

3 ALTERNATIVES CONSIDERED

3.1 WelTAG Approach

The Conceptual Design for the Scheme, and other associated transport measures were developed and appraised through the WelTAG Planning / Stage 1 Study commissioned in 2007 and the WelTAG Stage 2 Appraisal undertaken as part of the Key Stage 2 Study commissioned in 2009 (refer to Section 1.3.2).

The options that were considered during the WelTAG Stage 2 Appraisal are shown in ES Volume 2, Figure 3.1.

3.1.1 WelTAG Planning and Stage 1 Appraisal

The WelTAG Planning Stage firstly established Caernarfon and Bontnewydd's transportation problems, constraints and opportunities and the 'Transport Planning Objectives' (TPOs) were developed against which the appraisal of options could be tested against. Once these had been established, potential solutions were developed in the form of transportation options.

Following the Planning Stage, the WelTAG Stage 1 Appraisal was undertaken and fourteen transportation options were appraised against the TPOs, criteria relating to the Welsh Impact Areas and other criteria relating to public and stakeholder acceptability, feasibility, risk and affordability. The Welsh Impact Areas represent the three elements of sustainability which underline policy in Wales:

- The economy,
- The environment,
- Society.

Five of the fourteen options performed well against the TPOs and Welsh Impact Area criteria and were recommended for further appraisal at WelTAG Stage 2. These were:

- Option 1 – A new bypass from Llanwnda to Plas Menai,
- Option 2 – Local bypasses of Llanwnda, Dinas, Bontnewydd, Pont-rug and Crug,
- Option 3 – A conventional rail link either from Bangor to Caernarfon, Caernarfon to Afon-wen or Bangor to Afon-wen,
- Option 4 - An online package of measures, which includes; online road capacity improvements, road traffic management, parking, soft measures, accident remedial measures, cycle routes, lanes & priorities, pedestrian areas/crossings, and public transport modes, and
- Option 5 – Do nothing.

The WelTAG Appraisal Summary Table (AST) was completed for each option appraised at WelTAG Stage 1.

3.1.2 WelTAG Stage 2 Appraisal

A public consultation exercise was carried out as part of the Stage 2 Appraisal exercise. This resulted in a further seven options being developed, and gave a total of twelve options that were appraised at WelTAG Stage 2 as follows:

Bontnewydd Bypass Options

- Pink Option
- White Option
- Blue Option

Caernarfon Bypass Options

- Purple Option
- Yellow Option
- Brown Option
- Brown Variant Option
- Black Option
- Orange Option
- Red Option
- Cyan Option

These options are shown in Volume 2, Figure 3.1.

Online Improvements Option

Online package of improvements (traffic calming in Bontnewydd, promotion of park and share schemes, cycling and pedestrian facilities on the A487 and 'smarter choices'.

The WelTAG Appraisal Summary Tables (AST) for the above options are available in the ES Volume 3, Appendix A.4.

The Purple Route was announced as the preferred route in November 2010. In light of budgetary pressures, a review of the options was carried out. This resulted in the withdrawal of the original preferred route and the announcement of the Yellow Option as the preferred route. This route was protected for planning purposes through the Welsh Government serving a TR111 notice. The TR111 route is shown in Volume 2, Figure 3.2.

3.2 Design Alternatives assessed through KS3

As part of the ECI process the scheme that was submitted at the tender stage has been reviewed through an appraisal process. The results of this exercise is contained in the Design Options Report Highways, which informs the current Scheme (Volume 3, Appendix A.5) and Structures Design Options Report (Volume 3, Appendix A.6). The key areas where an alternative were considered that could bring overall benefit to the scheme were as follows:

3.2.1 Dinas Farm Access – Structure 105

The original illustrated scheme had an over bridge taking the access road to the farm complex. Following a wider review of vertical alignment, the bridge was replaced with an underpass which has been set down within the local landscape. This has reduced the visual impact of the structure in the landscape and provided another underpass that allows bats to cross the road alignment contributing to the landscape-scale approach to bat mitigation approach to mitigating the effects of the road on the local bat population in particular the Lesser Horseshoe Bats associated with the adjacent Glynllifon Bat SAC.

3.2.2 Afon Gwyrfai Viaduct – Structure 106

The scheme tender required that a viaduct structure be provided across the valley at this point reflecting its function as a flood plain. In order to consider construction costs savings and disposal of surplus fill the contractor considered a number of iterations of an embankment to replace a portion of the viaduct. After detailed appraisal and following consultation with NRW it was decided not to progress any further. This had ecological benefits to the movement of animals along the river corridor which is designated a SAC, and also reduces the impact of the structure on the hydromorphology of the river. Likewise, the issues of flooding in the valley floor and potential scouring were also addressed.

3.2.3 Structure 109

This structure was initially designed as an overbridge to carry a minor road across the bypass. Following consultation with the local authority it was agreed that the bridge would be dedicated to NMU use only. Current motor vehicle users would therefore be diverted to other crossing point along the Scheme.

3.2.4 Afon Seiont - Structure 112

This is the second viaduct along the scheme it crosses the Afon Seiont in the vicinity of the Glan Gwna Holiday Park. Its location within a steep sided valley minimises its more widespread impact. However, locally the impact is adverse and the alternative is to replace the viaduct on the southern side of the river with an embankment. This offers the scope to dispose of surplus fill and to landscape the earthworks to reduce the visual impact of the road corridor. Some concern was expressed as to the impact upon animals in particular Otters and bats passing along the river. The team held consultations with NRW who concluded that the option would not have an effect on animal movements in the area accordingly the alternative was adopted as part of the scheme design.

3.2.5 Bethel Junction

The existing junction of the B4366 Bethel to Caernarfon road with the unclassified road from Plas Menai is affected by the new bypass. A range of options have been considered including full or partial access on to the bypass options. The preferred option of the contractor is for an at-grade crossroads with the B4366 passing over the bypass. Following discussions with the local authority this has now been changed to a roundabout. The potential impact of roundabout lighting on bats as a result of this decision is covered in Chapter 8 – Nature Conservation.

3.2.6 Crug Lane Connection

The works information did not allow for the connection of Crug Lane with the Plas Menai junction with the A487 as it currently enjoys. Following discussions with affected parties and the local authority the client instructed that a connection be investigated. A number of options were examined and the preferred scheme allows for the direct connection provided off the Plas Menai junction. To meet standards, the junction with the Felinheli road and the Plas Menai National Outdoor Centre have been rationalised to one arm. This option required extensive earthworks including the felling of part of Bryn Covert which is important bat habitat. The mitigation includes replanting the affected woodland and the provision of connectivity planting.

3.3 Design development

In parallel with the review of alternatives there has been a number of design developments which complement the overall scheme design.

3.3.1 Provision of Laybys

The illustrated and the tender design showed the provision of four laybys along the route. Following a review of alignment, impact of layby provision on adjacent landowners and landtake it was agreed with the client that two laybys would be provided at Ch2500 (northbound) and Ch4250 (southbound).

3.3.2 Meifod Roundabout

In order to ease the construction process and traffic management the roundabout at the A487 junction at Meifod north of Bontnewydd has been relocated off line.

3.3.3 Pengelli Isaf Farm Access – S114

Ongoing consultations with Pengelli Isaf Farm indicated their preference for a non-highway route for transporting cattle to the milking parlour. The Tender Design proposals would have required the transportation of cattle by vehicle which could have led to a potential objection at Public Local Inquiry.

This design option therefore considered the widening of the existing Afon Cadnant culvert (S114) to include a cattle creep, and the inclusion of associated private means of access routes to facilitate non-highway access to the various fields and milking parlour associated with Pengelli Isaf Farm. This option would still necessitate a crossing of the realigned side road to the east. Following appraisal, this option was incorporate in to preliminary design.

An alternative solution for an accommodation overbridge at Ch.6+730 was also considered, however, this was discounted on grounds of whole life costs, maintenance, visual impact and land take for approach embankments.

3.3.4 Structures 116 and 118

These two culverts cross under the scheme in the vicinity of the Plas Menai cutting. The original design was to divert a local stream into these two culverts and into the Afon Cadnant. Following discussions with NRW the use of the Afon Cadnant catchment was not agreed and as a consequence the stream has been diverted through the two culverts into the localised catchment that runs into the Menai Straits. Following modelling of the watercourses, it was found that the structure 116 and 118 would flood during times of spate. As a result, two dry pipes were added to the design to allow mammals (primarily otters) to cross the Scheme during times of spate. Initially, the design was to have one, long dry pipe which would dogleg towards one end. This was subsequently broken up in to two separate dry pipes (116A and 118A), as evidence shows that otters will not use pipes where they are unable to see through to the other side.

The assessment of the impact of all culverts and other water related structures of is covered in Chapter 14 – Road Drainage and the Water Environment and the Water Framework Direct (WFD) assessment included within it.

3.3.5 Plas Menai Cutting

The tender design showed a steep rock cutting in this location. The Ground Investigation (Volume 3, Appendix F.3) indicated that the underlying strata did not have the amount of hard rock anticipated. In order to accommodate this change, the cutting slopes were slackened to 1 in 2.5 gradient. This would increase the land take but would allow the introduction of tree and shrub planting to mitigate the visual impacts both locally and from the Anglesey AONB across the Menai Strait.

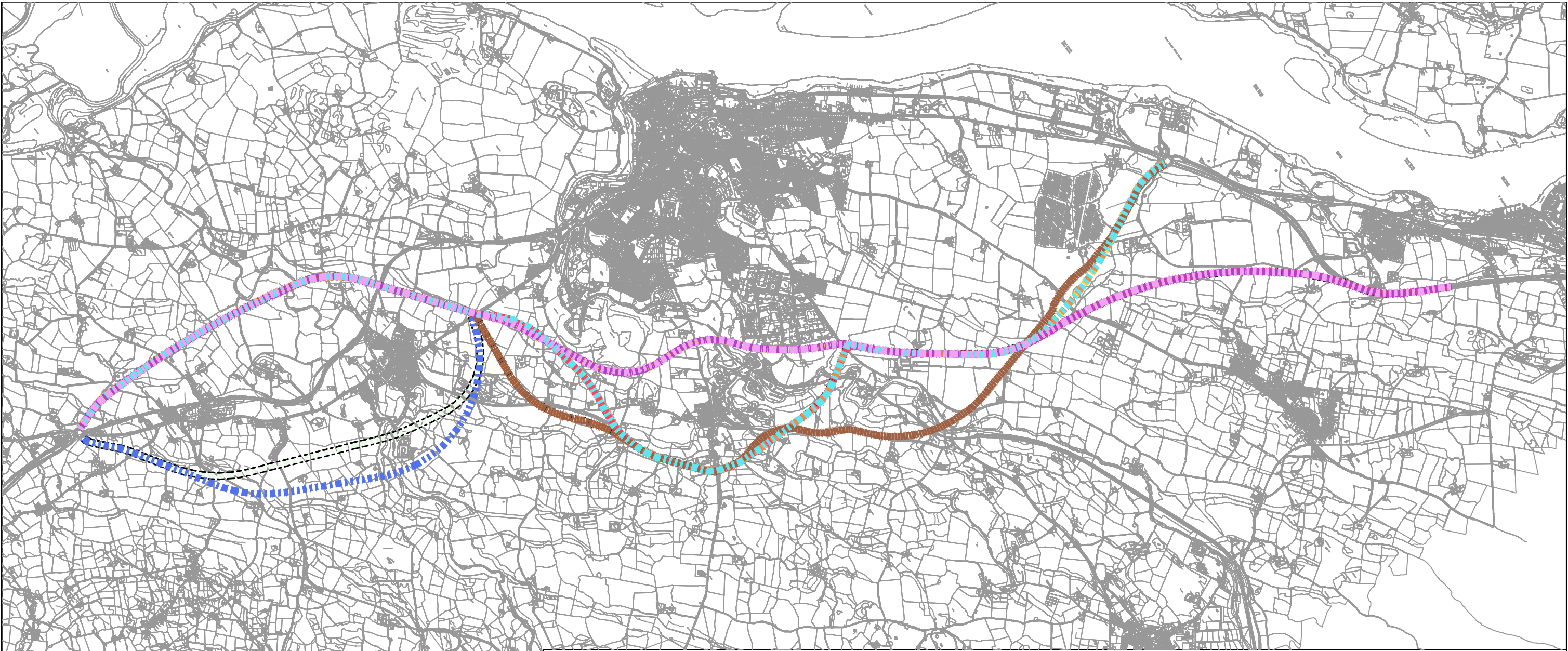
3.3.6 Landscape-scale approach to bats

An overarching feature of the Scheme is that mitigation is required to address impacts upon the local bat population, in particular the Lesser Horseshoe Bats from the Glynllifon SAC which is located about 1.5 kms south of the Goat Roundabout. This is a large maternity roost which houses some 6% of the Lesser horseshoe population in the UK. There are also two other Lesser Horseshoe Bat related SACs near to the scheme namely the Gwydir Forest Mines and Meirionnydd Oakwoods and Bat Sites. Furthermore, there are 14 Lesser Horseshoe Bat roosts at non-designated sites within 2.5km of the scheme (see SIAA para 5.1.13).

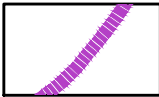
The approach taken by the JV has been to provide for general habitat connectivity and Scheme permeability within the design and mitigation strategy. This has been addressed by providing oversized culverts and underpasses, provision of hedgerows and woodland along both sides of the new road and identifying areas of existing vegetation to be retained and incorporating within the landscape proposals. Further information on how bats are addressed in relation to the Scheme is provided in Chapter 8 – Nature conservation. Where bats are a qualifying feature of the SAC, this is also assessed in Volume 3, Appendix E.2 – Statement to Inform and Appropriate Assessment (SIAA).

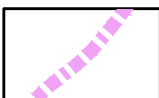
3.4 Recommended Optimum Scheme


The Recommended Optimum Scheme is that which includes all the alternatives considered above together with the design developments. This follows the preferred route which is the 'Yellow Option'.

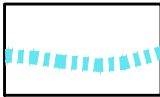


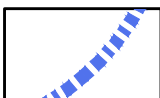
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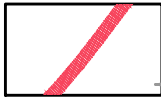
Pink option

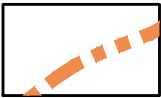
Orange option


Cyan option


Blue option

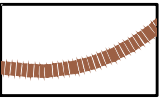
White option

Red option

Orange option

Black option

Brown option

Brown variant option

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Key Stage 2 Study Options (a-f)
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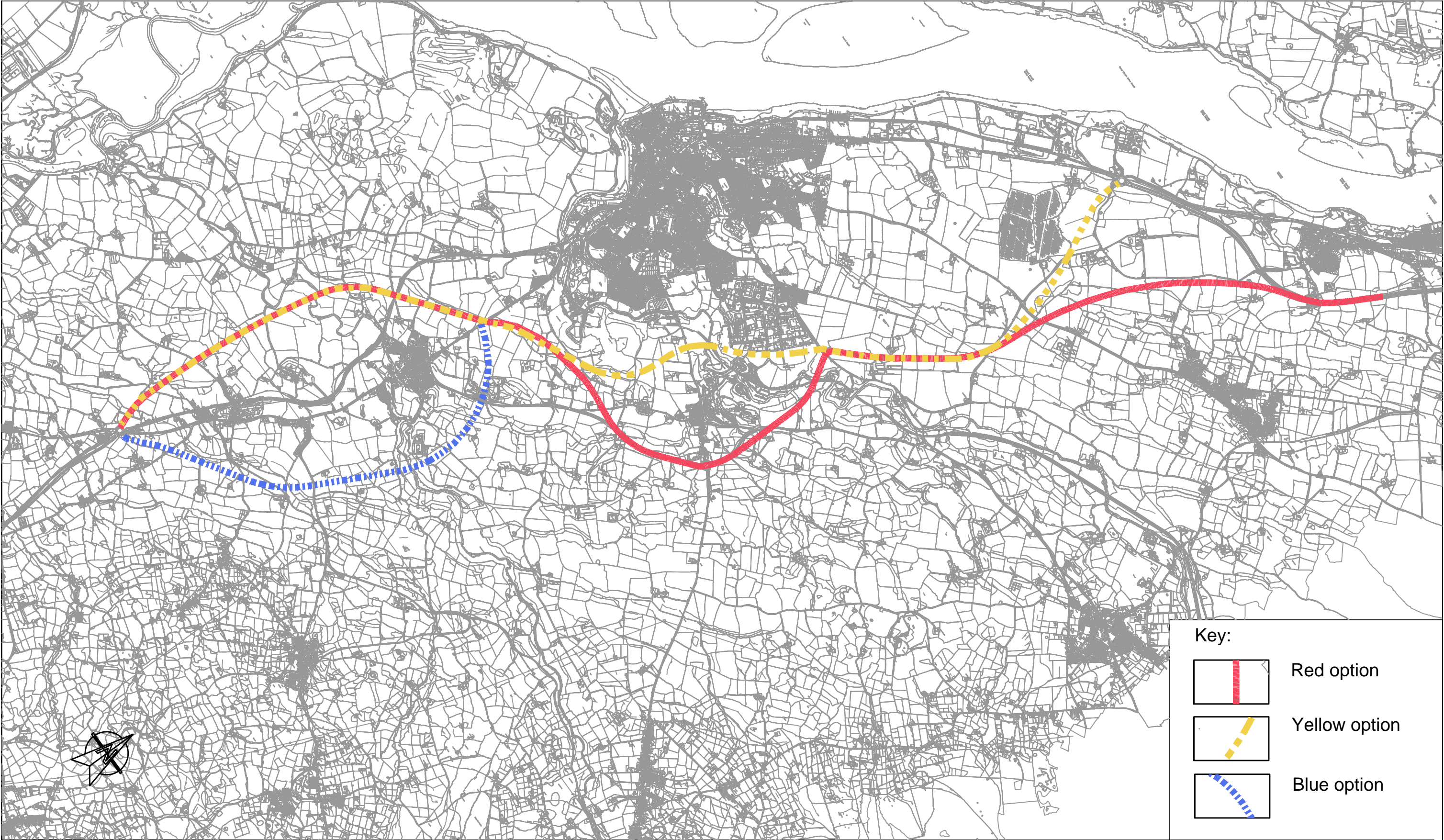




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Key:

Red option

Yellow option

Blue option

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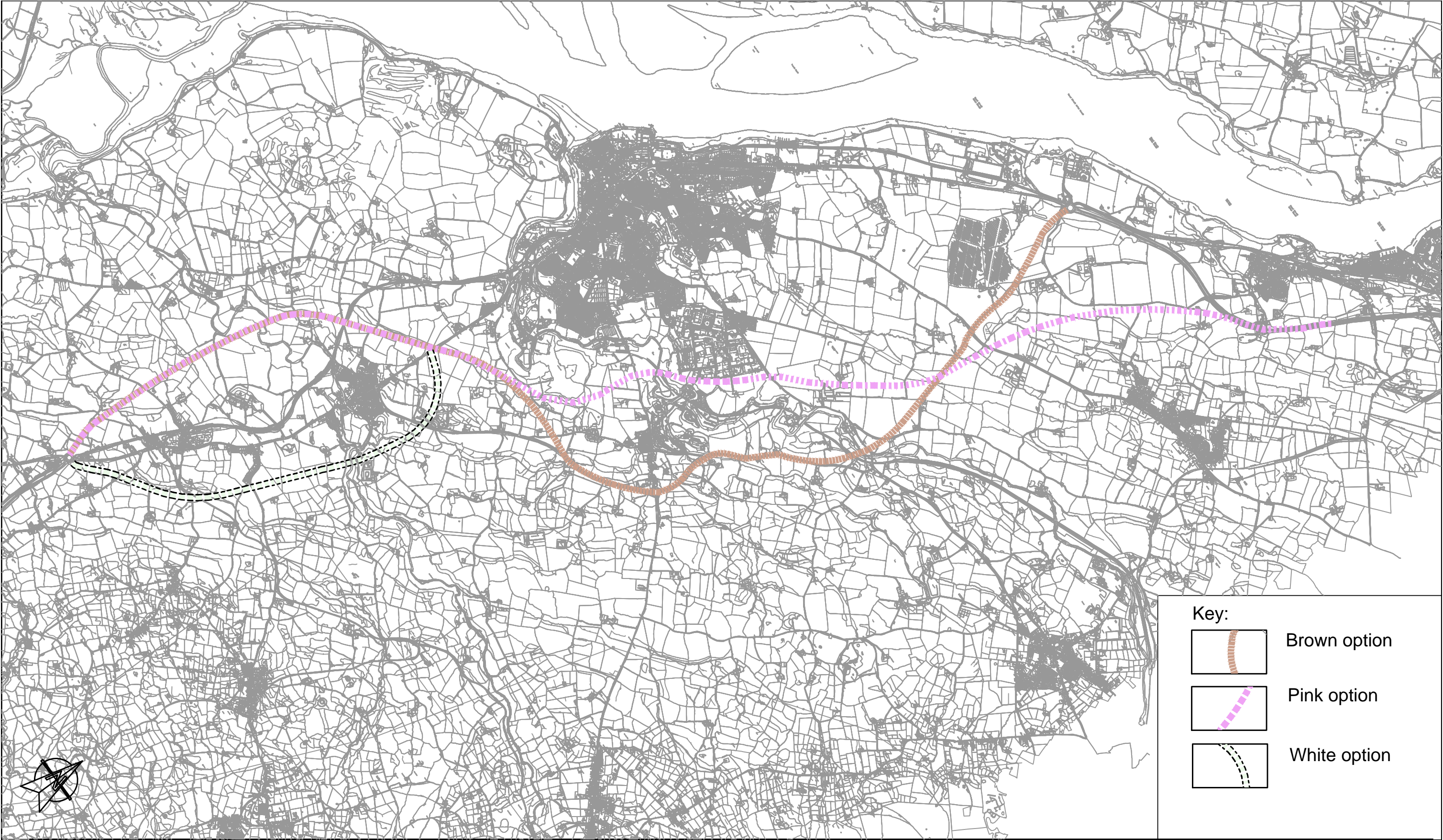


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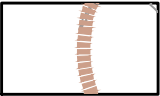
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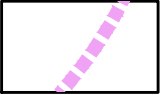
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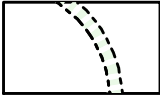
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Key:

 Brown option

 Pink option

 White option

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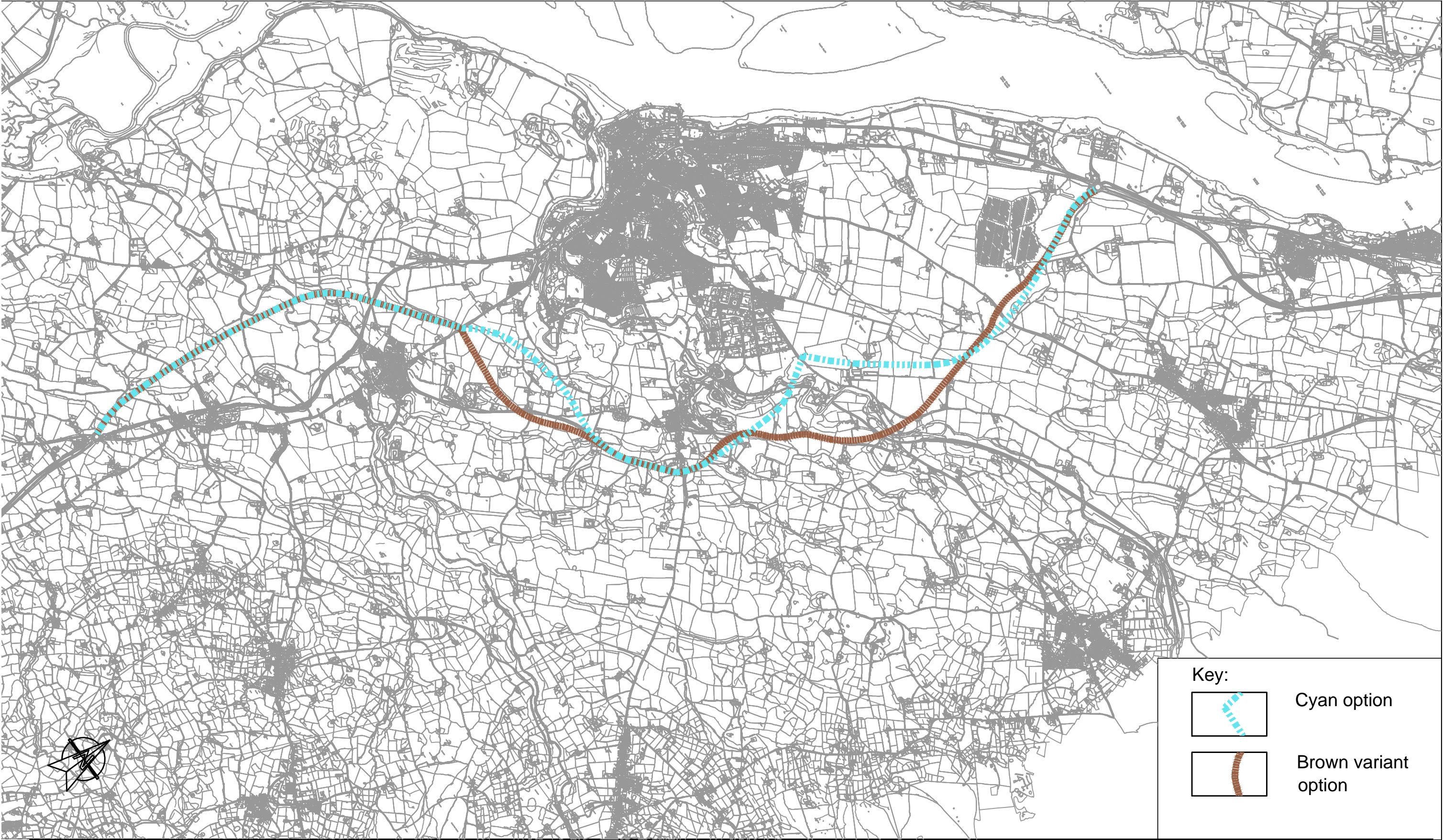
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Key:

 Cyan option

 Brown variant option

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Key:

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Orange option

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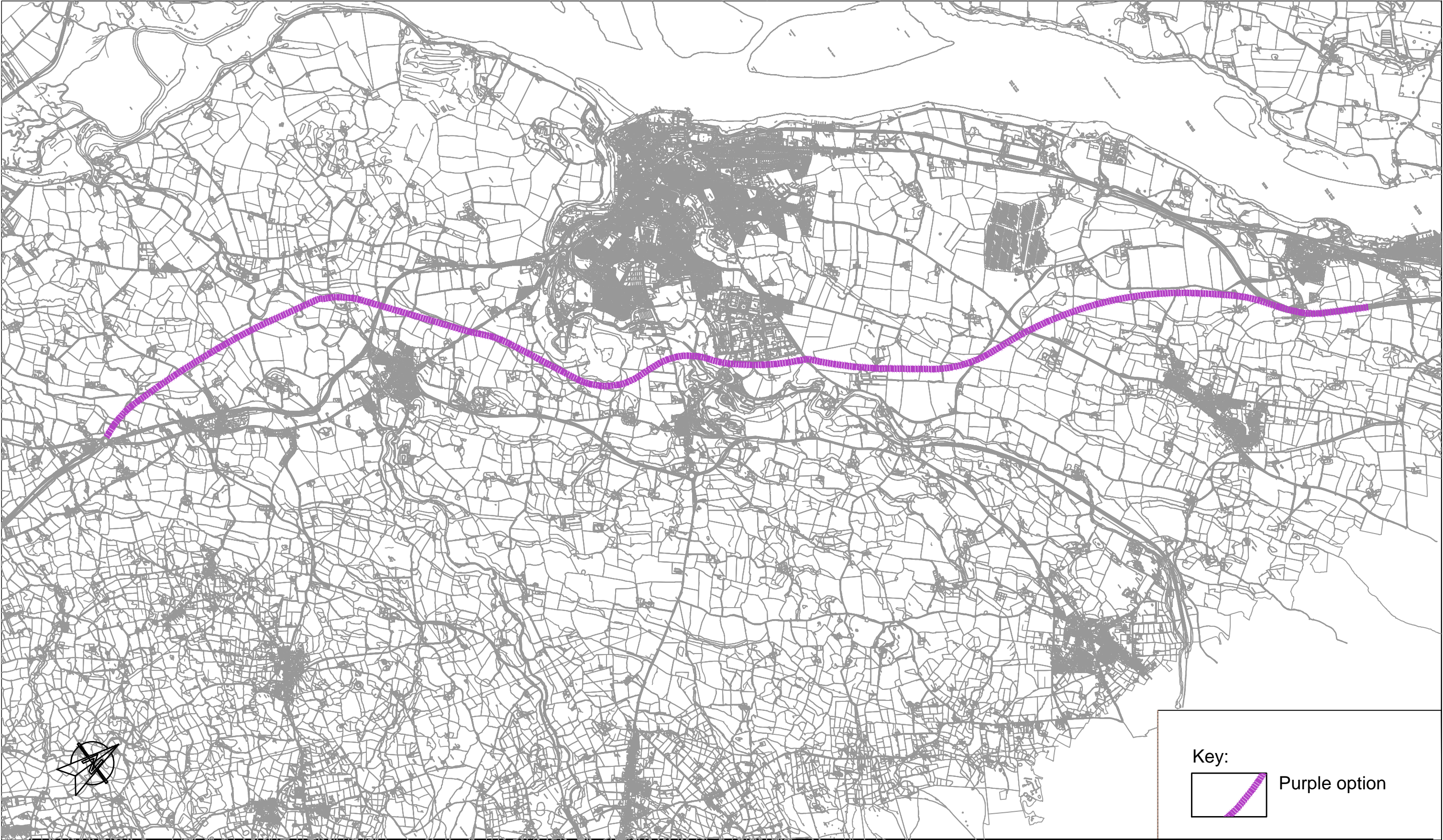


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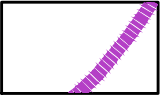
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 Purple option

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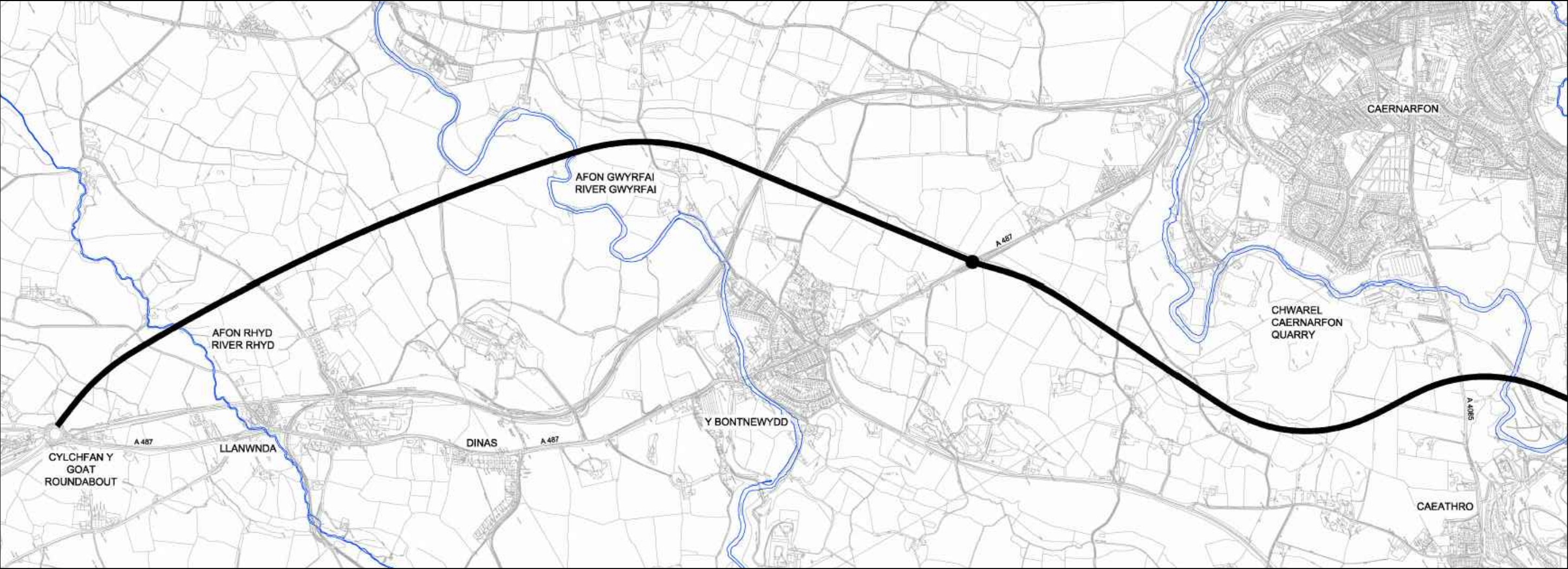


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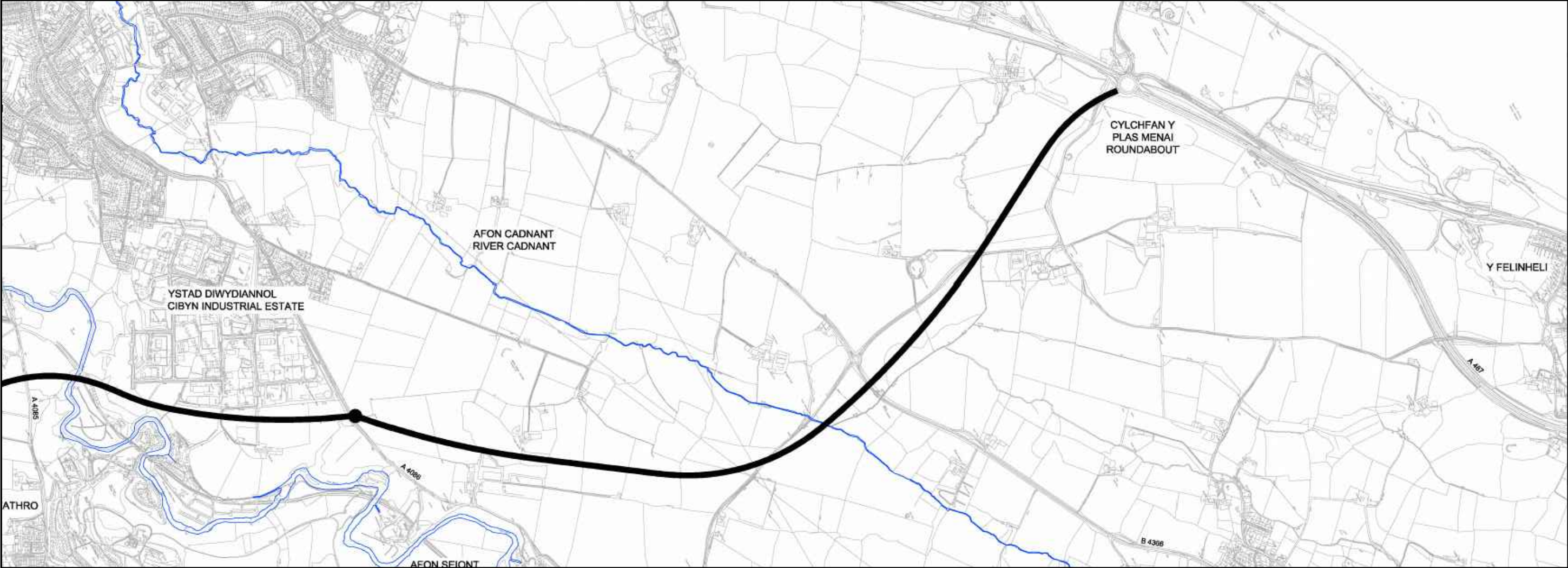
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