

# A9 Dual Carriageway

## Scoping of the Community's Option

### A9 in 1.5 kilometre Cut and Cover Tunnel

The Community's Option incorporates a 1.5 kilometre cut and cover tunnel, commencing at the existing Birnam Junction and terminating approximately 300 metres south of the existing Dunkeld Junction. Due to alignment constraints, a 50mph speed limit is required through the tunnel. This represents a reduction in the current speed limit of 60mph and the 70mph speed limit that will be provided on the rest of the A9 dualling. This equates to an increased journey time of up to 30 seconds longer than the existing A9, affecting approximately 24,500 vehicles per day in the year of opening.

The option has a number of advantages. It presents an opportunity to improve accessibility to Dunkeld & Birnam Station and the Category A Listed station building by re-connecting to Station Road and creating a replacement car park on top of the tunnel. The option also reduces noise levels over the extent of the tunnel and visual impacts and may provide an opportunity to establish new planting or possibly amenity space on top of the tunnel, which would benefit the local community.

The tunnel however, has a number of disadvantages. Due to the constrained nature of the site, piling works will be required to construct the tunnel. There is not sufficient space to construct a tunnel in an open excavation without encroaching into the Highland Main Line railway and residential properties. Approximately 3,700 large 1.2 metre diameter piles will be bored approximately 15 metres down in to the ground to form the three supporting tunnel walls.

A tunnel requires a wider dual carriageway cross-section due to the need to include a pedestrian evacuation route. Piling works will be required as close as 2.5 metres to the rail station building, introducing a risk of accidental damage to the building.

Construction of a tunnel brings the challenge of maintaining access to the rail station during construction, however, options to maintain access, such as a temporary relocated station or pedestrian bridge, are still being investigated and whilst a temporary solution may be possible, it is likely to have engineering and cost implications.

Additional land will be required for specialist plant and equipment for the construction of the tunnel, such as a concrete batching and mud plant. Some 430,000 tonnes of concrete is required for the tunnel, producing up to 500 tonnes of concrete a day during peak times. This equates to approximately 45,000 total lorry journeys.

Approximately 535,000 cubic metres of material is required to be excavated for construction of the tunnel. This results in approximately 90,000 lorry movements to dispose of excess material, which equates to around 250 vehicles per day.

The Inchewan Burn will require to be lowered to go under the tunnel, introducing an 8 metre vertical drop which will have significant environmental impacts. Both SEPA and SNH have raised concerns with regards to the impact on the natural characteristics of the burn and sediment transfer.

Construction duration of the Community's Option is expected to be approximately 4 ½ to 5 years based on having 6 piling rigs on site and working 6 days per week. However, this could be longer if fewer piling rigs are used and whether working day restrictions are imposed. Perth & Kinross Council (Environmental Health) will ultimately decide the working hours and days per week, however, we are keen to hear the community's views on this.

The tunnel also requires a fully manned 24-hour control centre which is likely to be built on top of the tunnel towards the southern end.

Significant construction costs in the range £1 billion to £1.6 billion. In addition ongoing maintenance and inspection of the tunnel will be required, incurring significant ongoing costs. We have anticipated each side of the tunnel will be closed to traffic once a month, however, two-way traffic can be permitted in the other tunnel avoiding full closure of the A9.

Concerns have been noted from some local residents, businesses and key stakeholders about the construction complexity, disruption and noise and vibration impacts over a prolonged period of time. Some residents are also concerned with potential damage to property as a result of piling works in close proximity.

Safety issues in relation to a cut and cover tunnel have also been noted by key stakeholders with the emergency services noting potential delays to reach an accident in the tunnel. Concerns have also been raised with the potential of a minor accident on a roundabout at Dunkeld leading to stationary cars in the tunnel, which is a significant risk.



A9 in 1.5 kilometre Cut & Cover Tunnel

**As a result of these challenges and impacts, and concerns raised by residents and key stakeholders, two additional mainline options will be included in the DMRB Stage 2 assessment along with the Community's Option.**

# A9 Dual Carriageway

## Additional Options



A9 Underpass (150 metres long)

### A9 Underpass (150 metres long)

Additional Option 1 incorporates a 150 metre long underpass at Dunkeld & Birnam Station, addressing key stakeholders concerns over tunnel safety. A 70mph speed limit is proposed throughout.

This option was the community's fourth preference and follows similar principles to the 1.5 kilometre cut and cover tunnel. An underpass similarly allows the re-connection of Station Road to Dunkeld & Birnam Station, improving the opportunity for the sustainable re-use of the Category A Listed station building. It does not however provide an opportunity to establish new planting or amenity space.

This option also requires piling works with approximately 860 piles of large 1.2 metre diameter being bored 15 metres in to the ground to construct the three supporting walls of the underpass.

A concrete batching plant and mud plant will be required on site. This will produce 58,000 tonnes of concrete to construct the underpass.

168,000 cubic metres of material is required to be excavated resulting in approximately 28,000 lorry movements.

While this option includes a lowered A9 providing reduced visual impact for some residents, it is not anticipated to significantly reduce noise levels.

This option partially addresses concerns from some local residents, businesses and key stakeholders about construction complexity and duration, with an expected construction duration of approximately 4 to 4 ½ years. This duration is based on 2 piling rigs and working 6 days per week. As per the 1.5 kilometre tunnel, this duration could increase depending on the number of rigs used on site and working days per week. Perth and Kinross Council (Environmental Health) will ultimately decide the working hours and days per week, however, we are keen to hear the community's views on this.

Construction of an underpass brings the challenge of maintaining access to the station during construction, however, options to maintain access, such as a temporary relocated station or pedestrian bridge, are still being investigated and whilst a temporary solution may be possible it is likely to have engineering and cost implications.

This option involves lowering Inchewan Burn by approximately 6 metres and will therefore have similar environmental impacts to the Community's Option.



At-grade A9

### At-grade A9

Additional Option 2 is an at-grade A9 dual carriageway throughout the scheme, addressing key stakeholders concerns over tunnel safety.

This option addresses concerns from some local residents, businesses and key stakeholders about construction complexity, with no piling works required and a construction duration of approximately 2 ½ to 3 years. Construction is unlikely to result in closures to Dunkeld & Birnam Station.

Being at-grade results in minimal excavation works on the mainline. In addition, an on-site concrete batching and mud plant will not be required.

This option does not allow the direct re-connection of Station Road to Dunkeld & Birnam Station. However, it does allow for an improved connection from Station Road with the option of a car park at the top of Station Road and a new pedestrian underpass to the station, as described on the following board. This would allow for an improvement to the existing access to the rail station.

This option has less impact on Inchewan Burn, with no lowering works required, addressing concerns raised by SNH and SEPA.

# Facts & Figures - Construction

Key features of the Community's Option for the A9 dual carriageway and the additional options are noted below for comparison.

	Community's Option 1.5 kilometre Cut and Cover Tunnel	Additional Option 1 A9 Underpass (150 metres long)	Additional Option 2 At-grade A9
<b>Estimated Scheme Cost</b>	£1 billion to £1.6 billion	£500 million to £800 million	£300 million to £500 million
<b>Construction Duration (based on 6-day working)</b>	4 ½ to 5 years	4 to 4 ½ years	2 ½ to 3 years
<b>Number of Bored Piles</b>	3,700	860	0
<b>Total Volume of Additional Concrete Required (m<sup>3</sup>/tonnes)</b>	180,000m <sup>3</sup> / 430,000 tonnes	24,000m <sup>3</sup> / 58,000 tonnes	0m <sup>3</sup> / 0 tonnes
<b>Number of Anticipated Vehicle Movements to Transfer Concrete</b>	45,000	6,000	0
<b>Total Excavation (m<sup>3</sup>/tonnes)</b>	535,000m <sup>3</sup> / 1,020,000 tonnes	168,000m <sup>3</sup> / 320,000 tonnes	27,000m <sup>3</sup> / 51,000 tonnes
<b>Number of Anticipated Vehicle Movements to Transfer Excavated Material</b>	90,000	28,000	4,500

Construction duration is based on working 6 days per week. This duration would increase if a 5 day working week was imposed. For the Community's Option, it is anticipated that construction would be 5 ½ to 6 years for a 5 day working week. Ultimately, Perth & Kinross Council (Environmental Health) will decide the working hours and days per week.

# Dunkeld & Birnam Station

## Scoping of the Community's Option

### Access via Station Road, Replacement Car Park on Top of A9 Dual Carriageway

The Community's Option which includes a 1.5 kilometre tunnel, provides an opportunity to re-connect Station Road to Dunkeld & Birnam Station and the Category A Listed station building with a replacement car parking facility included on top of the tunnel.

This option improves accessibility to the station and the Category A Listed station building, which was a key principle from the A9 Co-Creative Process.

However, given the scale and complexity of construction, which requires extensive piling and excavation works approximately 2.5 metres from the station building for a tunnel option, there is a need to consider safe temporary access options.

Maintaining access to the station during construction of the tunnel or underpass option is challenging, however, we are currently investigating options to maintain access to the station, such as a temporary relocated station or pedestrian bridge.

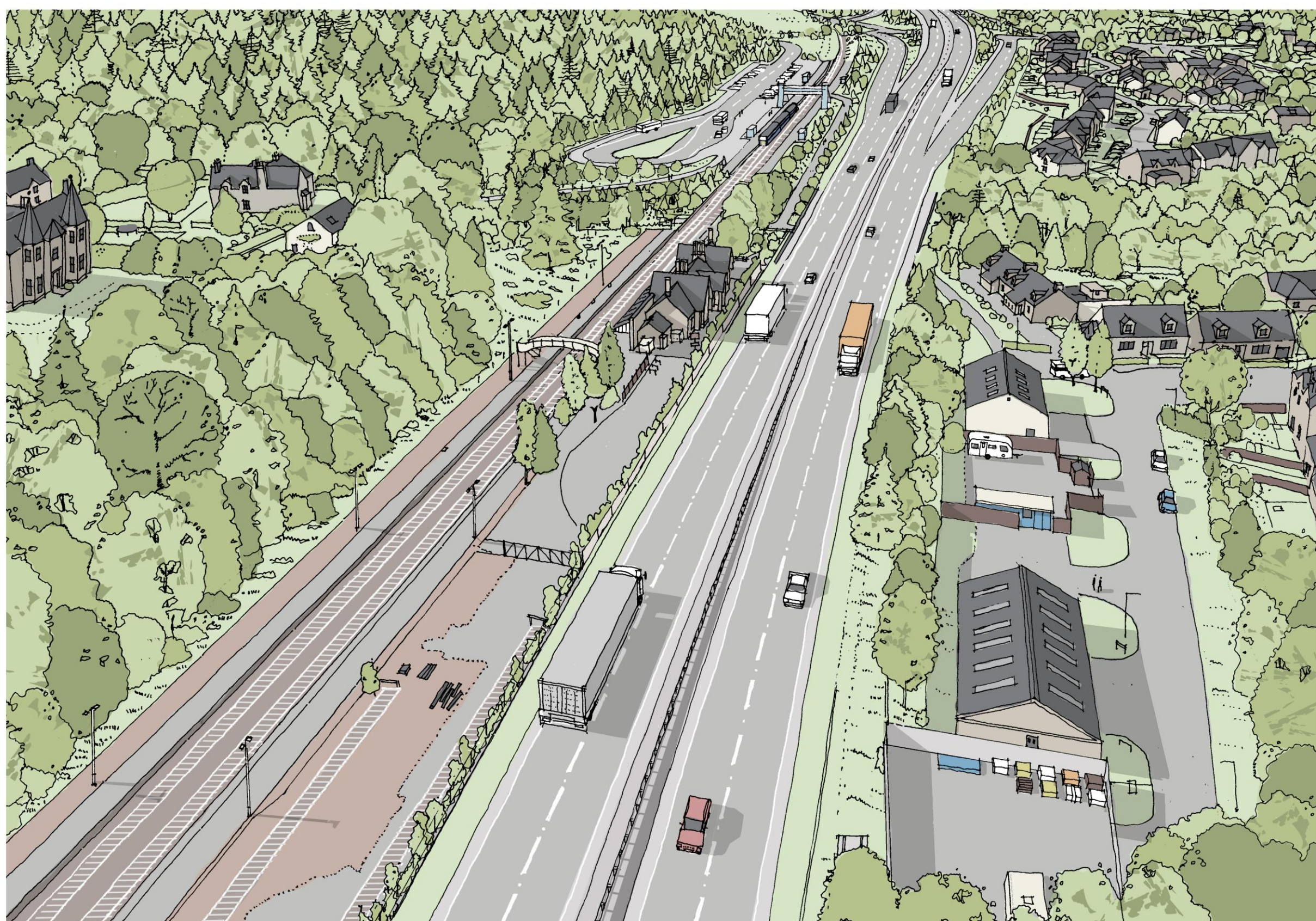
Local residents have informed us the station is well used and lengthy closures would impact the community. Additionally, key stakeholders have raised concerns over the long term impact of closing the station for a prolonged period of time.



Community's Option, Dunkeld & Birnam Station

**As a result of these impacts and the concerns raised by residents and key stakeholders, two additional options will be included in the DMRB Stage 2 assessment along with the Community's Option.**

## Additional Options



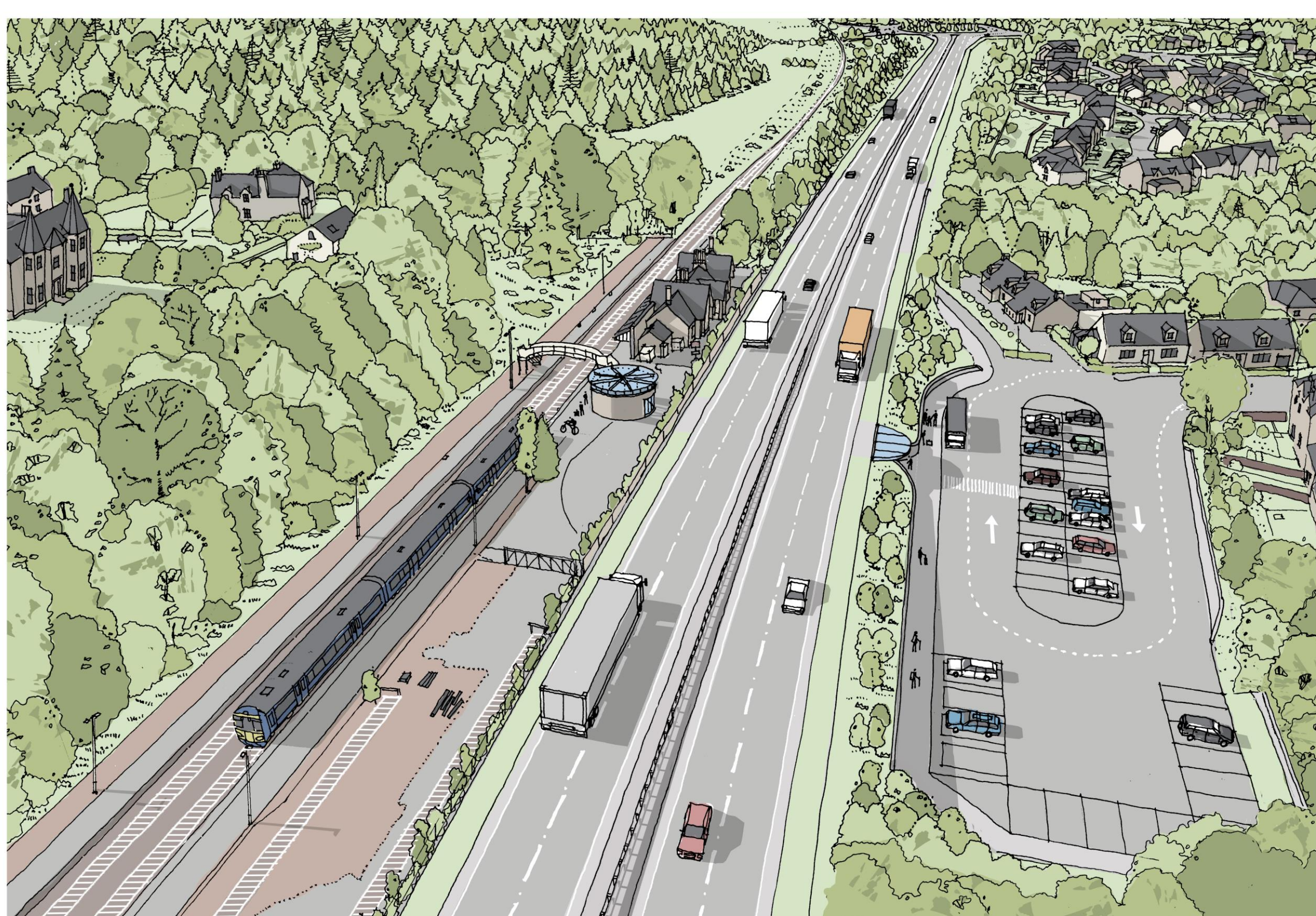
Relocated Dunkeld & Birnam Station

### Relocated Dunkeld & Birnam Station

Additional Option 1 is a permanently relocated station to an area of land immediately north of Inchewan Burn.

This option does not include re-connection of Station Road to Dunkeld & Birnam Station, and therefore does not meet a key principle of the Community's Option, and may impact the future viability of the Category A Listed station building. This option would also require works to the Highland Main Line railway. This is unlikely to cause significant disruption to passenger services or prolonged station closures compared to the Community's Option, addressing concerns noted by key stakeholders. This option would be designed to comply with current relevant accessibility and disability legislation, addressing many of the accessibility issues with the current station.

This option would have an impact on visual amenity for residents of Telford Gardens and Stell Park and will impact Ladywell Landfill site, with potential to encounter contaminated soils and groundwater. Access to the station would be comparable to the Community's Option that includes an access road from the A822 for properties on Birnam Glen.



Birnam Industrial Estate

### Birnam Industrial Estate

Additional Option 2 retains Dunkeld & Birnam Station in its current position and utilises Birnam Industrial Estate as a replacement car parking facility. A new pedestrian underpass links the car park with the station, with a lift included. This option would only be used with an at-grade A9 dual carriageway.

This option improves accessibility to the station, which is a key principle of the Community's Option, allowing for access in accordance with The Equality Act 2010 to Platform 1, improving on the existing situation. Furthermore, it provides greater opportunity for sustainable re-use of the station building, although not as effectively as the Community's Option. This option has an adverse impact on the setting of the Category A Listed station building, compared to the Community's Option as there is limited open space in front of the building.

Access to Dunkeld & Birnam Station would be maintained during construction with this option.

# Dunkeld Junction

## Scoping of the Community's Option

### At-grade Roundabout

The Community's Option includes an at-grade roundabout at the existing Dunkeld Junction.

The junction has a number of advantages compared with a grade separated junction, including reduced construction complexity in the Dunkeld Junction area, construction risk and time benefits, reduced landscape and visual impacts, primarily due to reduced footprint, earthworks and structures, and reduced impact on residential and commercial properties to the north-east and the Highland Main Line railway to the south-west.

The option however, does not meet with the A9 Dualling Programme strategy for grade separated junctions.

While queuing on the approaches to the roundabout will generally be minimal, there is likely to be queuing of up to 5 minutes on the side roads at peak times during the summer.

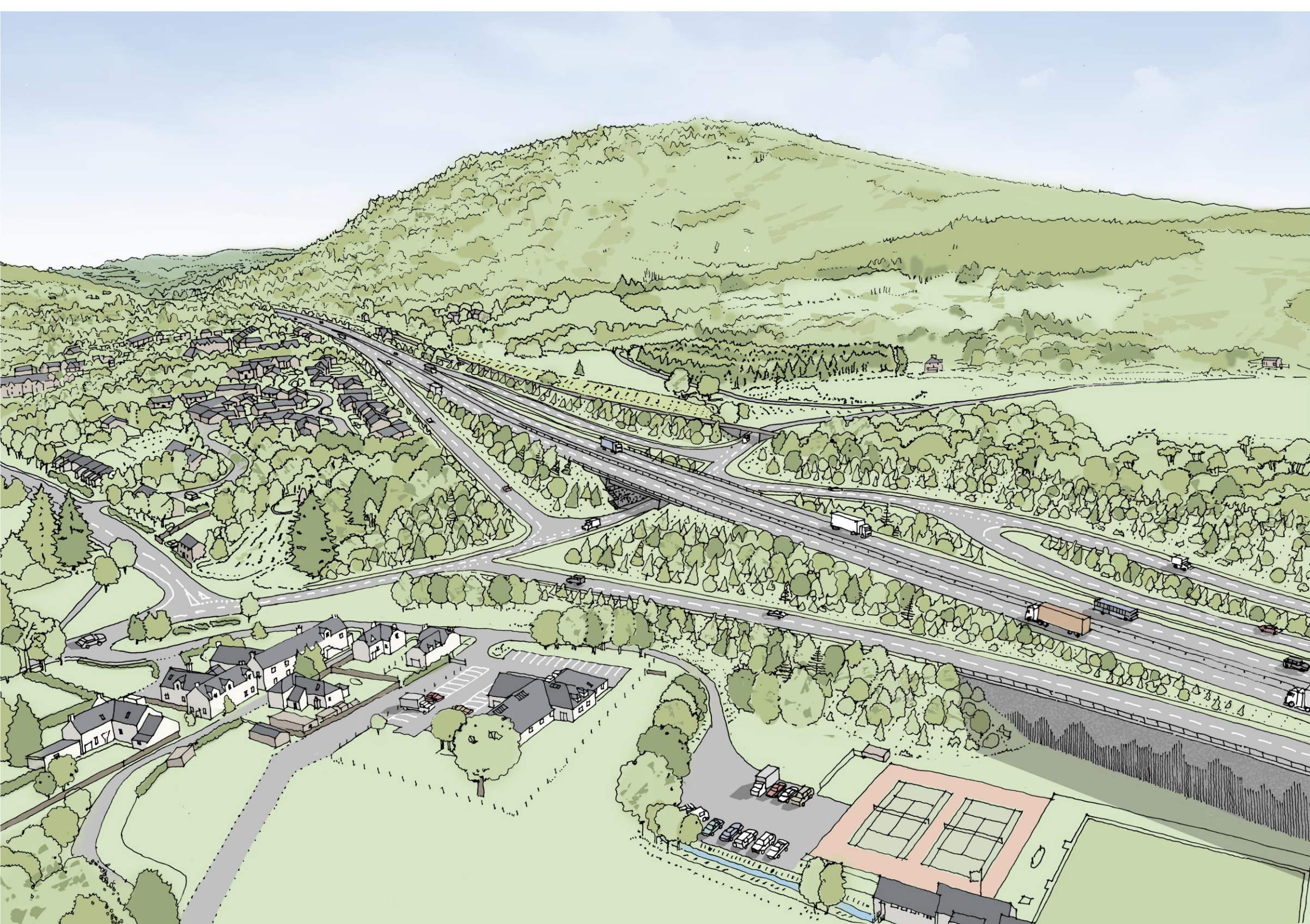
Concerns have been noted from some local residents, emergency services and other key strategic stakeholders over the safe operation of the roundabout, in combination with a tunnel, and the possibility of queuing back in to the tunnel during incidents. Key stakeholders have stated that minor accidents are more common at roundabouts than a grade separated junction. In addition, at-grade roundabouts do not provide segregated Non-Motorised User (NMU) crossing facilities, which has been noted as a concern by some cycle groups.



At-grade Roundabout

**As a result of these impacts and the concerns raised by residents and key stakeholders, an additional option will be included in the DMRB Stage 2 assessment along with the Community's Option.**

## Additional Option



Grade Separated Junction, All Movements

### Grade Separated Junction, All Movements

This additional option is a full movement grade separated junction at the existing Dunkeld Junction, with northbound and southbound entry/exit slip roads and an underbridge connecting the A923 and A822. A connection to Inver is also included.

This option facilitates all vehicle movements and does not result in queues, thereby complementing the community's objective to provide better, safer access on and off the A9, and meeting Transport Scotland's objectives to improve operational performance of the A9 and improve safety.

This option is in accordance with the A9 Dualling Programme strategy for grade separated junctions and therefore provides consistency throughout the route. It addresses the concerns noted by some key stakeholders over the effective operation of a roundabout and provides an NMU crossing facility.

However, this option has a greater landscape and visual impact compared with a roundabout.

Additionally, it requires more land take than the Community's Option and requires the loss of additional areas of existing woodland.

It also results in a new large retaining wall approximately 10 metres high immediately adjacent to the recreation club.

# What Happens Next?

The A9 Co-Creative Process was a unique and innovative approach to progress the design for the Pass of Birnam to Tay Crossing section of A9 dualling. The feedback from the A9 Co-Creative Process and your feedback from this event will be considered in the DMRB route option assessment process, which is how all trunk roads in the United Kingdom are developed and assessed.

As a result, the Community's Option, and the additional options, will be subject to a DMRB Stage 2 route option assessment.

The purpose of the DMRB Stage 2 route option assessment is to assess options, taking account of constraints, potential environmental (including community and individual human impacts), engineering and traffic and economic effects, and considering feedback from the public and other stakeholders.

Key elements of the design that will be assessed further at DMRB Stage 2 include:

- Constructability;
- Noise & Vibration;
- Landscape & Visual;
- Road Drainage & Water Environment;
- Ecology & Nature Conservation; and
- Geology & Soils.

We will also be carrying out a local business impact study to assess how each of the options may impact local businesses and the community. This study will feed in to the DMRB Stage 2 assessment.

At DMRB Stage 2, it is usual for multiple options to be considered and assessed. The conclusion of the DMRB Stage 2 route option assessment is the identification of a Preferred Route Option, which will be presented to Scottish Ministers for consideration. Should the assessment identify a Preferred Route Option that is different to the Community's Option, both options will be presented to Scottish Ministers for consideration.

It is anticipated that a Preferred Route Option for the Pass of Birnam to Tay Crossing section of A9 dualling will be announced later this year.

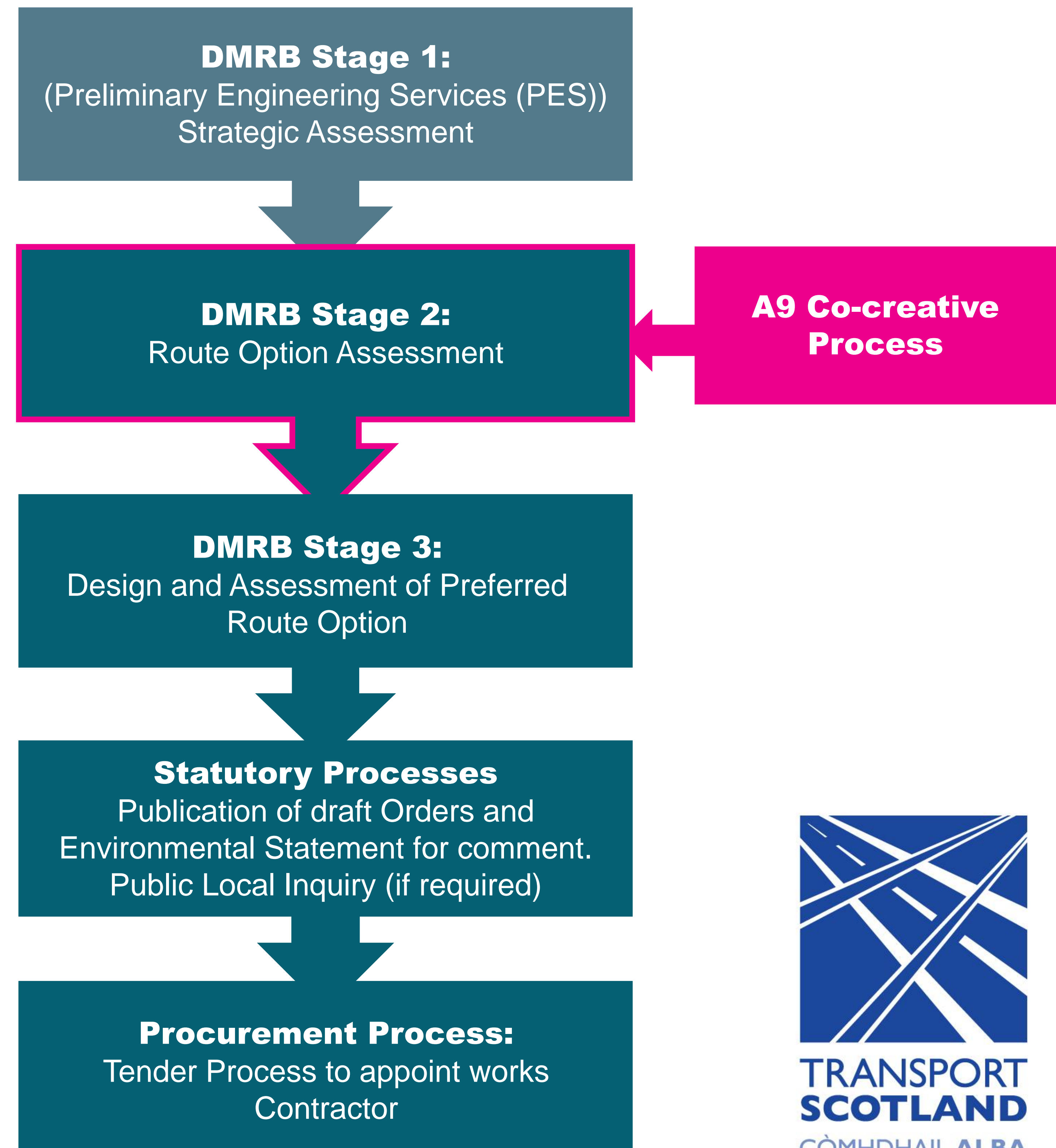
# Stage 3 Assessment and Draft Order Stage

Following the conclusion of the DMRB Stage 2 route option assessment and the announcement of a Preferred Route Option, the Preferred Route Option will be further refined, developed and assessed as part of the DMRB Stage 3 assessment, taking account of your feedback where appropriate.

An Environmental Impact Assessment (EIA) will be carried out and additional mitigation measures will be considered to establish the land requirements. This will lead to the development of the Environmental Statement (ES) and the publication of draft Road and Compulsory Purchase Orders (which identify the land required for the scheme).

After publication, there will be a formal six-week objection period associated with the draft Orders and a six-week representation period for the ES. Publication of the draft Orders will coincide with a further public consultation event.

Should Transport Scotland receive objections to the draft Orders, which cannot be resolved, there may be the need for a Public Local Inquiry (PLI) before the project can proceed. As a result, progress beyond publication of draft Orders will depend on the formal comments received to the proposals.



# Contact Information

We welcome your comments and feedback on the route options using the feedback form available at the consultation event or on the project website.

Please leave feedback forms in the feedback box provided at the event or send via e-mail or by post to the address below by **8<sup>th</sup> May 2019**. This will help the ongoing development of the Pass of Birnam to Tay Crossing project.

**Email to:** [A9dualling@jacobs.com](mailto:A9dualling@jacobs.com)

**Post to:** A9 Dualling Stakeholder Team  
Jacobs  
95 Bothwell Street  
Glasgow  
G2 7HX

## Further Information

Further information on the A9 Dualling Programme, Pass of Birnam to Tay Crossing project, along with these exhibition panels, summary leaflet, feedback form, drawings and visualisations from this event, can be found on the Transport Scotland A9 dualling website at:

[transport.gov.scot/projects/a9-dualling-perth-to-inverness/a9-pass-of-birnam-to-tay-crossing/](https://transport.gov.scot/projects/a9-dualling-perth-to-inverness/a9-pass-of-birnam-to-tay-crossing/)

Contact details for Transport Scotland's A9 Dualling Team:

**Telephone:** 0141 272 7100

**Email:** [a9dualling@transport.gov.scot](mailto:a9dualling@transport.gov.scot)

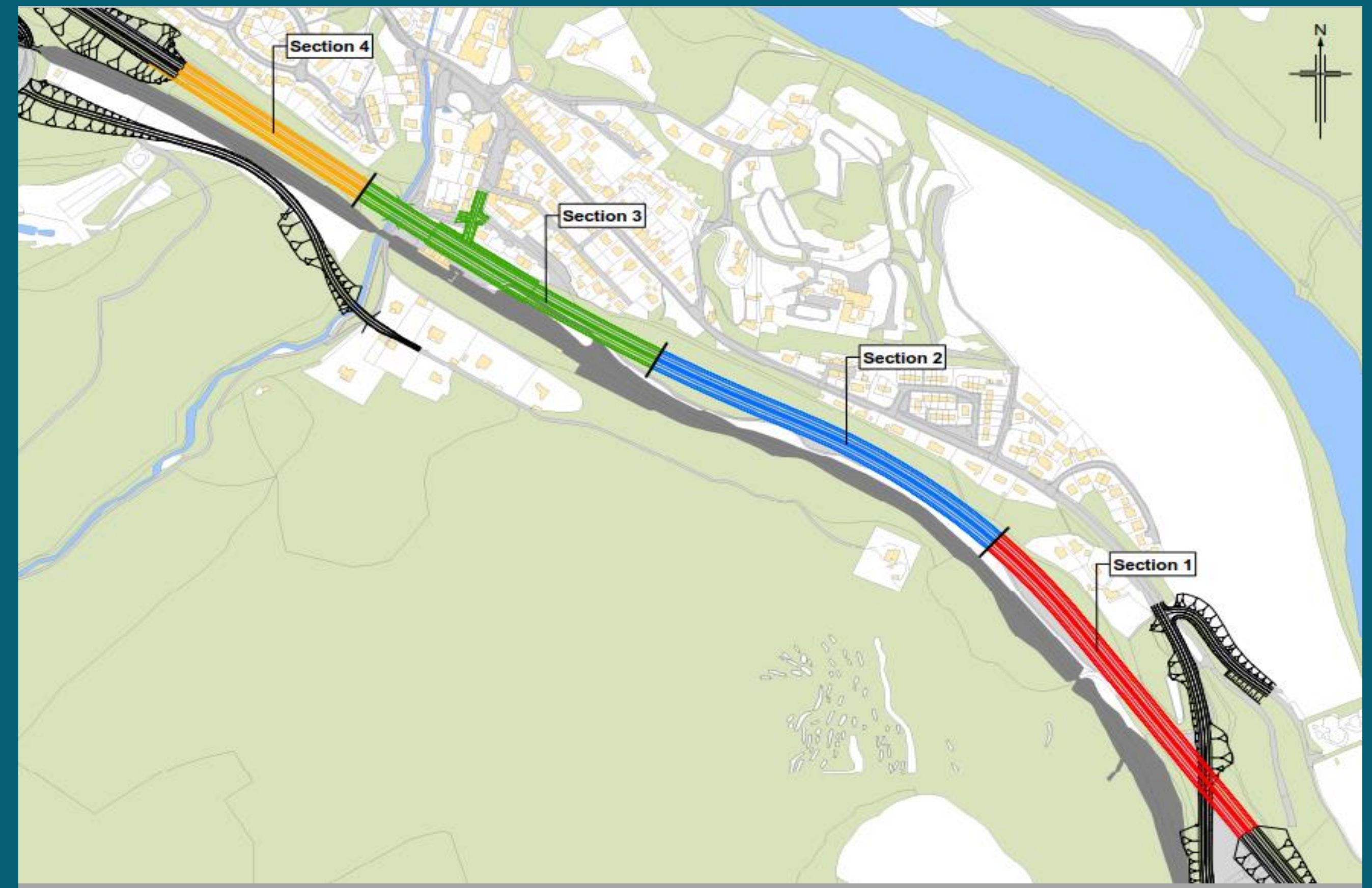




# Proposed Construction Sequence

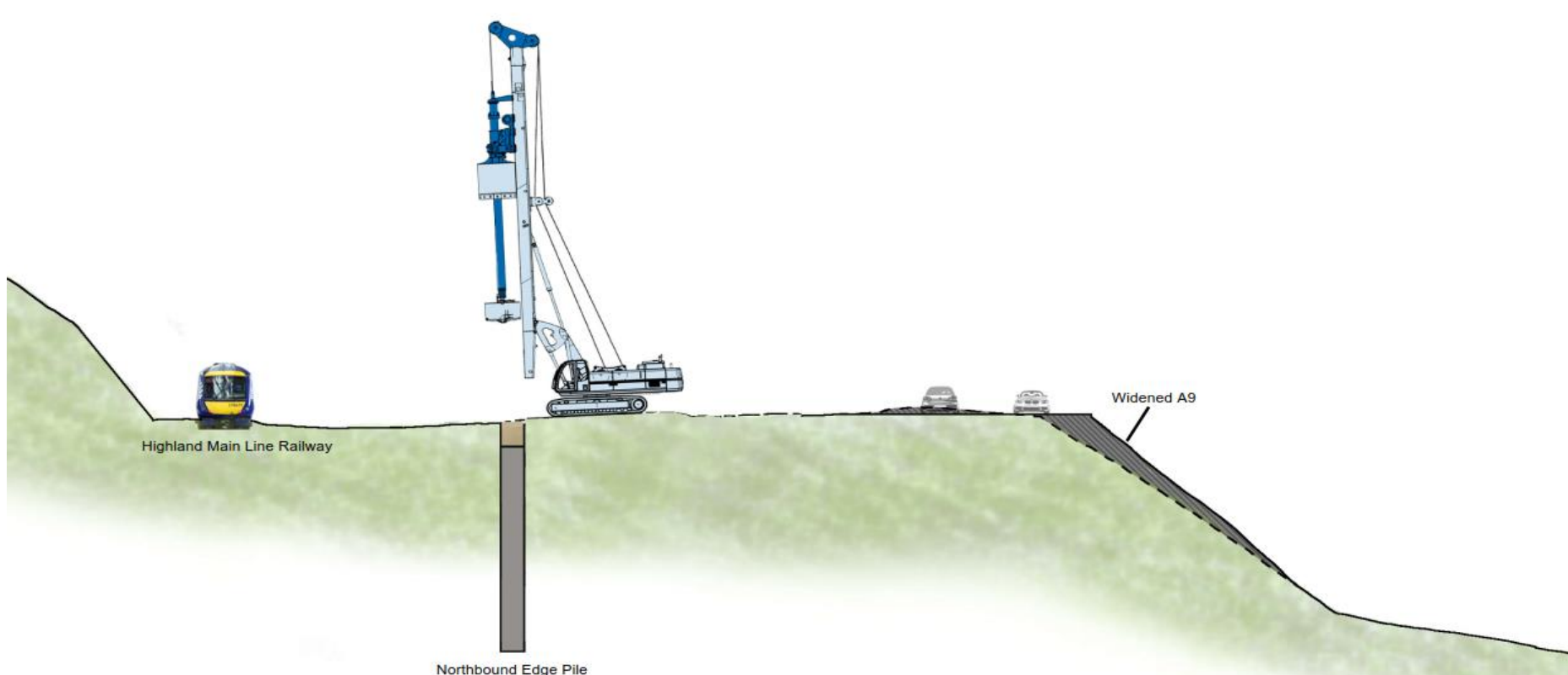
## Construction Sequence of 1.5 kilometre Cut and Cover Tunnel

- Construction of cut and cover tunnel is likely to be divided into 4 sections (3no. 450 metre sections and 1no. 250 metre section).
- Construction of the sections will be undertaken at the same time, with six piling rigs assumed, and other associated plant, in operation throughout the site.
- Section 1, 2 and 4 follow the same construction sequence, shown in the indicative cross-sections below.
- Sections 1 and 2 are constrained and require the southbound carriageway to be temporarily widened in these sections.
- Section 3 is more complex as it involves lowering Inchewan Burn and is in close proximity to Dunkeld & Birnam Station, Category A listed building. Construction in this section can be seen in the constructability app.

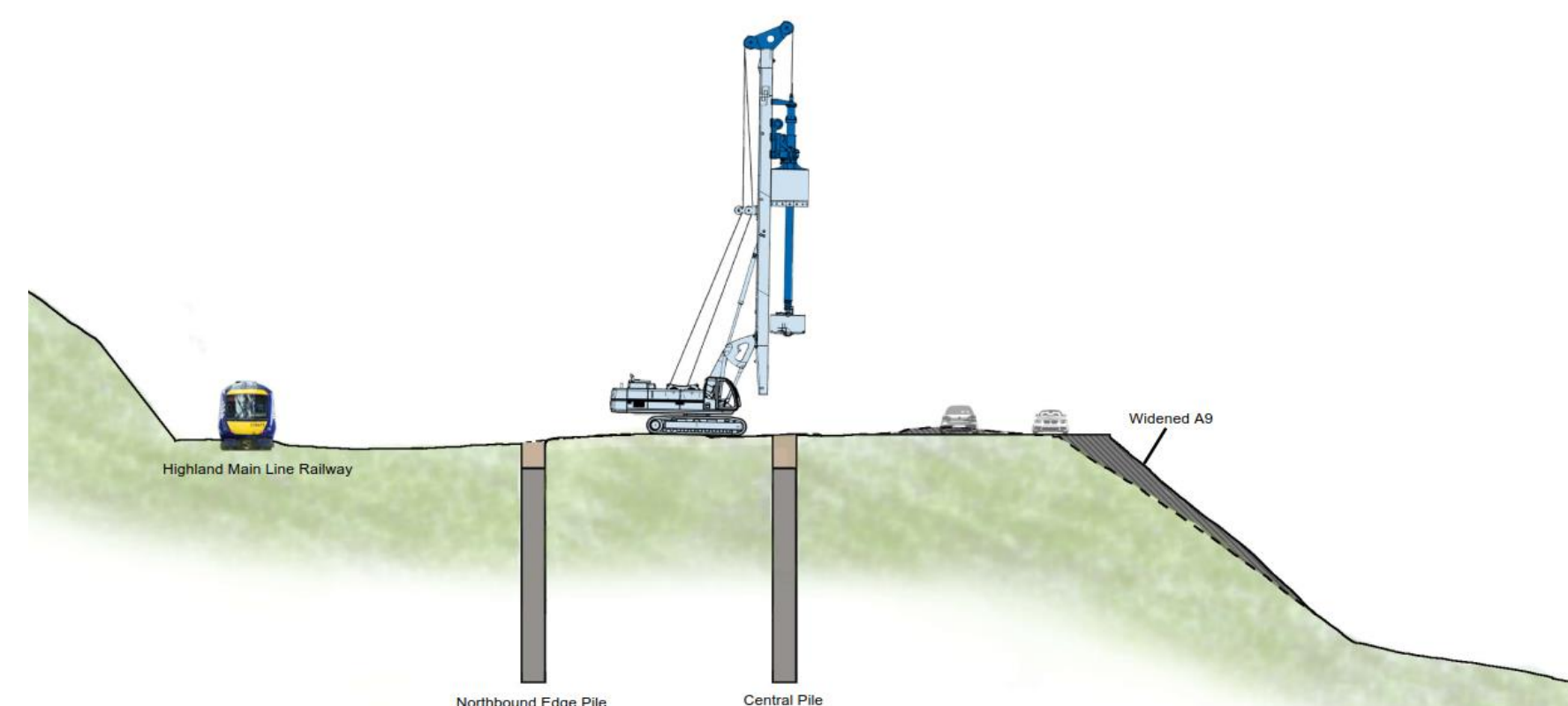


Construction Sections of 1.5 kilometre Cut and Cover Tunnel

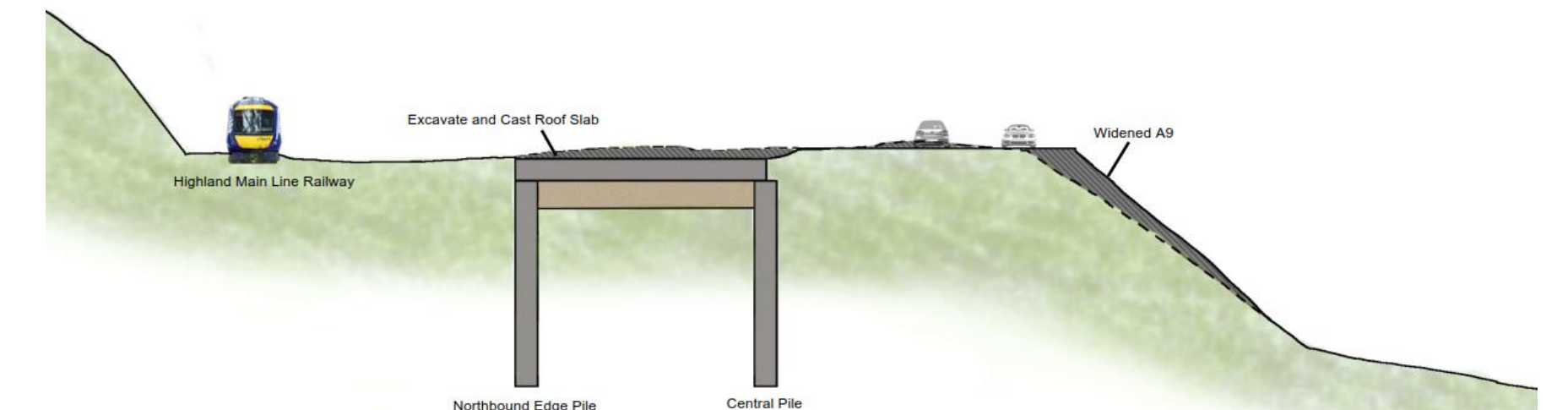
## Construction Stages of Sections 1, 2 and 4



Stage 1 – Install Northbound Carriageway Edge Piles



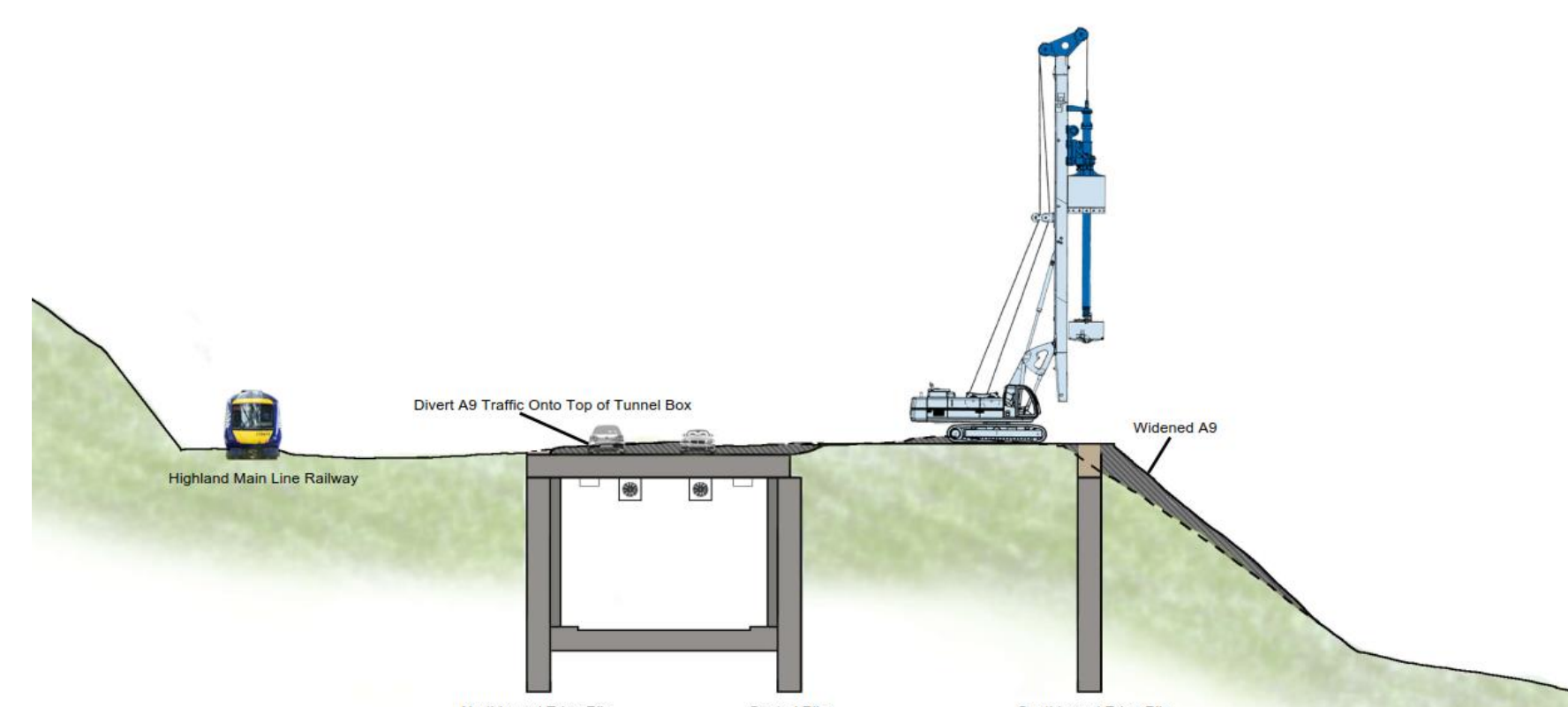
Stage 2 – Install Central Reserve Piles



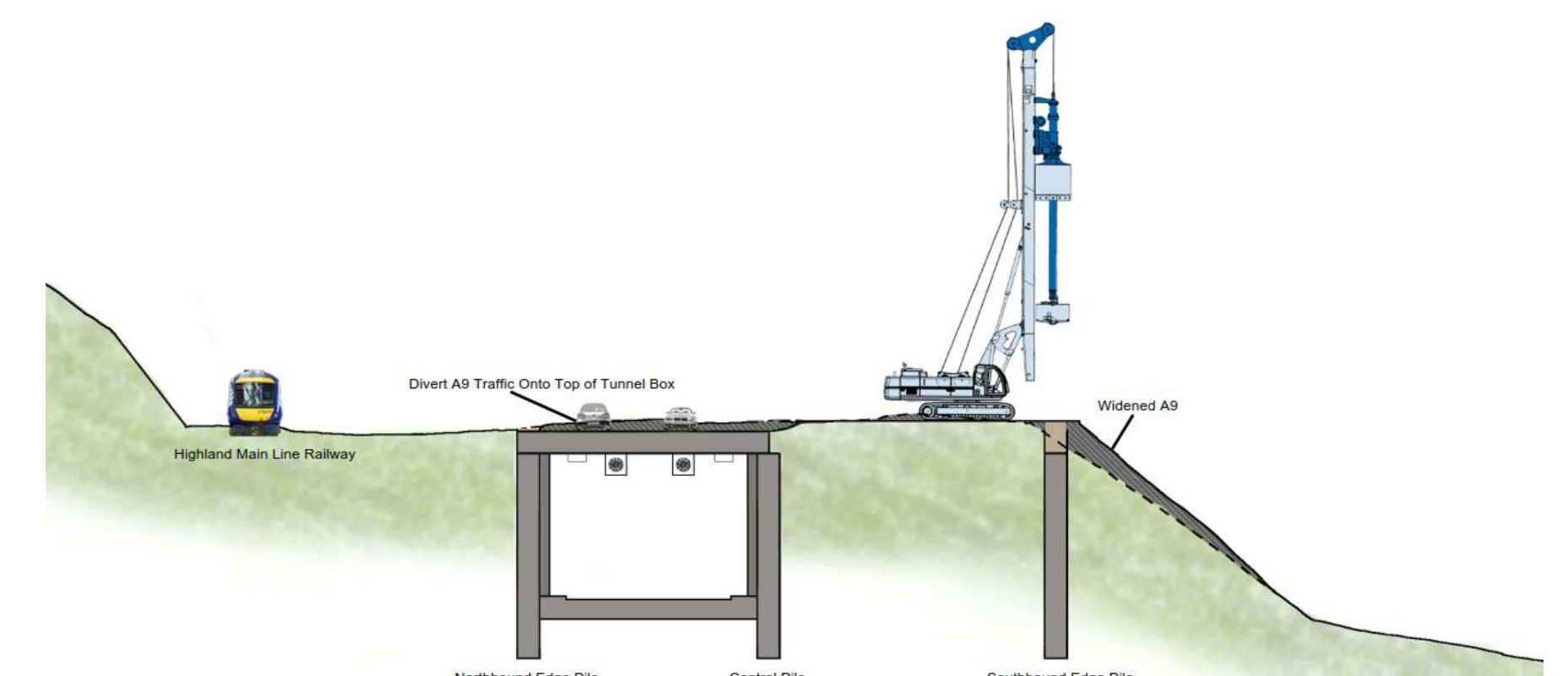
Stage 3 – Excavate and Cast Northbound Carriageway Permanent Concrete Roof Slab



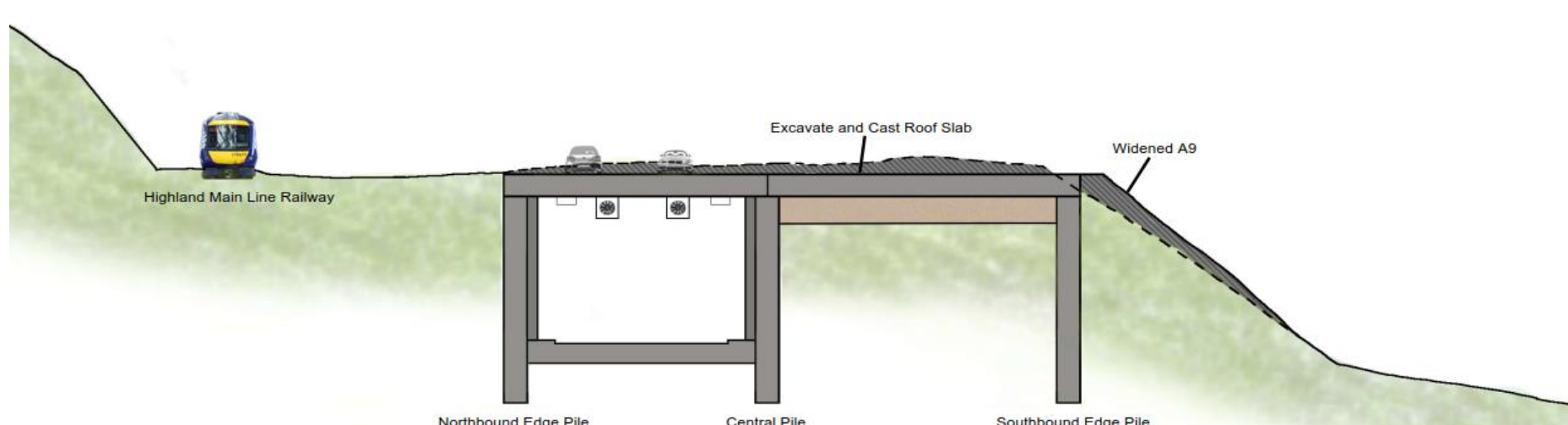
Stage 4 – Excavate Material to form Northbound Tunnel and Lay Foundation Slab



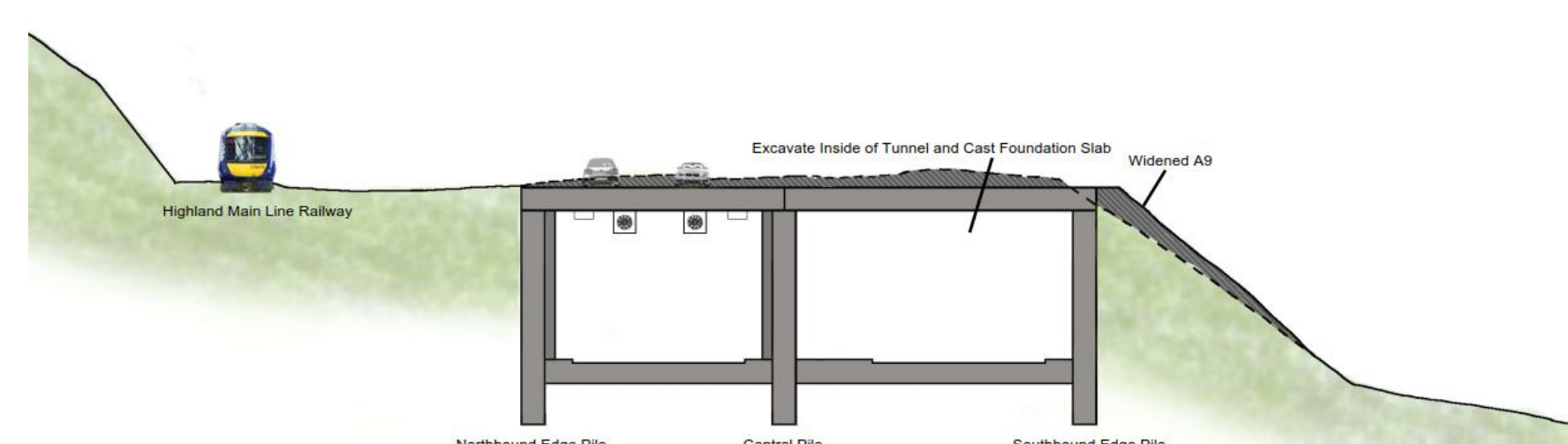
Stage 5 – Install Internal Fittings and Mechanical and Electrical (M&E) Equipment



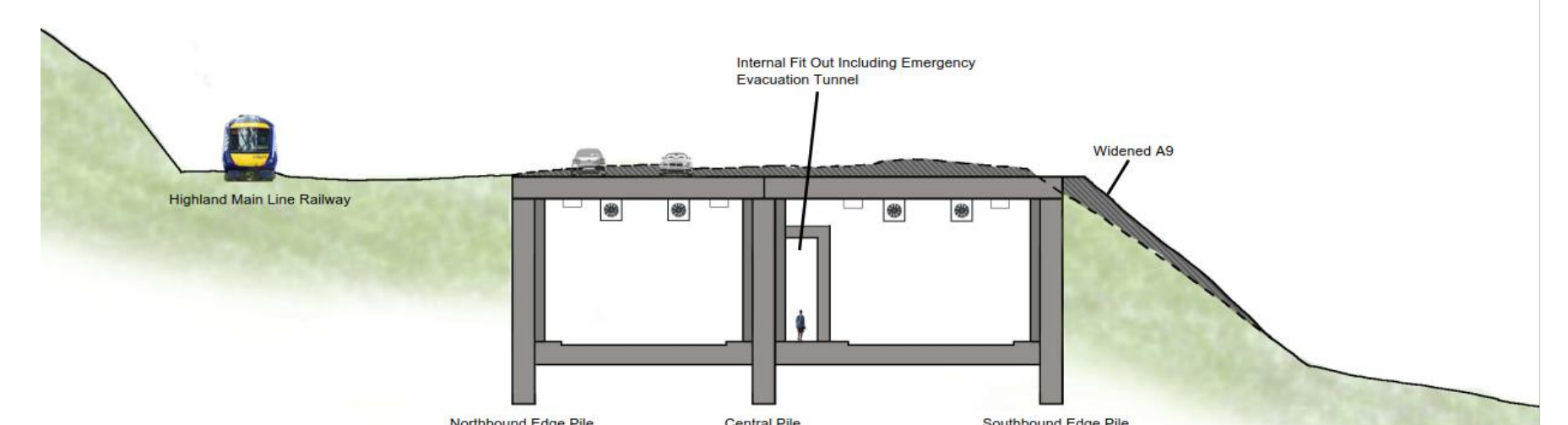
Stage 6 – Install Southbound Carriageway Edge Piles.



Stage 7 – Excavate and Cast Southbound Carriageway Permanent Concrete Roof Slab



Stage 8 – Excavate Material to form Southbound Tunnel and Lay Foundation Slab



Stage 9 – Install Emergency Evacuation Tunnel, Internal Fittings and M&E Equipment

## Construction Key Facts

- Construction duration is expected to be between 4 ½ and 5 years based on having 6 piling rigs on site and working 6 days per week. This would increase to between 5 ½ and 6 years based on working 5 days a week. Perth and Kinross Council (Environmental Health) will decide permissible working days and hours. Piling works is expected to be between 12 to 18 months depending on number of rigs and working days and hours.
- In total, approximately 3,700 bored piles, with 1.2 metre diameter are required.
- Disposal of approximately 698,000m<sup>3</sup> of material is required.
- Approximately 180,000 m<sup>3</sup> (430,000 tonnes) of concrete is required.
- Land is required for construction plant including mud plant and concrete batching plant.
- Total scheme cost approximately £1 Billion to £1.6 billion.