

3 Alternatives Considered

3.1 Introduction

3.1.1 The EIA Regulations require consideration of the main alternatives considered, and an indication of the main reasons for choices made, taking into account potential environmental impacts.

3.1.2 This Chapter briefly discusses the background to alternative mainline alignment and junction options considered during previous DMRB Stage 1 and Stage 2 assessments for the Crubenmore to Kincaig scheme. Information on the reasons for the selected preferred route are also presented.

3.2 DMRB Stage 1

3.2.1 DMRB Stage 1 focused on identifying a preferred corridor for A9 Dualling. As explained in **Chapter 1**, PES and SEA assessments identified and considered route-wide constraints and issues. The assessments considered three high-level, strategic alternative dualling corridor options:

- (1) On-line widening – dualling along the existing A9 single carriageway sections, to tie in with the existing dualled sections
- (2) On-line widening with some near off-line dualling – dualling along the existing A9 route, with near off-line dualling where constraints dictated
- (3) Off-line alternative route corridor options – dualling via seven possible alternative routes to the existing A9, as highlighted in **Figure 3-1** below.

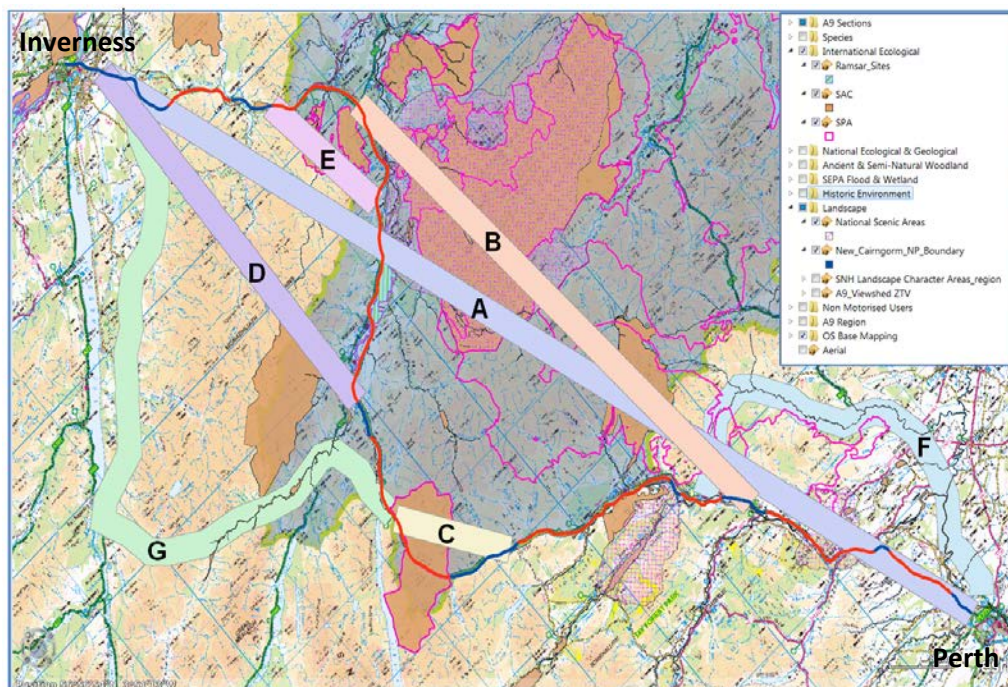


Figure 3-1: Alternative route corridors (A-G) considered via DMRB Stage 1 PES and SEA

3.2.2 As the Scottish Government's 2011 IIP committed to A9 Dualling, a 'do nothing' option was not considered. The DMRB Stage 1 Reports identified that on-line dualling, generally following the route of the existing A9, was the most suitable option.

- 3.2.3 An on-line dualling corridor was identified as a 200 m-wide corridor centred on the existing A9. However, it was noted that the 200 m-wide corridor represented an indicative ‘soft’ boundary that could be extended locally, depending on constraints encountered at later design and environmental assessment stages.
- 3.2.4 DMRB Stage 1 reports noted that the A9 is to be designed as a Category 7A dual carriageway, and therefore only grade separated junctions were to be permitted, with isolated left-in, left-out junctions where a feasible alternative did not exist. Existing at-grade junctions were to be upgraded or closed to prevent right-turn manoeuvres across the carriageway.

3.3 DMRB Stage 2 – Mainline Options Assessment

Initial Mainline Review

- 3.3.2 As stated above, DMRB Stage 1 selected an online corridor as preferred for the A9 Dualling Programme. This therefore informed the development and assessment of three preliminary mainline alignment options which were initially considered at DMRB Stage 2:
- Widening to the east (southbound side) of the existing A9
 - Widening to the west (northbound side) of the existing A9
 - Widening to both sides of the A9 (symmetrical widening)
- 3.3.3 Each of these options were produced to test where current DMRB dualling design standards might or might not be achievable within the surrounding topographical constraints, and to identify where any significant environmental constraints might or might not be avoidable.
- 3.3.4 Each initial mainline option was divided into 1.5 km lengths and assessed against engineering and environmental constraints. The alignments were reviewed against known constraints, to make an initial identification of the following:
- Lengths of the A9 where significant constraints were such that a clear decision could be taken to widen on one side only
 - Lengths of the A9 where the combination of constraints was such that a clear decision could not be made, and widening to either side would have to be considered and further assessed to compare constraints and opportunities
 - Lengths of the A9 where alternative options further removed from the existing mainline alignment were identified as having potential merits, therefore these were to be included for assessment of impacts and opportunities
- 3.3.5 Due to the need to keep the A9 open during construction, symmetrical widening was generally discounted from further consideration, and the number of transitions required from east to west was also carefully considered to keep to a minimum.
- 3.3.6 The outcome of this initial assessment was a series of recommendations on where dualling should be considered to the east or west of the existing route to avoid significant constraints.

Mainline Options

- 3.3.7 Following the initial mainline review, a series of mainline alignment options were developed to a level of detail suitable for comparative assessment between options, such that the Proposed Scheme could be established within the preferred DMRB Stage 1 corridor. Options were

sufficiently developed to indicate the approximate dimensions of embankments and cuttings and the locations of principal structures.

3.3.8 At this stage, the Project 9 extent was divided into five distinct assessment ‘sections’. The mainline options that were developed for the DMRB Stage 2 environmental assessment are illustrated in **Figure 3-2** and described below.

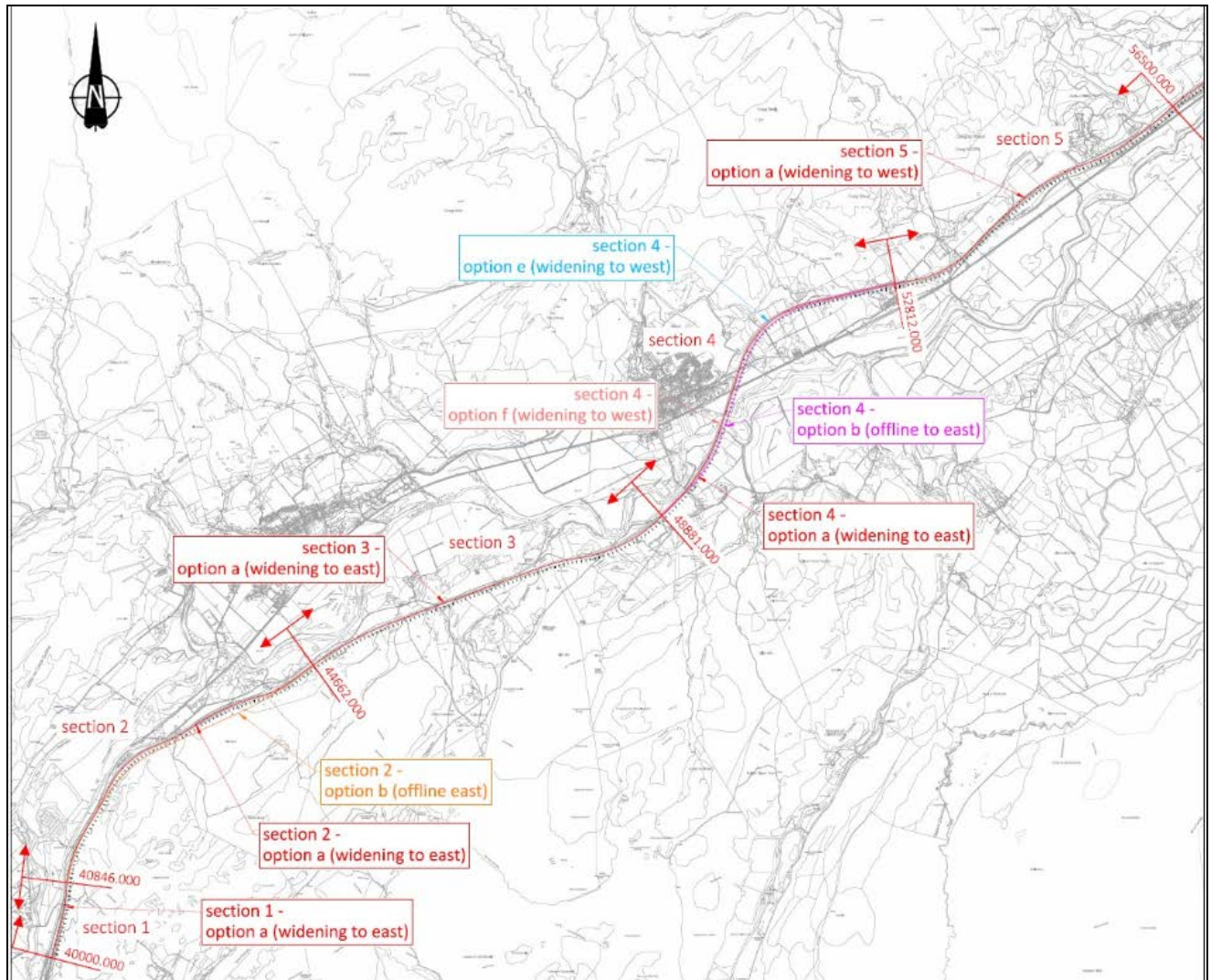


Figure 3-2: Project 9 mainline sections and options assessed at DMRB Stage 2

3.3.9 Each section was defined using ‘chainage’ (ch.) referencing to indicate the location of elements of the scheme. Note that chainage simply represents a measure of the number of metres from a defined project starting point. Project 9 begins at the southern extent at ch. 40,000 through:

- section 1 – ch. 40,000 to 40,846 – single mainline alignment option 1a
- section 2 – ch. 40,846 to 44,662 – two mainline alignment options 2a and 2b
- section 3 – ch. 44,662 to 48,881 – single mainline alignment option 3a
- section 4 – ch. 48,881 to 52,812 – four mainline alignment options 4a, 4b, 4e and 4f
- section 5 – ch. 52,812 to tie-in with the new Kinraig to Dalraddy dual carriageway at approximate ch. 56,650 – single mainline alignment option 5a

3.3.10 **Table 3-1** provides a brief description of each developed option. Note that Kingussie Junction options were interchangeable with all four mainline alignment options developed for section 4. However, the Newtonmore Junction options were uniquely associated with a single mainline option; therefore, combined mainline/ junction configurations were assessed in section 2.

Table 3-1: DMRB Stage 2 mainline alignment options

Section	Mainline Option	Chainage	Description
1	1a	40,000 to 40,846	Online widening to east (with tie-in to existing Crubenmore dual carriageway at the southern extent)
2	2a	40,846 to 44,662	Online widening to east, including Newtonmore Junction 7
	2b	40,846 to 44,662	Offline widening to east, including Newtonmore Junction 4
3	3a	44,662 to 48,881	Online widening to east
4	4a	48,881 to 52,812	Online widening to east (retaining existing Spey bridge with new bridge (parallel single carriageway structure) to the east)
	4b	48,881 to 52,812	Offline widening to east (with replacement Spey bridge (dual carriageway) to the east of existing)
	4e	48,881 to 52,812	Online widening to west (retaining existing Spey bridge with new bridge (parallel single carriageway structure) to the west)
	4f	48,881 to 52,812	Online widening to west (with replacement Spey bridge (dual carriageway))
5	5a	52,812 to 56,650	Online widening to west (with tie-in to new Kincaig-Dalraddy dual carriageway)
Note: Where reference is made to online widening this does not mean that the existing A9 carriageway would remain at the same level.			

3.3.11 Each DMRB Stage 2 section and option is discussed briefly below.

Section 1 – Option 1a

3.3.12 Option 1a commenced at the southern tie-in to the existing Crubenmore dual carriageway (ch. 40,000) ending at ch. 40,846 representing proposed widening to the east. The northbound dual carriageway would run on the existing alignment of the A9, while the southbound carriageway would be located immediately adjacent to the east.

3.3.13 Engineering and environmental design constraints were predominantly located to the west of the existing A9, which is the primary reason for widening the road to the east. These constraints include the River Truim (which is designated as part of the River Spey SAC), Highland Main Line (HML) railway and NCN7.

Section 2 – Options 2a and 2b

3.3.14 Section 2 commenced at ch. 40,846 north of the Glen Truim road junction onto ch. 44,662. This section incorporated a new Newtonmore Junction.

3.3.15 Option 2a headed north from ch. 40,864 with online widening to the east. The northbound dual carriageway would run on the alignment of the existing A9, with the southbound carriageway being constructed immediately to the east.

3.3.16 Option 2b was an offline option with both the northbound and southbound carriageways located east of the existing A9 alignment.

- 3.3.17 With the exception of hard rock face to the east, engineering and environmental design constraints were located to the west of the existing A9, which is the primary reason for widening the road to the east. These constraints include the River Truim (which is designated as part of the River Spey SAC), Highland Main Line railway, NCN7, Ralia Café, and the community of Ralia.

Section 3 – Option 3a

- 3.3.18 Option 3a commenced at ch. 44,662 and north to ch. 48,881, with proposed widening to the east of the existing A9. The northbound dual carriageway would run on the existing alignment of the A9, while the southbound carriageway would be located immediately adjacent to the east.
- 3.3.19 Engineering and environmental design constraints are predominantly located to the west including the River Spey SAC, the Braes of Nuide and accesses including the road to Nuide Farm.

Section 4 – Options 4a, 4b, 4e, 4f

- 3.3.20 Section 4 commenced at ch. 48,881 and includes crossings of the B970 at Ruthven, the River Spey and associated floodplain at the Insh Marshes, and the HML at Kingussie. This section also includes the Kingussie junction. All section 4 alignments commenced on the east side of the existing A9, linking from section 3, and transition over to the west side of the A9 at the end of section 4.
- 3.3.21 Within section 4, the River Spey Bridge (see **Photograph 3-1** below) and approach embankment configuration across the Insh Marshes NNR area was a major consideration in the mainline alignment choice.



Photograph 3-1: River Spey Bridge at Kingussie/ Insh Marshes

- 3.3.22 Following an earlier options sifting process, four options (4a, 4b, 4e, 4f) were taken forward to be considered in the Stage 2 assessment. These options considered retaining the existing Spey bridge and providing a new bridge adjacent to the east or west to carry southbound or northbound traffic. Replacement with a full dual carriageway Spey bridge, with demolition of the existing bridge, was also considered. The River Spey and Insh Marshes designations were taken into account in the development of the options which are shown in **Figure 3-3** below.
- 3.3.23 Options 4c and 4d were ruled out through sifting as 4c required parallel widening of the existing Spey bridge, which was deemed not feasible in engineering terms. Option 4d required a separate

offline single carriageway embankment and bridge through the Insh Marshes, which was deemed to create a sterilised area between two embankments, so was removed from further development.



Figure 3-3: DMRB Stage 2 Options 4a, 4b, 4e, 4f at the River Spey Crossing

- 3.3.24 The aim of the DMRB Stage 2 assessment was to determine the mainline alignment, and not the bridge type or length; however, in order to inform DMRB Stage 2 engineering and economic cost assessments a range of *indicative* structure types (variants) were also developed. The variants considered were based on the typical span lengths that might be achievable using composite steel structures or balanced cantilever concrete structures (i.e. some had shorter spans and more footings/ piers and others had longer spans and fewer footings/ piers).
- 3.3.25 The key environmental issues related to the mainline assessment at the Spey crossing were:
- the River Spey is actively eroding the bank upstream of the existing crossing and will reach the existing A9 embankment in the future
 - the existing A9 embankment and bridge restricts flood water flows, creating upstream flood storage and providing a level of protection to downstream receptors
 - the existing embankment splits the Ruthven north and south compartments in the National Nature Reserve (NNR), and extends into Natura 2000 internationally designated site boundaries (SAC, SPA and Ramsar) at the River Spey
 - construction and demolition operations would create disturbance and displacement risks to NNR bird species, and otter and fish SAC species
 - long term ecological permeability, River Spey/ floodplain connectivity and need for installation of river bank erosion protection measures should be considered within the context of change in upstream floodplain storage and risk to downstream receptors
- 3.3.26 As a result, options that required works to widen upstream to the west (options 4e and 4f) were rejected due to upstream floodplain displacement risk, increased risk of flooding to works due to no protection afforded by the existing embankment, and the risk presented by upstream river bank

erosion which would require inclusion of significant erosion protection measures. Option 4f required construction of half of a new dual carriageway bridge on the upstream side before removal of the existing bridge and completion of the new.

- 3.3.27 Options 4a and 4b considered a mainline and crossing configuration to the east of the existing; these offered some flood protection of works from the existing embankment. However, option 4a required a parallel structure to match the existing which required extension of earthworks into the Natura site boundary, offered no improvement in permeability, river/ floodplain connectivity, and therefore would require installation of river bank erosion protection measures. Option 4a also resulted in two bridges of different age, with two different maintenance regimes, which could increase frequency of disturbance over the long term.
- 3.3.28 Option 4b was an offline dual carriageway alignment and crossing, downstream to the east of the existing. The enabled a new dual carriageway bridge to be lengthened beyond the existing length, to span across the Natura site boundaries, and restrict the footprint within the internationally designated sites to pier footings rather than an earthwork embankment. The increased span extended beyond the upstream river bank area most at risk of erosion, allowing the river to move without extensive erosion protection measures. Being offline from the existing bridge, this option enabled traffic to continue using the existing during construction, reducing the need for diversions through Kingussie. The negative aspects of this option were that it maintained an embankment through the NNR Ruthven compartments, albeit shorter but wider. As this option widened the crossing span, it meant a reduction in upstream flood storage and passage of that lost volume downstream, potentially increasing water levels and flood risk to downstream receptors.

Section 5 – Option 5a

- 3.3.29 Option 5a continued on the west side of the existing A9 to tie-into the Kincaig to Dalraddy dual carriageway to the north (Project 10). Several constraints, including the settlement of Lynchat, a number of listed buildings forming part of the Balavil estate, a Scheduled Monument and the close proximity of the B9152 dictated that widening should be to the west of the existing A9 in section 5.

DMRB Stage 2 – Newtonmore and Kingussie Junctions

- 3.3.30 The DMRB Stage 1 Preliminary Engineering Study identified that new or upgraded junctions would be required for Newtonmore and Kingussie.
- 3.3.31 Nine initial layout options were developed for Newtonmore and six options for Kingussie. An engineering and environmental review of the options was undertaken, to sift through and enable the removal of a number of options where:
- layouts were either very similar, or had very minor differences, and could be consolidated into a single option for review
 - layouts suggested would require a deviation from design standards compliance, so could be removed from further consideration
 - layouts suggested were clearly more constrained by significant engineering or environmental issues and could be removed from further consideration
- 3.3.32 Following this review, three layout options for each junction location remained and were presented via a public consultation event in Kingussie and Newtonmore and via direct communication by mail/ email. All feedback received was recorded and incorporated into a further junction options refinement and sifting process. At this point, additional Kingussie Junction layout options were developed as a result of feedback and enhanced understanding of local conditions and constraints.

- 3.3.33 Further sifting assessment was undertaken, focusing on environment, engineering, safety and accessibility issues, including public consultation feedback. This process made recommendations on a shortlist of two junction options to be taken forward for further design development and to be considered in the DMRB Stage 2 assessment for Newtonmore Junction, as listed in **Table 3-2** and two options for Kingussie Junction as listed in **Table 3-3**.
- 3.3.34 As discussed above, at Newtonmore there was one junction layout option for each of the two mainline alignment options in section 2. Newtonmore Junction Option 7 was considered in conjunction with mainline alignment Option 2a, and Junction Option 4 was considered in conjunction with mainline alignment Option 2b (refer to **Figure 3-4**).

Table 3-2: *Newtonmore – junction options for comparative assessment at DMRB Stage 2*

Junction Option	Description
4	TD22/06 Grade Separated 'trumpet' Junction with underpass
7	TD22/06 Grade Separated 'half diamond/ half cloverleaf' Junction with underpass



Figure 3-4: *Newtonmore Junction Options taken through DMRB Stage 2 comparative assessment (Option 4 on left, Option 7 on right)*

- 3.3.35 With respect to the Kingussie Junction, the sifting process also determined that two distinct junction layout options were to be considered, as noted in **Table 3-3** (refer to **Figure 3-5**). Each Kingussie Junction option layout noted in **Table 3-3** was compatible with any of the four mainline options in section 4.

Table 3-3: *Kingussie – junction options for comparative assessment at DMRB Stage 2*

Junction Option	Description
2	TD42 layout with underbridge and auxiliary lanes on diverges
7	TD22 layout with underbridge and local realignment of A86



Figure 3-5: *Kingussie Junction Options taken through DMRB Stage 2 comparative assessment (Option 2 on left, Option 7 on right)*

DMRB Stage 2 Junction Options Assessment

- 3.3.36 The DMRB Stage 2 assessment concluded that Junction Option 7 for Newtonmore (incorporated with mainline alignment 2a), and Junction Option 2 for Kingussie, had the least adverse impacts in terms of land take. Kingussie Option 2 also had a lesser effect on community land at Glebe Ponds. Following consultation with the A9 Dualling Environmental Steering Group, public consultation exhibitions and drop-in events and one to one meetings, these two junction options were recommended as the preferred junction options to serve Newtonmore and Kingussie and were taken forward to DMRB Stage 3 for further design development and EIA.

3.4 DMRB Stage 2 Preferred Options

- 3.4.1 To summarise, following DMRB Stage 2 Engineering, Environmental and Economic assessments, Mainline Options 1a, 2a, 3a, 4b and 5a, were selected as the preferred route options to be taken forward to DMRB Stage 3. However, it was noted that opportunities to further refine Option 4b to bring the proposed Spey crossing closer to the existing A9 Spey crossing, in line with stakeholder feedback, were to be considered at DMRB Stage 3.
- 3.4.2 Newtonmore Junction Option 7 (associated with mainline option 2a) and Kingussie Junction Option 2, were selected as the preferred junction options to be taken forward to DMRB Stage 3. However, it was noted that there was an opportunity to consider the potential benefits of a compact form of grade separated junction at Newtonmore as an early DMRB Stage 3 activity.
- 3.4.3 The preferred route alignment, junction locations and layouts were shared via public exhibitions in Newtonmore and Kingussie in March 2017, before progression to DMRB Stage 3 design development and assessment.
- 3.4.4 The DMRB Stage 3 design development process (i.e. progression from Stage 2 to include drainage networks and Sustainable Drainage Systems (SuDS), watercourse crossing structures and culverts, accesses and alternative connections) is discussed in the following **Chapter 4**, and the Proposed Scheme being considered through the EIA is presented and described in **Chapter 5**.

3.5 References

- 3.5.1 Relevant references for introductory **Chapters 1 to 7** of this ES are compiled and listed at the end of **Chapter 7**.

