

A27 Arundel Bypass

Ecological desk based assessment

Jeremy Burgess

Landscape and Biodiversity lead

March 2017

Summary

- The Landscape and Biodiversity Lead for the South Downs National Park Authority has been asked to provide a desk based assessment of a range of options for a highway development at Arundel which may have impacts on the National Park.
- Proposals from Highways England for a bypass and highway improvements around Arundel are currently at the pre-consultation stage. A range of options have been presented that include on line improvements and various options for new routes. Due to the range of potential options a search area 2km either side of the current route has been undertaken.
- Two national-level nature conservation site designations are situated within the 2 kilometre (KM) search area of the route options. Six locally-designated nature conservation sites are situated within the 2km radius. It is considered that none of the highway routing options will result in the loss or removal of any part of the nationally designated sites, but there is a clear risk of direct impacts and habitat loss to Local Wildlife Sites (LWS) as a consequence of all of the proposals.
- A significant number of protected and notable species records occur within the 2KM search area. These include 13 species of bats, Hazel Dormouse, Great Crested Newt, water vole and reptiles. In addition there are many protected birds and over 130 species listed under section 41 of the NERC act. It is recommended that future ecological appraisal work should include detailed assessment of impacts on all protected species, supported where required by an appropriate level of survey.
- The likelihood of impacts on sites, habitats and species are high for all options but highest for those that move away from the current road alignment.

1. Introduction

1.1 Project description

This ecological desk based assessment has been undertaken in relation to proposed highway improvement options around Arundel in West Sussex.

1.1.1 Proposal

The proposals from Highways England are currently at the pre-consultation stage and no final decision on routing is currently available. A range of options have been outlined which include alterations to the current route (on line) to a new bypass passing south of Arundel.

1.1.2 Requirement for Ecological Assessment

At the early stage of options appraisal by the South Downs National Park Authority, it was recognised that a desk-based assessment of biodiversity would be required to inform an understanding of the potential ecological impacts of different options associated with the project.

1.1.3 Site Description

The proposed highway improvement and realignment options will either improve existing sections of the A27 or will create a new route to the south. All routes will need to cross the floodplain of the river Arun valley.

Broad habitats along the line of all routes include deciduous woodland, floodplain grazing marsh, chalk streams and wood pasture and parkland. There is also potential impact on the River Arun itself with intertidal mudflats and a small area of saltmarsh and reedbed. There are a considerable number of veteran trees in the area and areas of Ancient woodland.

1.2 Limitations

No site visit has been undertaken at this stage of the project and the results and recommendations made as part of this desk-based assessment are based upon the data supplied to the South Downs National Park Authority by the Sussex Biological Record Centre (SxBRC); professional judgement; and any information relating to the proposals from available studies.

2 METHODS

2.1 Desk-based Assessment

A desk-based assessment was carried out in March 2017. Geographical Information Systems (GIS) mapping was used in order to identify all records of designated sites, protected species, non-native invasive species and habitats within a 2KM radius of the site and 5KM for designated site Core Sustainment Zones associated with bat species, as set out in good practice guidelines. Given the scale of the proposals and the range of options a 2km data search radius is considered suitable for enabling an assessment of the likely zone of influence of all the options.

The South Downs National Park Authority has full access to the extensive biological database provided by the Sussex Biological Record Centre (SxBRC)).

This dataset is for the use of the South Downs National Park Authority only. The supply of this data is subject to a Service Level Agreement with Sussex Biological Record Centre (SxBRC) and the data

should not be passed on to third parties without the prior agreement of the relevant data provider. Third parties should be referred to SxBRC (as appropriate) so that any data given out is covered by a Data Supply Agreement.

The data, recent aerial imagery and professional judgement are used to provide an assessment of the likely ecological implications of the proposed works. Potential constraints will include the presence (confirmed or potential) of various legally-protected or otherwise noteworthy habitats and species. Only habitats and species with realistic potential for occurrence (i.e. confirmed locally or habitat suitable) at this site are discussed.

Additional information provided by the MAVES ecological study has been studied in relation to the record centre data.

3 RESULTS

3.1 Designated Sites

There are two statutory designated sites and six non-statutory designated sites situated within the 2KM search area. No international sites designated for bat species are located within the 5KM radius search. Six non-statutory sites located within the 2km radius are designated as a Local Wildlife Site with some areas within these sites designated as ancient woodlands. Arundel Park SSSI is just to the North of the current A27 route. Details are provided within **Table 1** below.

Table 1 Designated Sites Occurring within 2KM of the proposed Arundel A27 highway route options

Site Name	Distance from routes	Reason for Designation
Nationally Designated Sites		
Arundel Park SSSI	0.8km North	A historic park with chalk grassland woodland and open water important for invertebrates
Fairmile Bottom SSSI and LNR	1.8km North	The site contains yew (<i>Taxus baccata</i>) woodland and scrub and Unimproved chalk grassland, which are all nationally rare communities.
Locally designated sites		
Binsted Wood Local Wildlife Site	Adjacent to the current route (S) impacted by some options	Mixture of woodland including Ancient Woodland
Poling Copse Local Wildlife Site	Adjacent to existing A27 1km from options	a large block of ancient, semi-natural woodland on the Coastal Plain
Warningcamp Hill and New Down Local Wildlife Site	1.8km NE	Herb Rich chalk grassland
Rewell Wood Complex Local Wildlife Site	Adjacent to existing A27 (N) may be impacted by some options	Rewell Wood is a large ancient woodland complex. Wide rides and glades support a rich flora and butterfly fauna.
Arun Valley Local Wildlife Site	Adjacent to existing A27 (N) may be impacted by some options	This section of the River Arun and its floodplain forms an extensive tract

		of wetland, a nationally declining habitat.
Slindon Common Gravel Pit Local Geological Site	Adjacent to existing A27 (N) may be impacted by some options	Middle Pleistocene raised beach deposits

3.2 Protected Species

There are a number of records of protected species within the 2km data search radius. A summary is presented in Table 2 below.

Table 2 Summary of Protected Species Records within 2km of the proposed Arundel A27 highway route options

Species	Distance from routes	Details
Internationally protected species under Habitats regulations		
Great Crested Newt	Under 1km	Recorded in Walburton and Poling area but could be in any local ponds. 3 records
Stag Beetle	Under 1km	Recorded in suitable habitat including Binstead Woods and Arundel Park. 49 records
Desmoulins whorl snail	Unknown	One historic record (1994) but can be found in grazing marsh ditches
Hazel dormouse	Under 1km	Found in suitable woodland across the search area including Binstead woods. 422 records
Barbastelle Bat	Recorded in all parishes in the search area	60 records for the area.
Serotine bat	Under 1km	Recorded from Arundel Park and Binstead woods. 70 records
Alcathoe bat	Under 1km	Only 3 records but a recently discovered species.
Bechstein's bat	In wider search area	3 records
Brandt's bat	Under 1km	2 records including Binstead Wood
Daubenton's bat	Under 1km	13 records including Binstead wood
Whiskered Bat	Under 1km	5 records including Binstead wood
Natterer's bat	Under 1km	12 records including Binstead wood
Noctule Bat	Under 1km	Recorded from Crossbush and Binstead wood 10 records
Nathusius's pipistrelle bat	Under 1km	Recorded from Ford area 4 records

Common Pipistrelle bat	Under 1km	Widespread species including Binstead wood. 99 records
Soprano pipistrelle bat	Under 1km	Widespread species 42 records including Binstead wood
Brown long eared bat	Under 1km	52 records including Binstead wood
Bird Species protected under the Bird's Directive		
	45 species	
Nationally protected species under the NERC act section 41 by species grouping		
Amphibians	2 species	
Fish	2	
Flowering plants	13	
Butterflies	10	
Moths	48	
Crickets	1	
Liverworts	1	
Mosses	2	
Mammals	6	
Reptiles	4	
Birds	39	

3.3 Priority Habitats

The following priority habitats are recorded in the search area;

Chalk stream. There are several chalk streams in the area including Binstead stream and 2 streams crossed by the current road.

Coastal and floodplain grazing marsh. Extensive areas found in the Arun floodplain both north and South of the current route and crossed by all options.

Deciduous woodland. Extensive areas especially to the west with woods currently bordering both sides of the current route. All options have the capacity to have an impact.

Wood pasture and parkland. Extensive parkland associated with Arundel estate but other areas to the south of the existing road.

Lowland heathland. A very small area unlikely to be impacted by any options

Lowland calcareous grassland. Several areas but away from proposed route options.

Intertidal saltmarsh and mudflat. Within the River Arun.

Ancient woodland and veteran trees. There are many veteran trees recorded in the area and also areas of ancient woodland.

3.4 Non-Native Invasive Species

Table 3 Summary of Non-Native and Invasive Species Records within 2KM of the proposed Arundel A27 highway route options

There are records of 14 bird species listed on schedule 9 of the Wildlife and Countryside act 1981, however almost all of these are waterfowl and likely to be associated with escapes from the WWT

site. They are therefore not listed here. There are 17 other species listed on schedule 9, some with only 1 record. The key species are listed below.

Species	Distance from route	Details
Water Fern <i>Azolla filiculoides</i>	Under 1km	4 records including from river Arun
Cotoneaster species <i>Cotoneaster horizontalis</i>	Under 1km	8 Records include alongside the current A27
New Zealand Pigmyweed (Australian Swamp Stonecrop) <i>Crassula helmsii</i>	Under 1km	4 records including in a pond at Binstead and Warningcamp
Montbretia <i>Crocasmia x crocosmiiflora</i>	Under 1km	10 records. Widespread garden escape
Canadian and Nuttall's Waterweeds <i>Elodea sp.</i>	Under 1km	16 records including in Arundel and at Swanbourne lake
Japanese Knotweed <i>Fallopia japonica</i>	Under 1km	9 records including Binstead, Ford and Crossbush
Indian Balsam (Himalayan Balsam) <i>Impatiens glandulifera</i>	Under 1km	8 records including Binstead and Arundel Park
Parrot's-feather <i>Myriophyllum aquaticum</i>	Under 1km	3 records including a pond at Binstead and Arundel
Rhododendron <i>Rhododendron ponticum</i>	Under 1km	15 records including Arundel Park, Rewell and Binstead woods
American Mink <i>Neovison vison</i>	Under 1km	8 records from WWT and river Arun
Eastern Grey Squirrel <i>Sciurus carolinensis</i>	Under 1km	23 records but widespread

4 ASSESSEMENT OF IMPACTS AND RECOMMENDATIONS

4.1 Designated Sites

4.1.1 Nationally-designated Sites

Two SSSI sites were identified in the search area, Fairmile Bottom SSSI and LNR is designated for yew woodland and calcareous grassland. This site is approximately 1.8km to the North of the proposed routes and there is unlikely to be any impact from the proposals.

Arundel Park Site of Special Scientific Interest (SSSI) is designated for its woodland, open water parkland and chalk grassland. The site supports several an unusually rich invertebrate fauna. This is SSSI is quite large but the closest designated area is under 1km from the proposals. The current proposed routings do not pass through the SSSI designated site and it is to the North of all the options; however, with larger schemes, potential impacts may arise from introduction of impacts on the sites from air quality, and water pollution.

4.1.2 Locally-designated Sites

There are six locally designated sites in the search area of these two, Poling Copse and Warningcamp Hill & New Down are over 1km from the proposed routes and unlikely to be effected.

The Arun Valley Local Wildlife Site is adjacent to the current route and is likely to be effected by all options. Potential issues here are habitat loss of freshwater grazing marsh, disturbance and potential for increase pollution.

Two woodland sites, Binstead Wood LWS and Rewell wood Complex LWS are adjacent to the western side of the current route. Rewell wood is to the north but these may be some habitat loss with some options. Binstead wood to the south is directly affected by some options, impacts will include loss of priority habitats, disturbance, severance of connectivity (especially for Bat species and Dormouse) increased pollution and impacts on water quality in the Binstead stream.

The final site is a local geological site to the North of the road and as this site is not on any of the line of proposed routes will be unaffected.

4.2 Habitats

At this stage, without the selected route options, it is difficult to accurately assess the potential impacts to habitats and vegetation. However the desk top study has identified potential impacts on a wide range of priority habitats as outlined in section 3.3.

The online routes will have a lesser impact but some priority habitats are adjacent to this route and could well be impacted by any widening or realignment. Of particular note are areas of ancient deciduous woodland at the western end of the route, freshwater grazing marshes around the Arun valley and historic parkland landscape

4.3 Protected and notable species.

4.3.1 Bats.

13 species of bat have been recorded in the search area, including 2 nationally rare species. The large number of bat records includes some known roost sites, foraging and commuting routes will also be present and connectivity of woodland and hedgerow features will be important for many species. There will be other roost sites in woodland areas that have not yet been identified.

The extent of any tree or structure removal is unknown at present and it is recommended that ecological surveys check for bat roosting evidence and potential. Based on the evidence reviewed to date there is considered to be **High potential** for roosting bats to occur on all options.

Habitats within the vicinity of the site are likely to be suitable for foraging and commuting bats and features such as woodland or riparian habitat is of high quality for foraging bats. Potential impacts could arise from loss of habitat, external lighting and a barrier effect separating bat roosts from foraging areas or affecting population dispersal.

Loss of foraging habitat and the barrier effect could arise from any of the Options due to the new highway realignment and the loss of areas of woodland, watercourses which are likely to be of high quality for foraging bats.

The large number of records and species in the area mean that the extent of any impact is likely to be **High** and it is recommended that ecological surveys assess bat activity, potential commuting routes and likely impacts.

4.3.2 Dormice

There are over 400 records of dormice in the search area including records as part of the ongoing national monitoring programme. The presence of this legally protected species is a significant consideration and will need to be supported by an appropriate level of ecological survey and assessment work.

The extent of any impact is unknown at present and depends on route selection but it is recommended that ecological surveys assess dormouse presence in suitable habitats and likely impacts. Based on the evidence reviewed to date there is considered to be **high potential** for dormice to be present on all route options.

If initial assessment identifies that protected species are likely to be present and affected by the development then further survey work is likely to be required. It is important to note that these more detailed surveys would need to be carried out for a minimum of 6 months at an appropriate time of year to demonstrate absence of dormice.

4.3.3 Great Crested Newt

The data search shows records of Great Crested Newt from Waterbodies in the East of the Search area. These water bodies are unlikely to be affected by any of the route options. However, the absence of records does not mean absence of newts and there are many suitable waterbodies in the western section of the search area. As a legally protected species it is essential that a presence or absence study is carried out of all suitable water bodies within 500 metres of the routes and if necessary further survey work to determine population size.

There is **Medium potential** for Great Crested Newts to be present along the routes.

4.3.4 Stag Beetle.

Stag beetles are another species protected under European and National Law. There are 49 records in the area. Stag beetles like old decaying wood and can be found in parkland with trees and mature woodland and even gardens. The records include Binstead and Rewell woods and Arundel Park but there may be other suitable habitat. The species can be affected by loss of habitat, especially removal of large and old trees and deadwood.

The extent of any impact is unknown at present and depends on route selection but it is recommended that ecological surveys assess stag beetle presence in suitable habitats and likely impacts. Based on the evidence reviewed to date there is considered to be **high potential** for stag beetle to be present on all route options.

4.3.5 Water Voles and Otter

Water voles are known to be present in the area with records from the WWT reserve and surrounding water bodies in the Arun Valley. The extent of any impact is unknown at present and depends on route selection but it is recommended that ecological surveys assess the suitability of any water body directly impacted or close to any chosen route options for presence of water voles and habitat suitability. Based on the evidence reviewed to date there is considered to be **high potential** for Water Vole to be present on all route options.

There are no otter records within the data search radius, however otter are returning to suitable habitats in south east England and can cover large territories. There are reports of Otter elsewhere on the Arun and so any field assessment for water vole should also consider evidence of otter presence.

4.3.6 Badgers

No records of badger are kept at the records centre so they do not appear in the data search, but the species is widespread and the habitats present would appear highly suitable.

The extent of any impact is unknown at present and any assessment would need to include impacts on populations and territories. Based on the evidence reviewed to date there is considered to be **high potential** for badgers to be present on all route options.

4.3.7 Reptiles

Four species of reptiles have been recorded in the search area. (Grass snake, Adder, common Lizard and slow worm). Given the spread of suitable reptile habitats in the search area, all route options may result in impacts on reptiles and the associated loss of habitat.

The exact extent of any impact is unknown at present and it is recommended that ecological surveys assess reptile presence in suitable habitats and likely impacts. Based on the evidence reviewed to date there is considered to be **high potential** for reptiles to be present on all route options.

4.3.8 Nesting birds

There are 45 species recorded that are protected under the European Birds directive, 39 species listed under section 41 of the NERC act and a further 42 schedule 1 birds under the wildlife and Countryside Act. All route options will significantly disturb bird nesting habitats including woodland, hedgerows and wet grassland. Crossings of watercourses may also impact water species and these routes are considered to have **high potential** for protected birds to be present.

Breeding birds will likely be present within trees and woody vegetation along all highway route options during the breeding season. All species of bird, their nests, eggs and young receive legal protection. Impacts to breeding birds are best avoided by undertaking vegetation clearance works (or other works which would disturb suitable habitat) outside of the breeding bird season (March-August included). Based on the evidence reviewed to date there is considered to be **high potential** for nesting birds to be present on all route options.

4.4 Non Native and Invasive Species

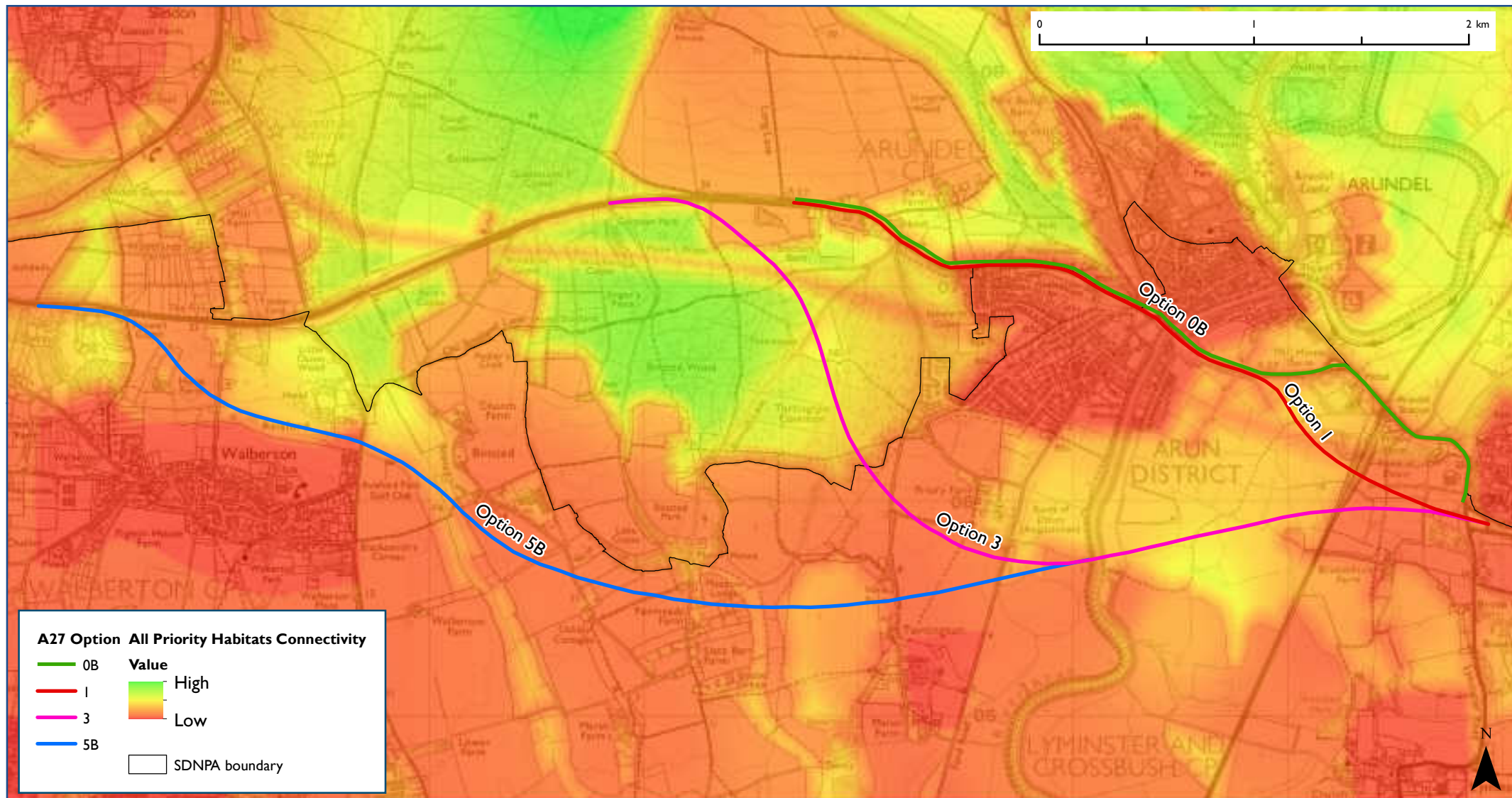
All highway routing options pass through areas where a number of non-native and invasive species have been recorded. There are 17 species (excluding birds) listed on Schedule 9 of the Wildlife and Countryside Act in England and Wales (including plants which are an offence to plant or otherwise cause to grow in the wild and plants that are illegal to sell).

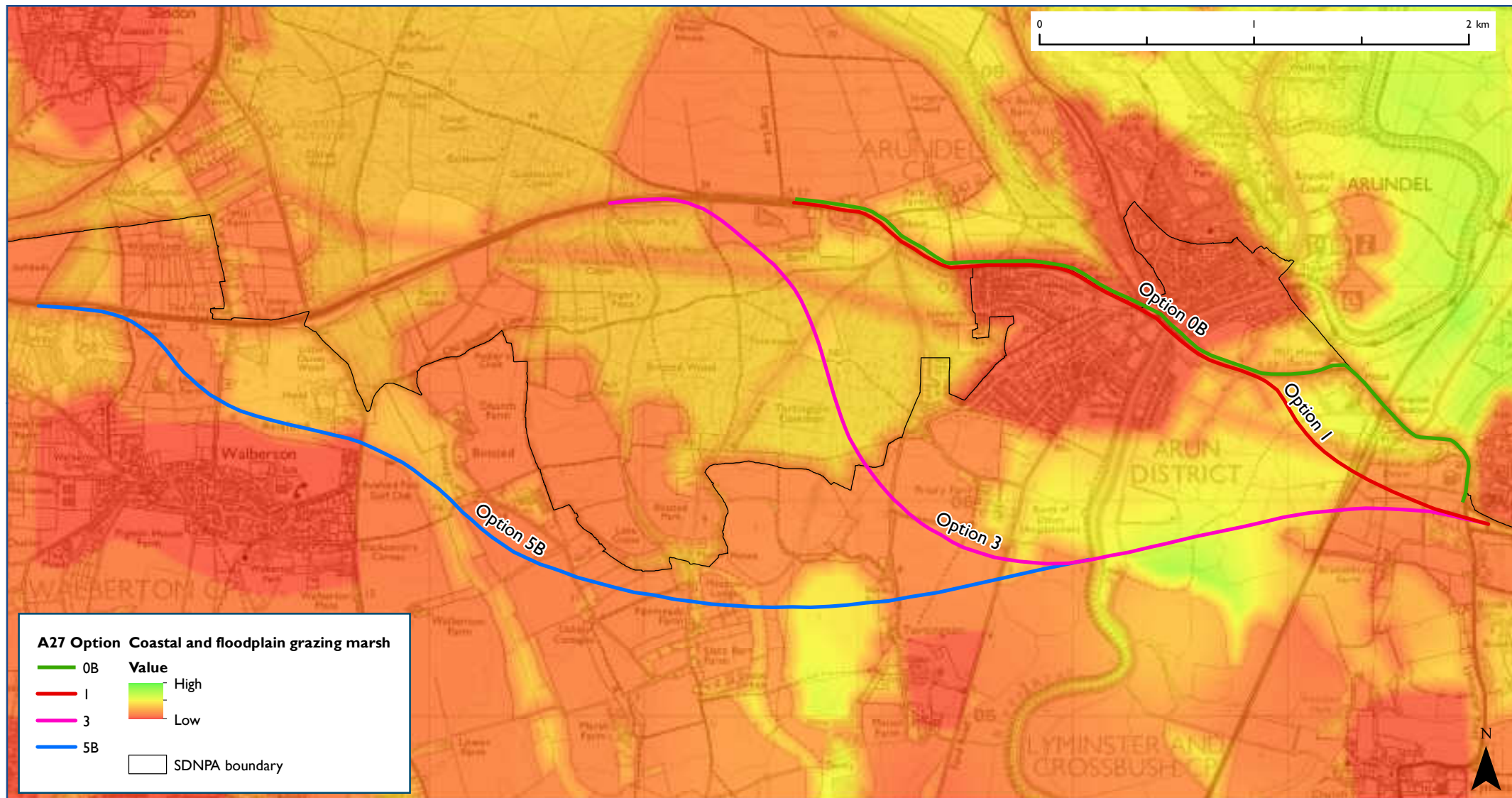
Controlling the spread of these species is important but, especially in the case of Schedule 9 plants, construction projects can contribute to the spread of a species. The exact location of invasive species will need to be targeted for managed removal prior to any clearance or construction work. Based on the evidence reviewed to date there is considered to be **high potential** for non-native and invasive species to be present on all route options.

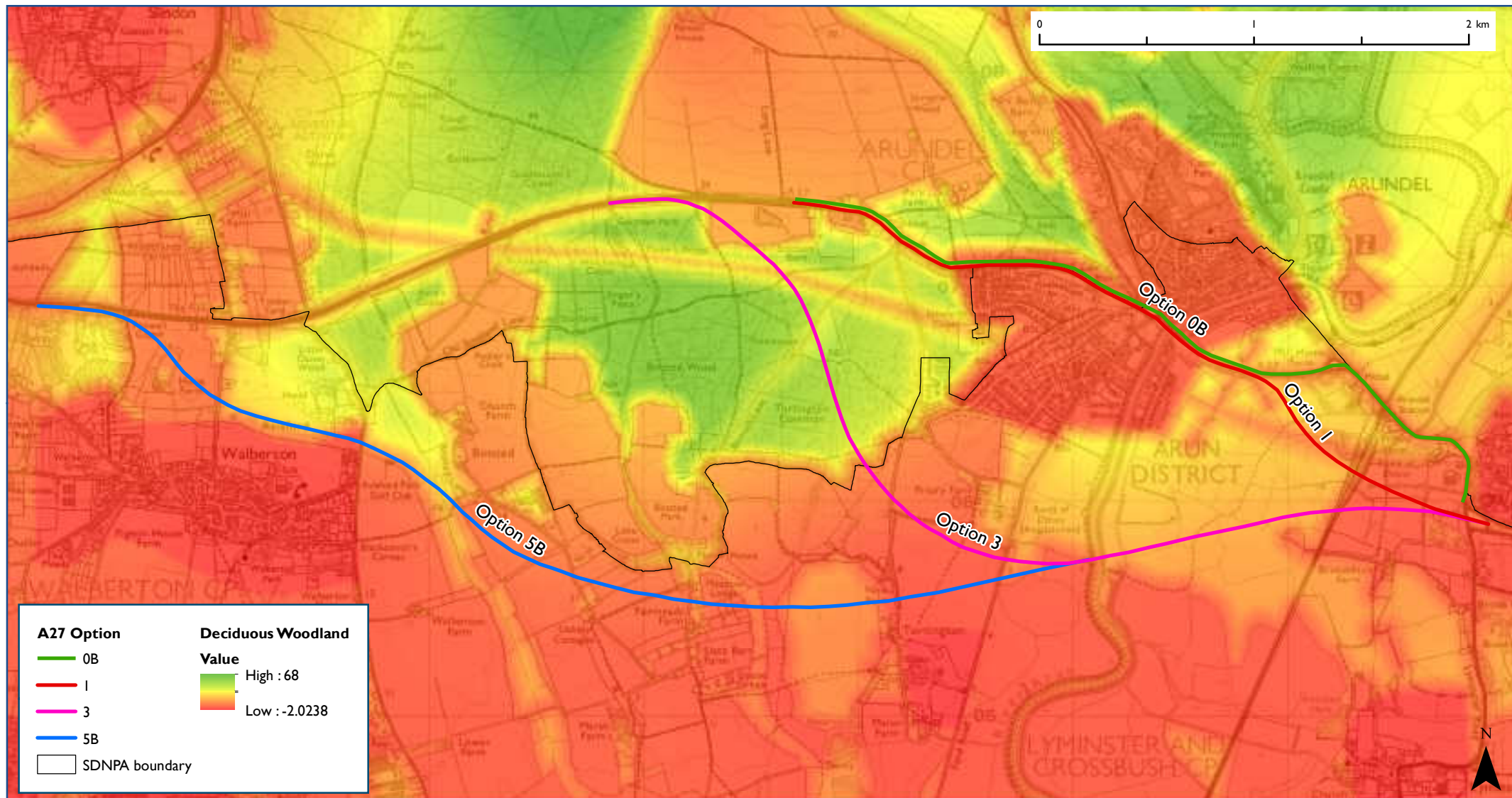
Where options include new highway links in areas of wet habitats, this risk is considered elevated due to the increased risk from encountering invasive aquatic species and the risk of spread via disturbance of (or introduction to) watercourses. There are numerous records of aquatic INNS species in the search area.

4.5 Ecological Enhancement

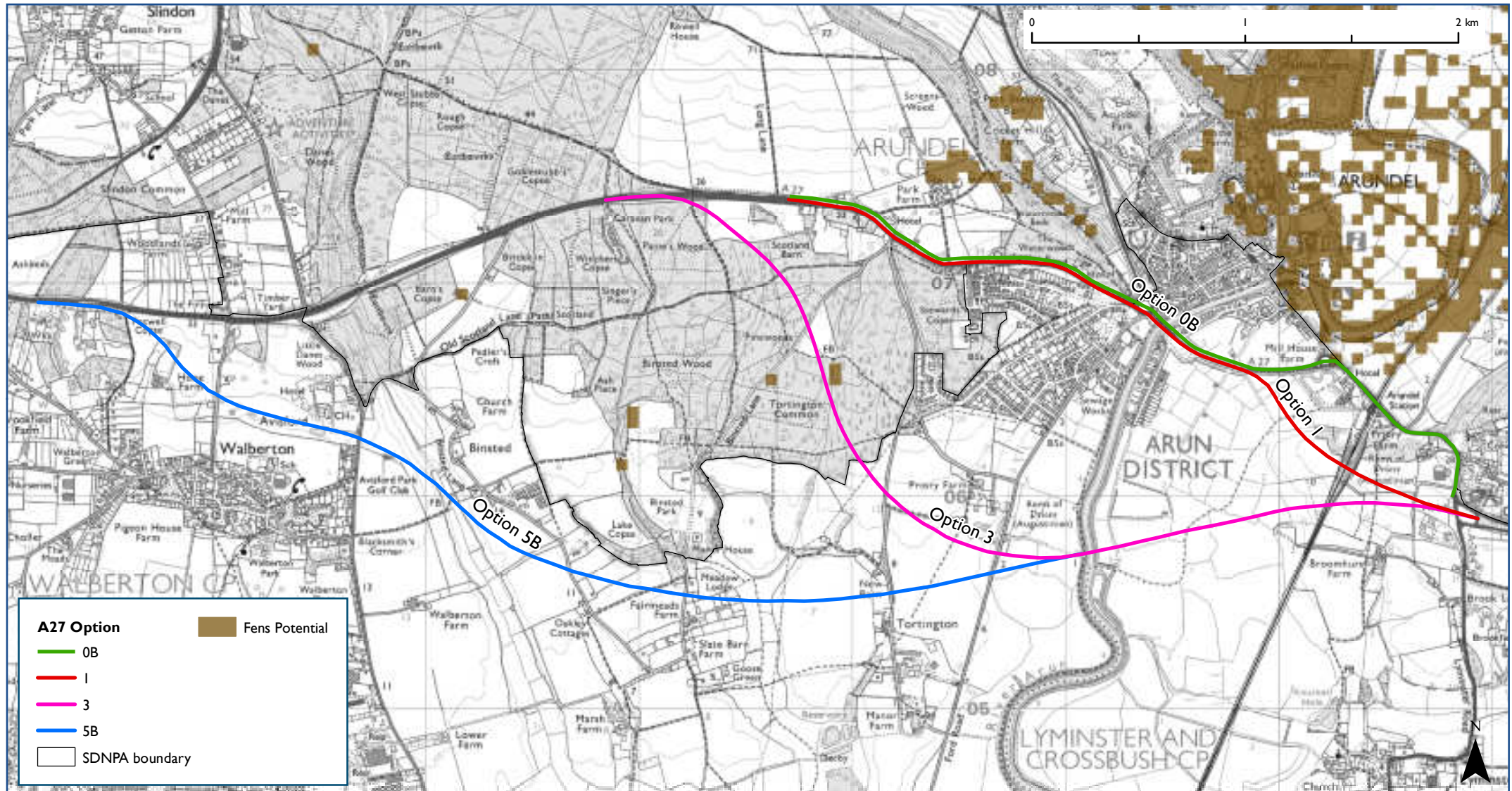
Natural Environment and Rural Communities Act 2006 encourages the incorporation of ecological enhancements into proposals. It is recommended that initial ecological surveys and reporting seek opportunities to contribute to biodiversity enhancement of adjacent habitats and contribute to existing initiatives.

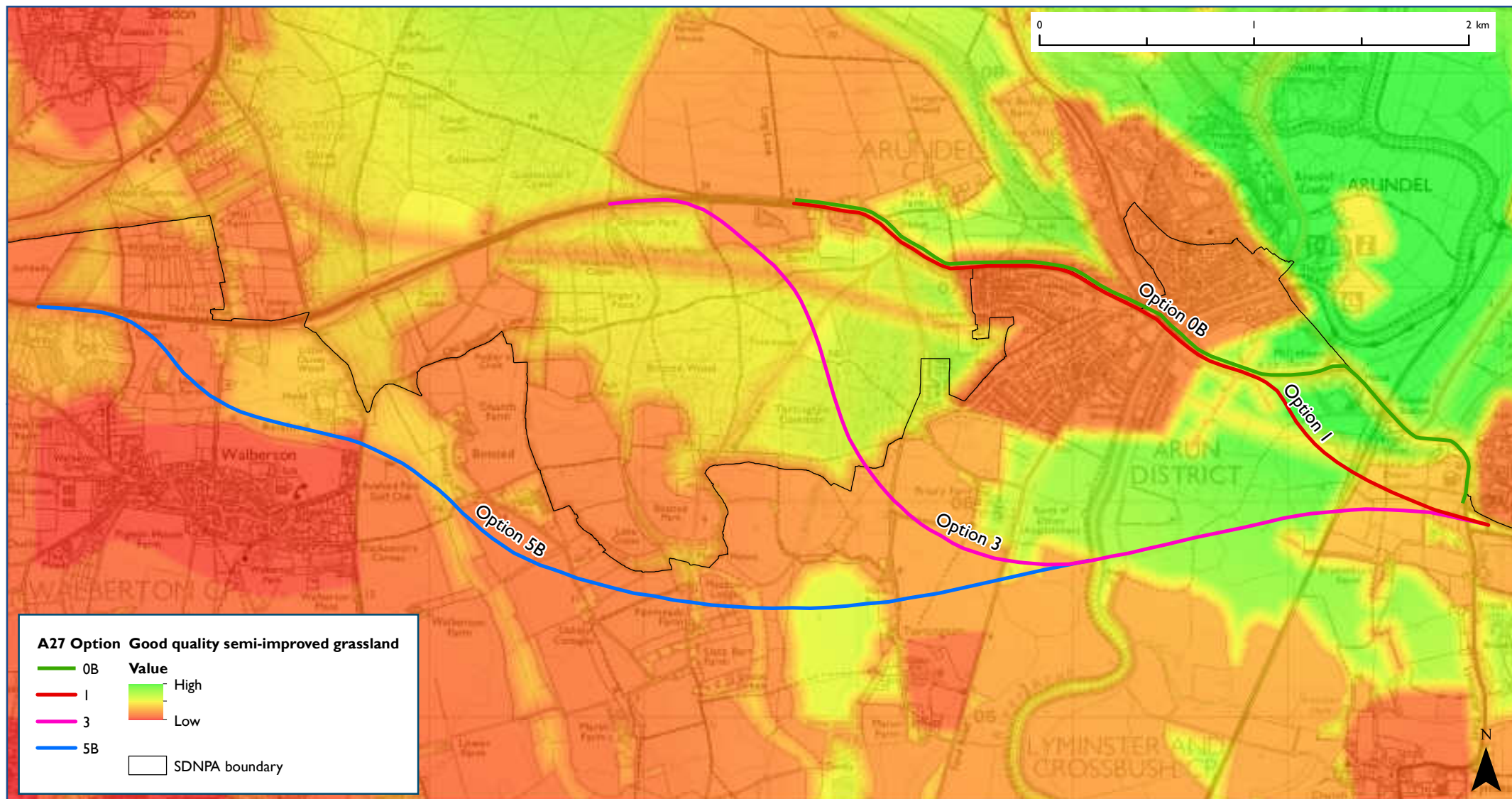






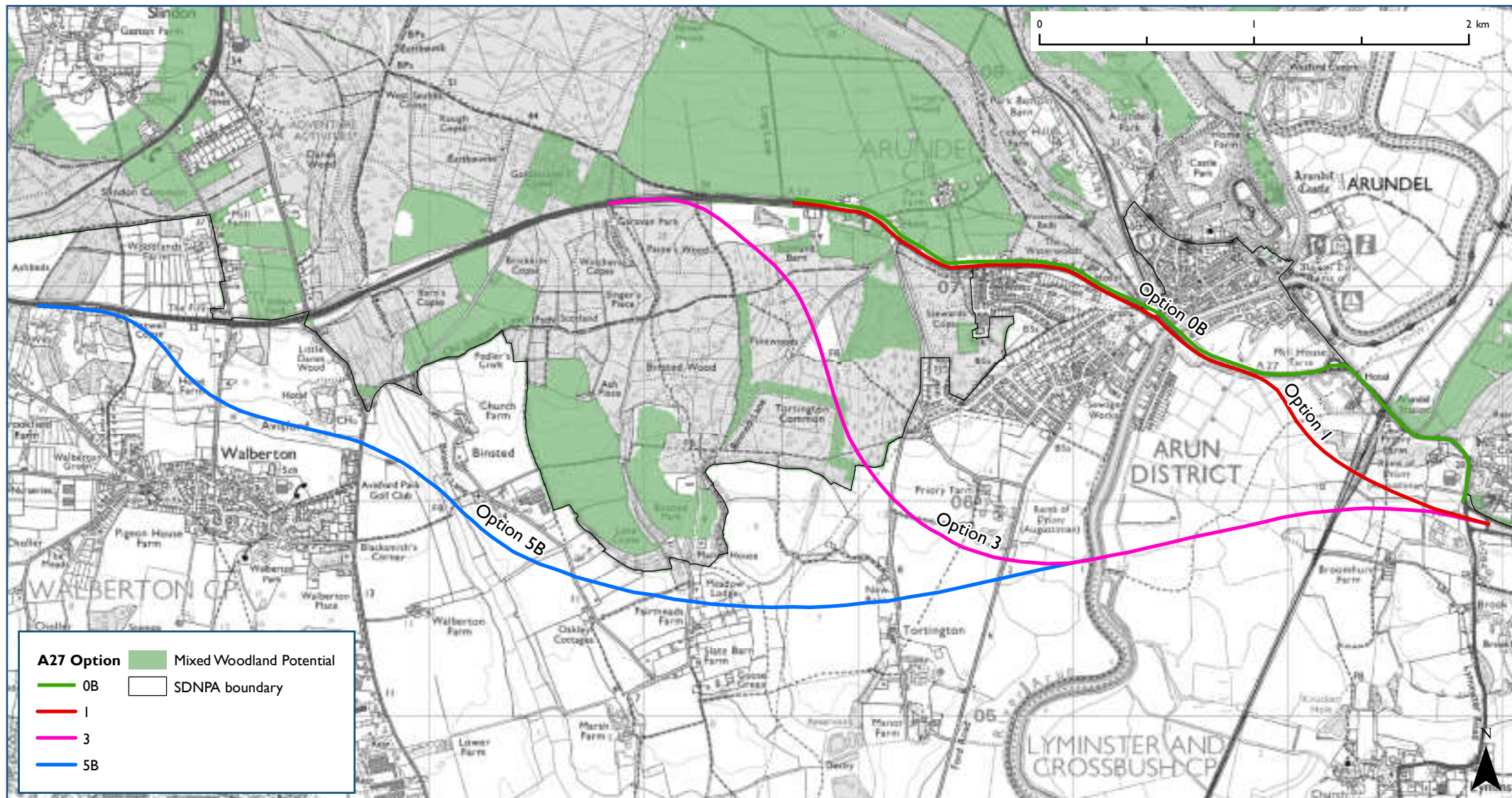
A27 Arundel Route Options - Landscape Context Fens Habitat Opportunity





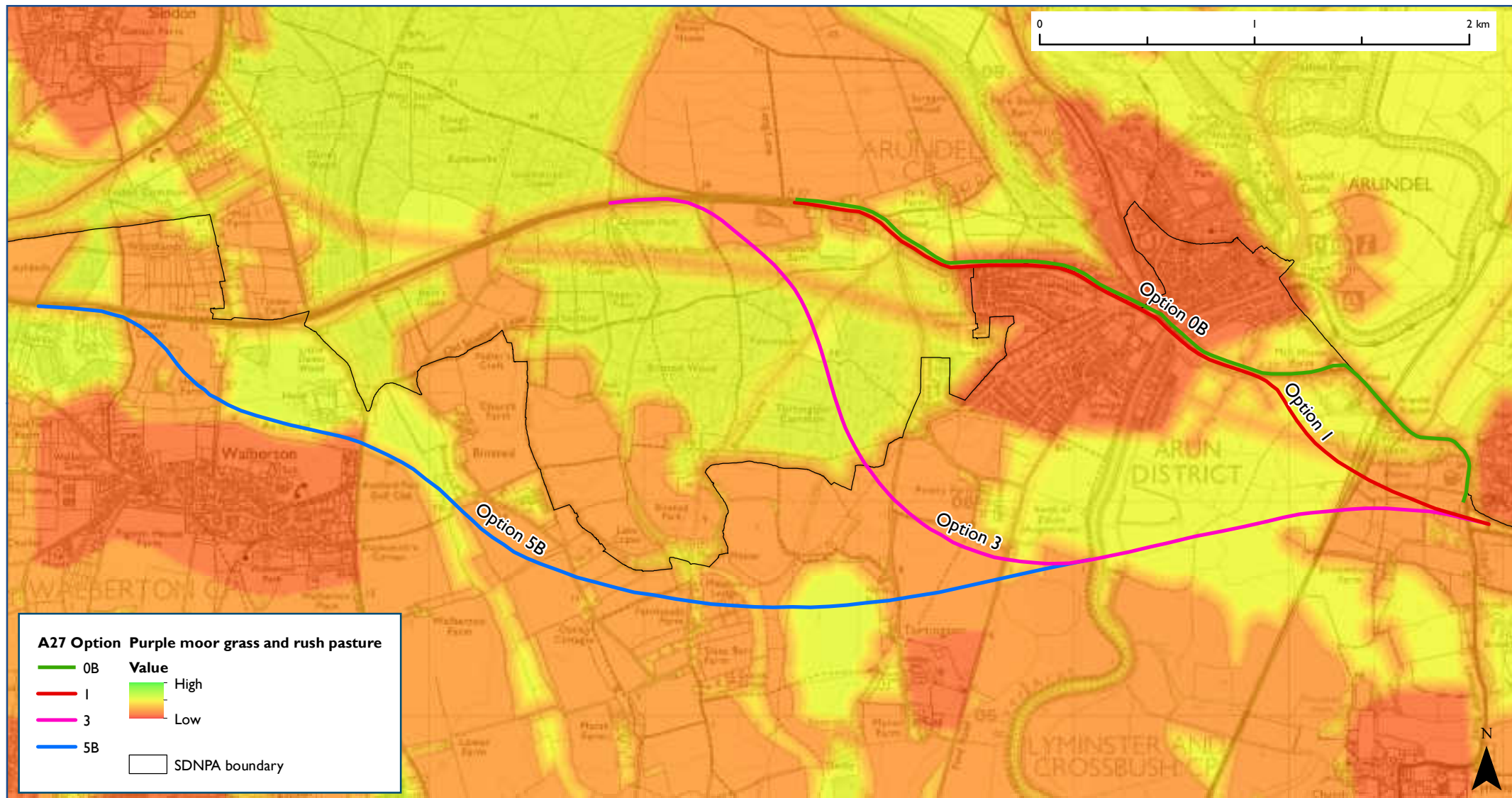
© Crown copyright and database rights 2017 Ordnance Survey 100050083
Scale at A4 1:25,000

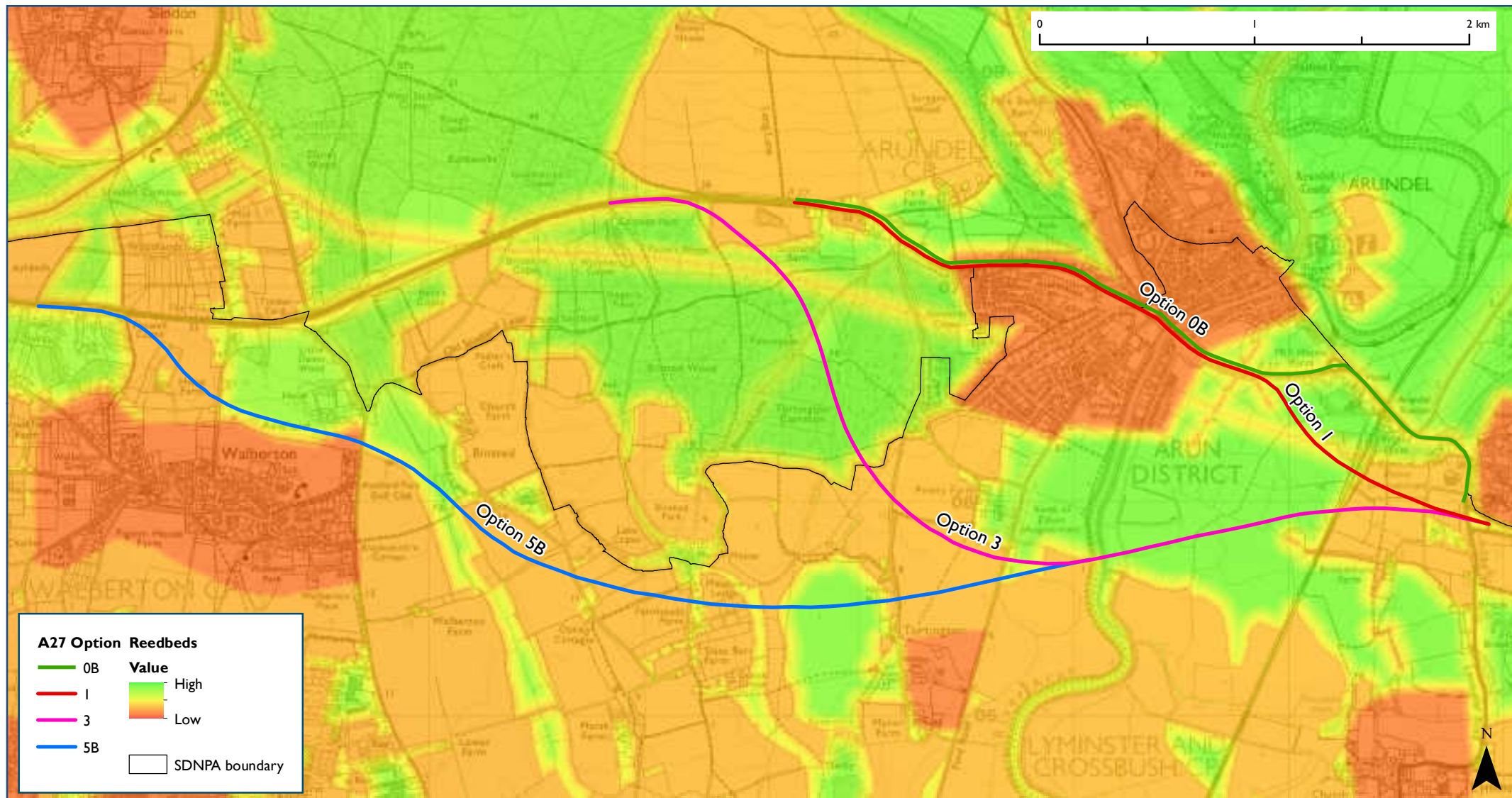
A27 Arundel Route Options - Landscape Context Mixed Woodland Habitat Opportunity



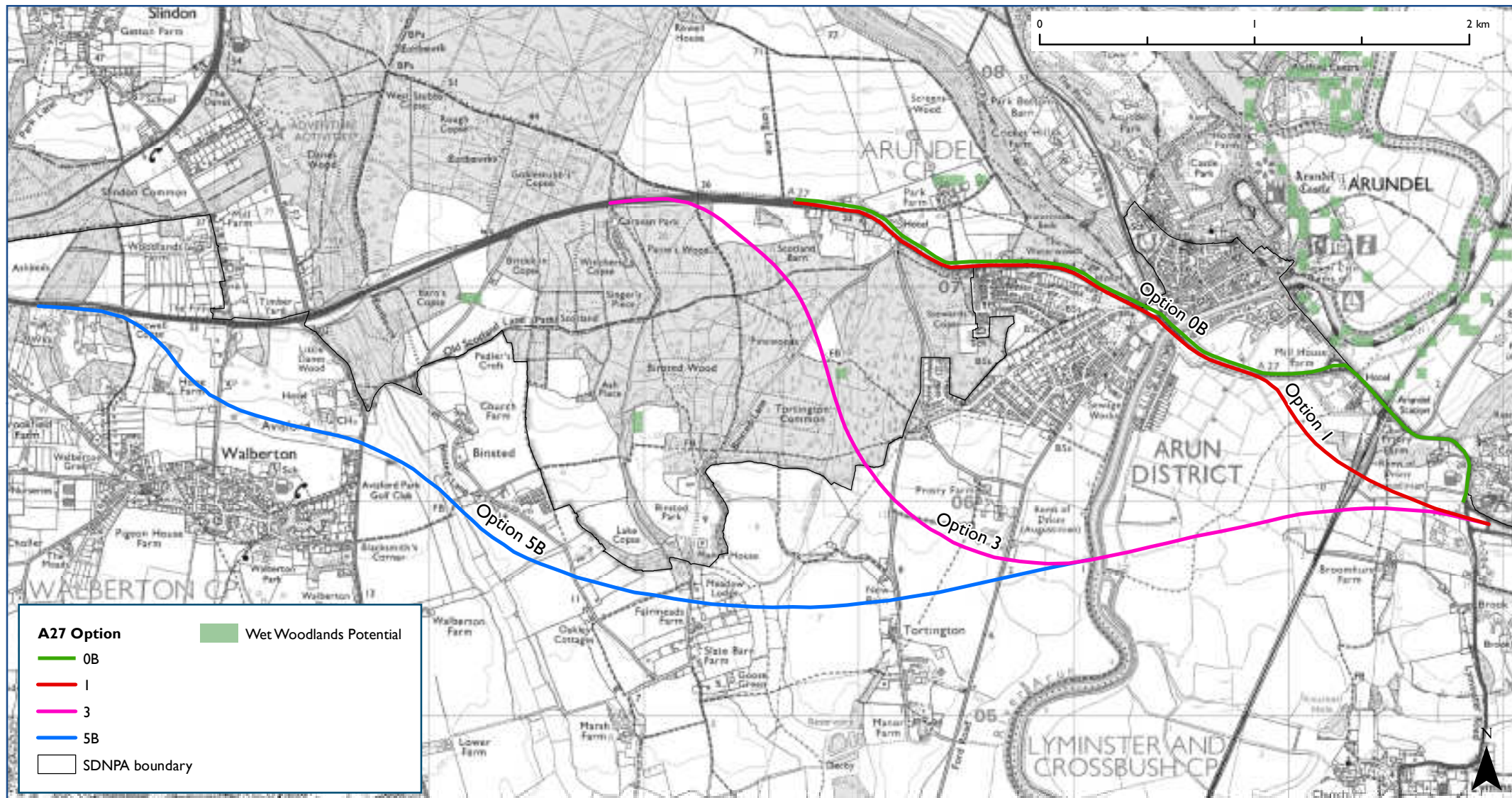
© Crown copyright and database rights 2017 Ordnance Survey 100050083

Scale at A4 1:25,000





A27 Arundel Route Options - Landscape Context Wet Woodlands Habitat Opportunity



Habitat Connectivity: Hedgerows and Field Margins

