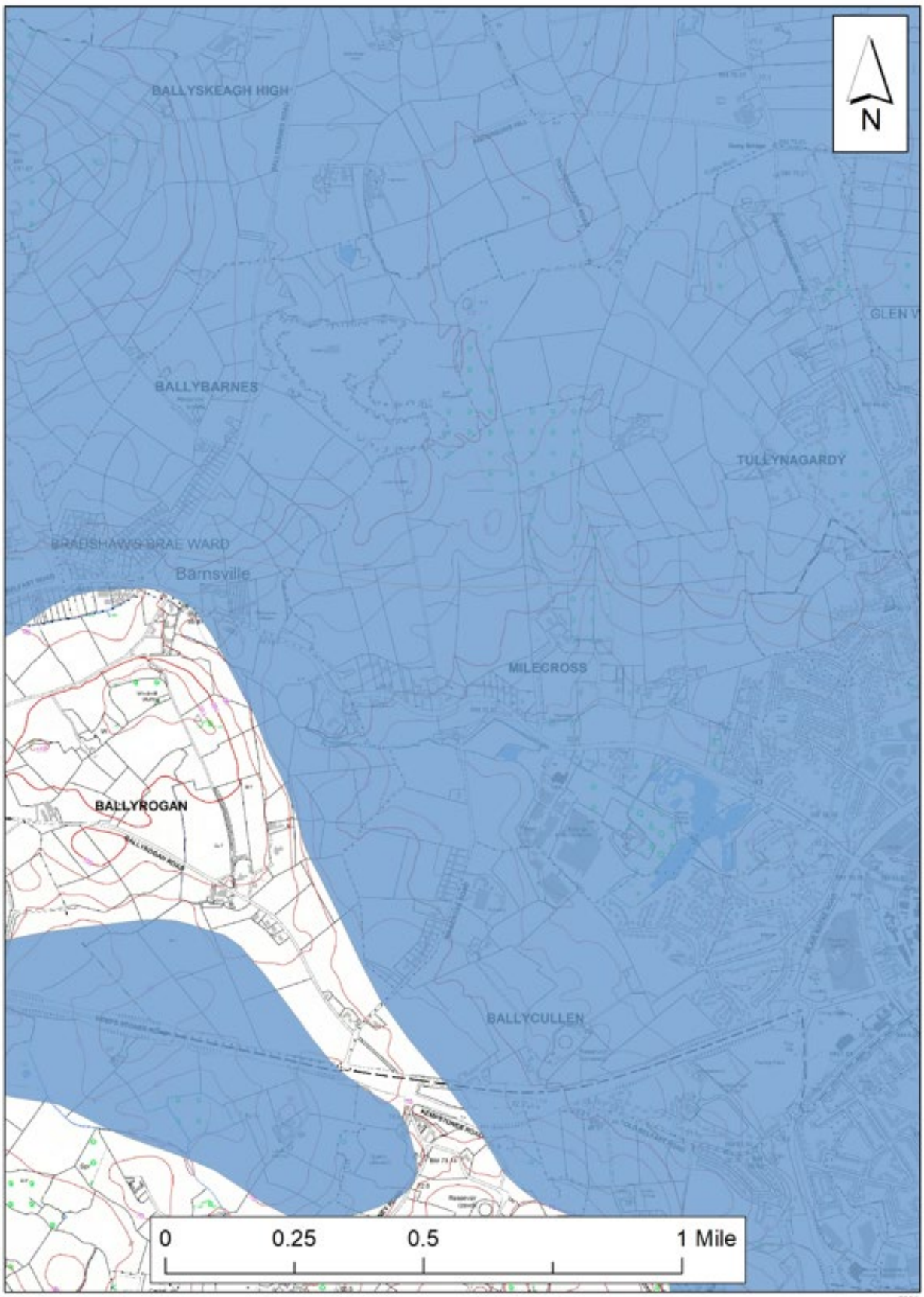


Figure 5B -Resource with infrastructure removed

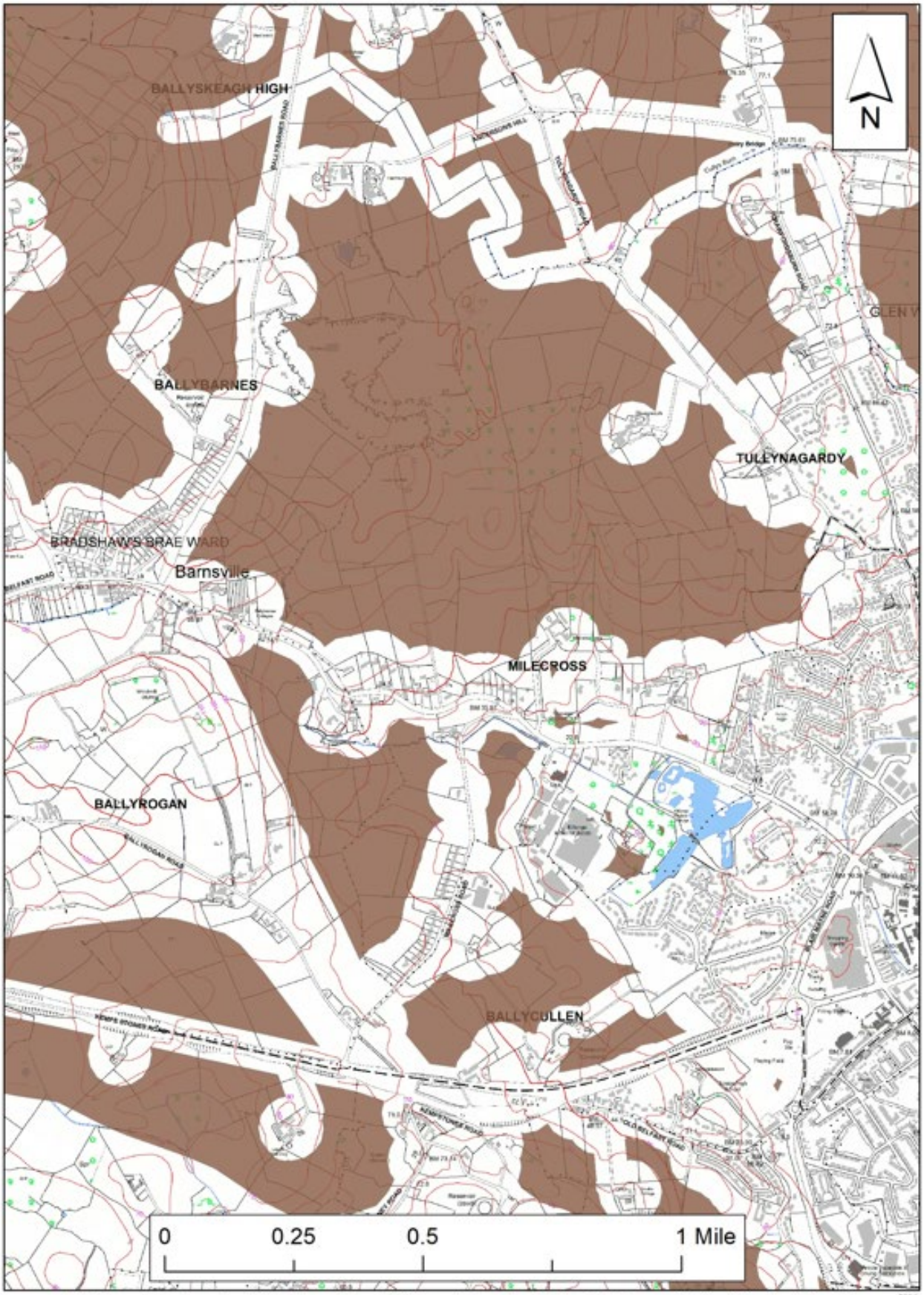


Figure 5C - Resource with small packages removed

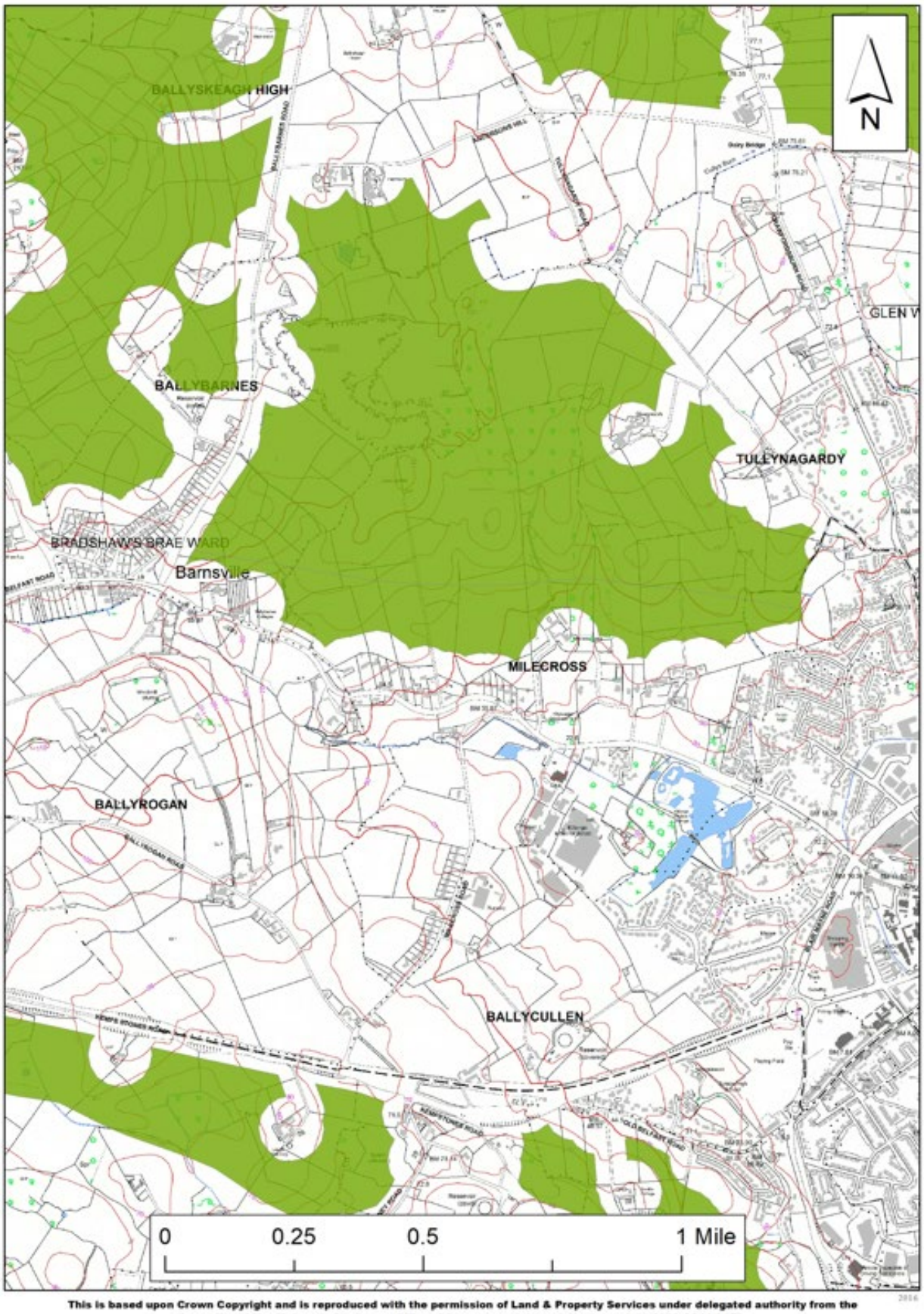


Figure 5D - AONB effect

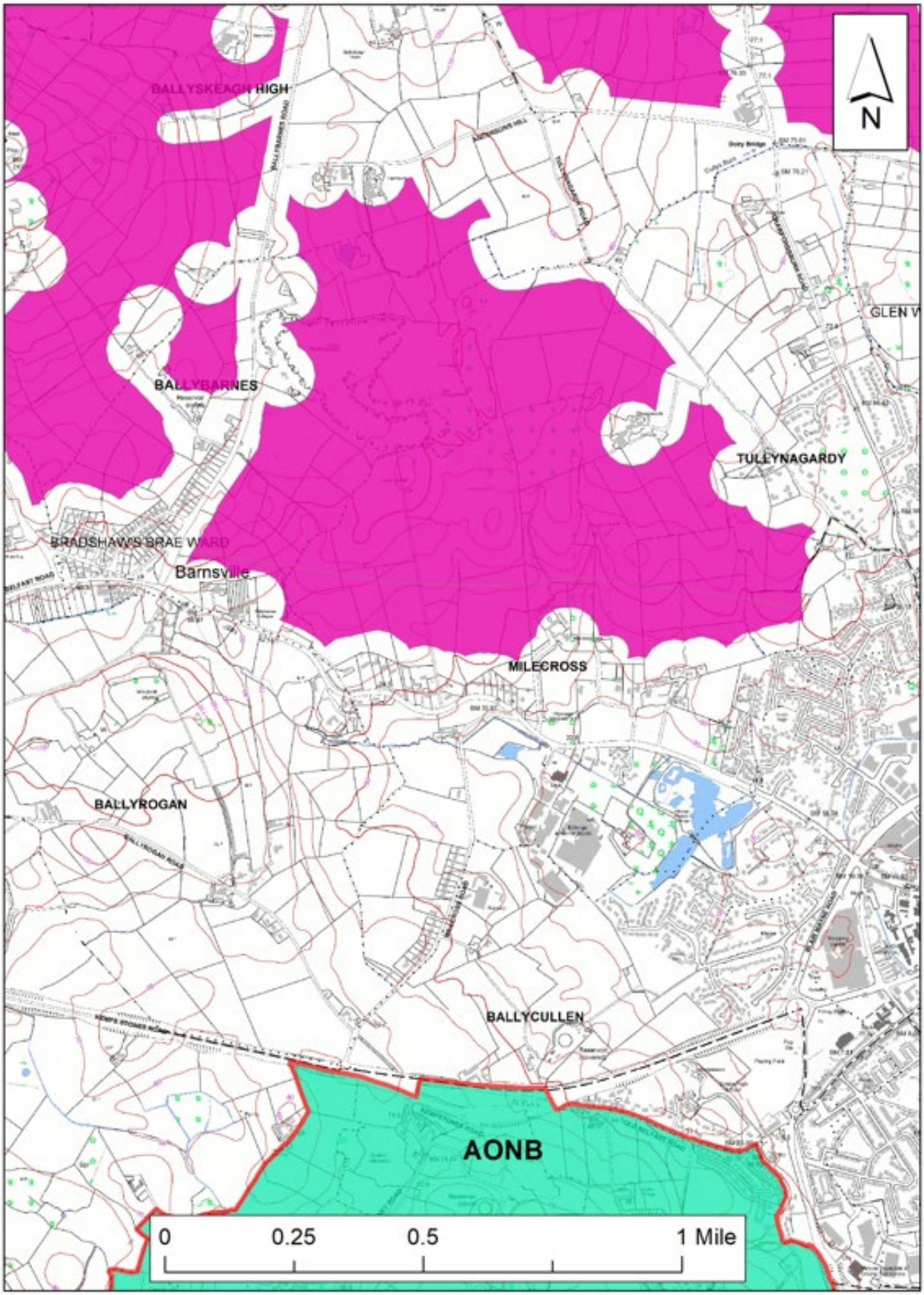
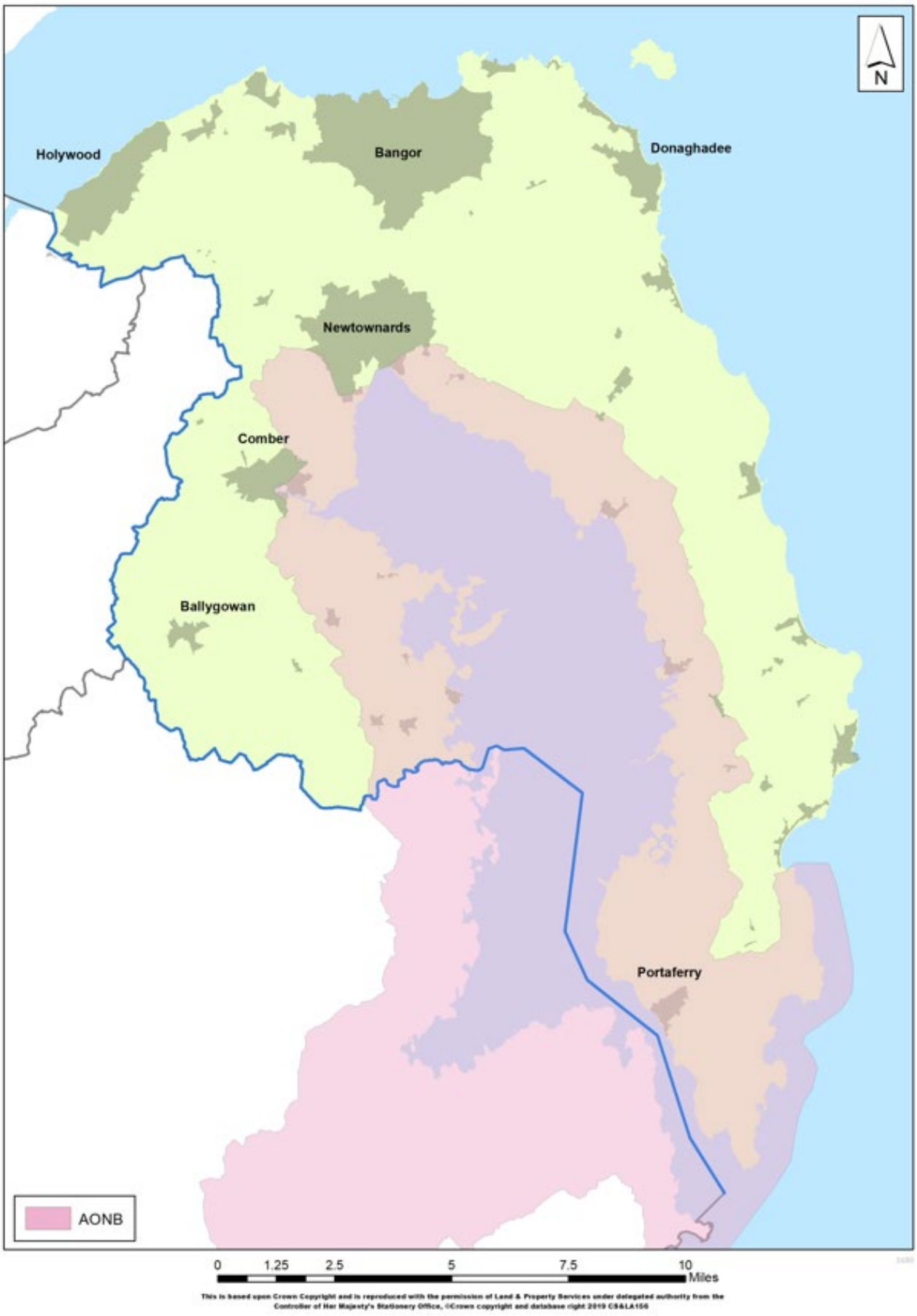


Figure 6 - Strangford and Lecale AONB



6.0 SAFEGUARDING

6.1 The complexities of the situation regarding safeguarding mineral resources at an example quarry are illustrated in the Figure 7D, (the selected quarry was chosen at random). Here the sand and gravel operation at Ballybarnes Road is used to demonstrate the requirement to deal with each commodity and location as a standalone entity. As in Figure 5, the colours of the polygons represent the resource availability based on the process described previously.

6.2 Figure 7A shows the extent of the Ballybarnes workings outlined in lilac. The total extent of the operation in the image covers 0.34 km2.

6.3 Figure 7C is the result when the calculated minimum operable size is applied. The average size has been used as a reference, whilst it is acknowledged that there is variation in size of quarry operations across the Borough. The average size has been used as the buffer that has been removed from 7B to leave the resulting resource shown in Figure 7C.

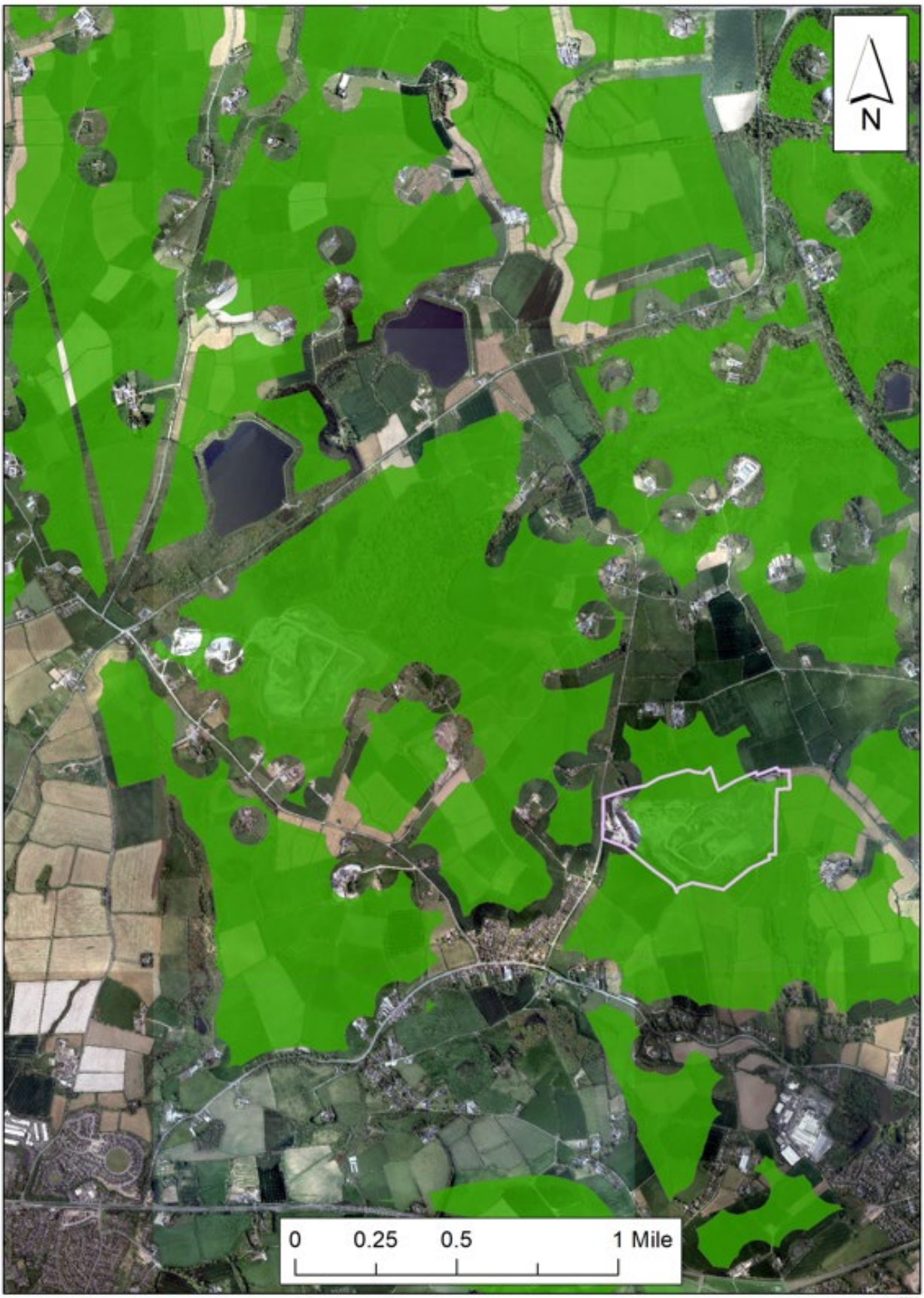
6.4 Map 7C shows the resource around the existing quarry at Ballybarnes that contains viable sized greywacke, away from infrastructure that would affect resource extraction. The example shows that there is a greater extent of sandstone to the south and east of the existing quarry with some reserves to the north. Expansion to the west is limited by existing infrastructure.

6.5 This map also illustrates the proximity of some of the quarries within Ards and North Down, the aerial element of this map shows the additional quarry Craigantlet notated on the map, and the resource area to the north and northwest and the constraint of further development of this site to the west and south due to infrastructure constraints.

Figure 7 - A Full extent of potential sandstone resource around an existing quarry example Ballybarnes

Figure 7B - The infrastructure removed from the total resource, demonstrating the segmentation of the aerial extent into smaller packages when houses and roads are removed

Figure 7C - The sandstone resource potential around Ballybarnes quarry.



7.0 Conclusion

7.1 The 2012 Planning Maps produced by the British Geological Survey to assist the Northern Ireland Planning Department in management of aggregate resources are a valuable source of information regarding the distribution of potential construction aggregates across Northern Ireland and District Council areas.

7.2 By considering the mapped distribution and removing areas that have been effectively sterilised from development through the construction of housing and road networks and the naturally occurring water features, it can be shown that the mapped distribution may be greatly reduced.

7.3 In considering areas for mineral constraint and mineral safeguarding, careful attention should be given to the impact that this sterilisation will have on resource availability and the ability of the Council to meet the medium to long term aggregate demands from local sources. In the case of sandstone, the reduction of the resource from the initial distribution to economic distribution is from approximately 464.2km2 to 263.1km2. When the resource within the Strangford and Lecale AONB is also excluded the available distribution is 119.4 km2, an overall reduction of 74.38%.

7.4 Ards and North Down quarries exclusively extract sandstone, which is the bedrock. Existing quarries are mostly long established having developed through extensions and as hard rock quarries they have the potential to deepen which has not been assessed through this preliminary assessment.

7.5 The widespread availability of greywacke in particular may cause safeguarding of rock for future needs to focus upon further development at existing quarry sites, rather than new quarries being located elsewhere, particularly where there is known high PSV resource.

7.6 If new areas of High PSV greywacke were to be identified through drilling and testing, which is expensive, it could result in new extraction areas, however, this has not been mapped by GSNI or known outside of existing sites.