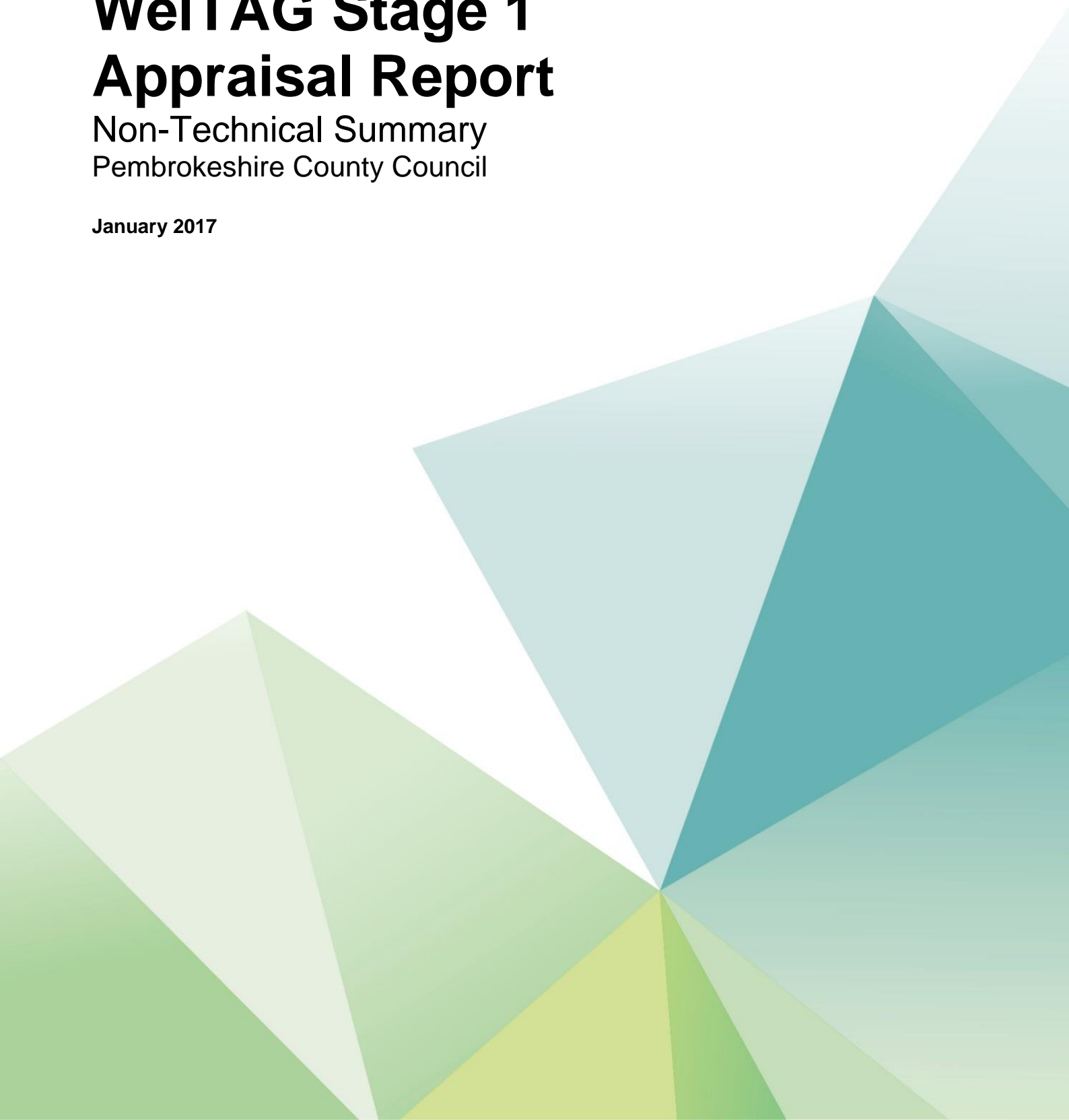


Newgale - WelTAG Stage 1 Appraisal Report

Non-Technical Summary
Pembrokeshire County Council

January 2017



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Acronyms

AQMA	Air Quality Management Areas
BMV	Best and Most Versatile
DM	Do Minimum
NMU	Non-Motorised User
PCC	Pembrokeshire County Council
PCNPA	Pembrokeshire Coast National Park Authority
PRoW	Public Rights of Way
SAC	Special Areas of Conservation
SAM	Scheduled Ancient Monument
SPA	Special Protection Areas
SSSI	Site of Special Scientific Interest
TPO	Transport Planning Objective
WelTAG	Welsh Transport Planning and Appraisal Guidance
WTS	Wales Transport Strategy

1. Introduction

1.1. Non-Technical Summary and Project Background

This is a Non-Technical Summary of the Newgale WelTAG Stage 1 Appraisal Report. It describes the results of the WelTAG Stage 1 appraisal of four options to replace the existing beach road (A487) at Newgale.

In the winter storms of 2013/14, the shingle bank at Newgale in Pembrokeshire which provides coastal protection for the A487 and the village of Newgale, was overtopped and the A487 flooded. The shingle bank has been overtopped many times resulting in road closure and with rising sea levels this is expected to become a more frequent and severe event.

In February 2016 Pembrokeshire County Council (PCC) published a Welsh Transport Planning and Appraisal Guidance (WelTAG) Planning Stage Report. The report considered potential transport interventions to overcome the road closure issue. Subsequently an Addendum to the Planning Stage Report was produced to identify a short list of route options to take forward for further assessment.

Following on from the Planning Stage Report and the Addendum, Atkins has been commissioned by PCC, to undertake the WelTAG Stage 1 appraisal of the short-listed route options including alternative routes to the existing A487 through Newgale.

The transport solution will be part of a wider coastal adaptation scheme which includes a masterplan. The masterplan is being developed in parallel with the WelTAG Stage 1 assessment.

1.2. Summary of Previous Studies

The 'Do-minimum' (DM) scenario whereby the existing defence is maintained to protect the existing road is not considered to be a potential solution due to the adverse effects of the increasingly frequent defence failures and consequent road closures. Therefore the Do-minimum is only used as a baseline to assess the options, it is not an option in itself.

In February 2016 Pembrokeshire County Council published a WelTAG Planning Stage report as part of the process of resolving the transportation issues arising from the intermittent failure of the coastal defence at Newgale. The WelTAG Planning Stage Report considered over twenty options to resolve the problem; appraising each of these options against the Transport Planning Objectives (TPOs) and the Welsh Impact Areas: Economic Impacts, Environmental Impacts and Society Impacts.

The Planning Stage Report identified ten route options which were deemed suitable for further consideration.

Subsequently the Planning Stage Addendum Report documented Atkins' targeted review of the Planning Stage report to facilitate the preparation of a WelTAG Stage 1 appraisal which is both proportionate and can inform future decisions to be taken by the Steering Group.

The targeted review gave further consideration to the coastal realignment and highway engineering implications of the options recommended in the WelTAG Planning Stage report, specifically the design considerations which are likely to impact on the purposes of the Pembrokeshire Coast National Park. The options were then retested against the following Transport Planning Objective (TPO):

'To conserve and enhance the natural beauty, wildlife and cultural heritage of the Pembrokeshire Coast National Park avoiding, or at least minimising, adverse effects on the natural environment caused by traffic and associated infrastructure'.

As part of this process two further variants of the Planning Stage options were identified as potentially viable.

The Planning Stage Addendum Report concluded that a number of options should be discounted from further appraisal due to the major adverse impact of those options on landscape character, landscape features, visual amenity and the impacts on biodiversity which are inconsistent with the objectives of the National Park.

Therefore the following options are retained for further assessment as part of this WeITAG Stage 1 appraisal:

- Option 3b: Alignment behind the Duke of Edinburgh Inn by building a bridge, viaduct or culverted causeway;
- Option 7: Partially on existing road and track: 'Pen-y-Cwm – Llethr – (Site of) Brawdy Mill' – new road including crossing of Brandy Brook;
- Option J; Hybrid option; and
- Option 11: Maintain existing route but upgrade Diversion Route (C3062-C3063-C3010) over time for increasing use.

Each of the options have been assessed using 'Do-minimum' as the baseline.

1.3. Transport Planning Objectives

Transport Planning Objectives (TPOs) were identified in the Planning Stage report, based on the review of problems, constraints and opportunities identified by consultees and a review of available data; and of strategic objectives contained in the Wales Transport Strategy (WTS) and the South West Wales Joint Transport Plan (JTP). These TPO's (along with potential options) were presented for public consultation in October and November 2015. As a result of feedback from that consultation the wording of the TPO's were strengthened.

The TPOs are as follows:

- To improve sustainable long term highway connectivity to and within the local community, and between St David's peninsula, Haverfordwest and the Trunk Road Network in the context of coastal erosion;
- To conserve and enhance the natural beauty, wildlife and cultural heritage of the Pembrokeshire Coast National Park avoiding, or at least minimising, adverse effects on the natural environment caused by traffic and associated infrastructure;
- To improve the actual and perceived safety of the transport network in the study area for all users and residents;
- To make the transport network suitable to facilitate tourism and regeneration in the St David's Peninsula including access to the coast at Newgale; and
- To support and facilitate the safe movement of vulnerable road users to their destination.

2. Existing Conditions

2.1. General

Newgale is a village located on the A487 between Haverfordwest and St. David's in the county of Pembrokeshire, South West Wales. The village is located within the Pembrokeshire Coast National Park and the Pembrokeshire Coast Path runs through the village.

In addition to Newgale there are several small settlements in the study area including Penycwm, Brawdy, Wood and Roch, as illustrated in Figure 2.1.

Figure 2-1 Study Area



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2.2. Topography

The topography of the area is characterised by the Brandy Brook Valley which is a low lying flat area which opens out to the west at Newgale Sands beach. Either side of the valley to the north and the south is hillside with undulating landform.

2.3. Land Use

There are three residential areas within the study area, Newgale (the largest), Pen-y-Cwm and Wood. Roch and Brawdy are located on the edge of the study area. Generally the study area is formed of agricultural land with farmsteads and isolated residential properties.

Newgale is comprised largely of residential properties with a number of commercial properties located along the beach road and Newgale Hill.

On the northern edge of Roch there is a primary school and a pub as well as number of residential properties. Scattered throughout the study area there a number of properties providing catered or self-catering holiday accommodation along with other private properties.

Cawdor Barracks Army Base is located at Brawdy in the northern part of the study area. The barracks is home to the 14th Signal Regiment and generates significant traffic flows only on event days. The site is accessed off the A487 just north of Newgale. The Ministry of Defence (MoD) announced in November 2016 that Cawdor Barracks will close in 2024. The site is not allocated for development in either of the Local Development Plans but it is reasonable to assume that it will come forward for future development.

Within the study area there is no land allocated for development by the two relevant Local Plans. However land in St David's is allocated for residential and employment use. Land in Solva is allocated for residential use.

A masterplan is currently being prepared to provide a vision for the future of Newgale irrespective of which highway alignment option is taken forward.

2.3.1. Agriculture

The study area is under grassland for beef cattle and sheep, with occasional fields of arable crops (mainly barley) and fodder crops (mainly beet, hay and silage). There are no dairy farms in the area. Most of the grassland is improved, except on steep banks where there is gorse and bracken and north of Roch Bridge where there are fields of rushy pasture. There are small areas of woodland alongside streams.

The floodplain of Brandy Brook has semi-natural bog vegetation and is probably rarely, if ever, grazed.

Option 3b occupies coastal strip south of Newgale where the land use is recreational and includes a camping site operated by Wood Farm.

2.4. Existing Transportation

2.4.1. Highway Network

Newgale is located on the A487, an important part of the County Road Network which links Haverfordwest with the St. David's peninsula. The road terminates at Fishguard to the north-east.

The section of A487 in the vicinity of Newgale is single carriageway running from Roch to Penycwm. The road passes through Newgale on the eastern side of the shingle bank which separates Newgale from its beach and the sea.

Welsh Road is a single carriageway road located to the south of Newgale; running parallel to the shingle bank / seafront. The road provides a link between Newgale and Nolton Haven.

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Two minor roads are aligned off the A487 around Newgale; Roch Hill and the C3010 (Penycwm). These minor roads combine to form the 6.2km diversion route for through traffic when the A487 through Newgale is closed (see Figure 2.2).

Figure 2-2 The existing A487 Newgale Diversion Route



2.4.2. Bus

The scheduled bus routes that currently serve Newgale are the 411 service (running between Haverfordwest and St David's) and the 'Puffin Shuttle' service No. 400 (running between St David's and Marloes). Both these services are currently operated by Richard Bros.

2.4.3. Existing Traffic Conditions

The majority of traffic exhibited on the A487 in Newgale is through traffic heading to St David's (and Solva) in the north-west and to Haverfordwest in the south-east. The A487 is also the only diversion route for Heavy Goods Vehicles (HGVs) in the event of a major accident closing the A40 at Treffgarne Bends.

When the A487 at Newgale is closed as a result of extreme weather events or flooding of Brandy Brook, through traffic is diverted along the alternative C3062 and C3010 route (passing through Roch and Penycwm).

Overall the accident rate is in-keeping with a transport network of this type.

2.5. Structures

The following road structures are present in the study area. A brief description is given below:

- **Roch Bridge** – A multiple span masonry arch bridge crosses the Brandy Brook near Roch Mill. The road over the bridge is single track.
- **Newgale Bridge** – A single span masonry arch bridge crosses the Brandy Brook at the bottom of Newgale Hill. The road over the bridge is single track.

2.6. Traffic Noise and Vibration

Traffic on the existing road network is the predominant cause of noise in the area. Roadside levels of noise in the study area is generally between 63 and 66 decibels. Additional sources of noise, including from farms and industrial estates, may affect particular properties at particular times.

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Residential properties located near roads in Roch, Penycwm and on Newgale Hill form the majority of the 264 receptors identified as sensitive to noise.

2.7. Air Quality

Pembrokeshire County Council (PCC) has declared two Air Quality Management Areas (AQMA), which are located in Haverfordwest and Pembroke, approximately 12 and 20 kilometres to the south-east of the study area respectively. These AQMAs are not considered to be of relevance to this study area.

2.8. Landscape and Townscape

The study area including all route options falls within the following landscape designations:

- Pembrokeshire Coast National Park;
- Brandy Brook Valley potential Site of Special Scientific Interest (SSSI) (Options 3b, J & 7). Through consultation with Pembrokeshire County Council, it is understood that the lowland marsh habitat that runs through the study area may be designated as a SSSI in the future. Therefore this assessment considers the associated habitats to be of SSSI quality and have been valued as of High importance;
- National Cycle Route 4 (all route options); and
- Wales Coast Path; approximately 0.2km from Option 3b and 0.7km from Options J, 7 & 11.

2.9. Biodiversity

There are a series of sites designated for their biodiversity significance. Two Special Areas of Conservation (SAC) (St David's / Ty Ddewi and Pembrokeshire Marine / Sir Benfro Forol), the Ramsey and St David's Peninsula Coast Special Protection Areas (SPA) and the St David's Peninsula Coast SSSI are located within 2km of all options.

A summary of the habitat features potentially affected by each option is provided in Table 2.1.

Table 2-1 Habitat feature summary (all values are approximate)

Option	Waterbodies within 500 m	Watercourse crossings	Lengths of Hedgerow affected (m)	Woodlands affected
Option 3b	1	1	81	0
Option J	4	1	318	10
Option 7	5	2	1100	8
Option 11	0	2	6200	4

WWBIC (West Wales Biodiversity Information Centre) was contacted to obtain records of notable species within the study area, incorporating all options and a further 1 km buffer around the area in November 2016.

2.10. Soils

The study area is formed of a mixture of Grade 3 soils (land with moderate limitation to agriculture) and Grade 4 soils (land with severe limitations). There is currently insufficient soil information to determine the specific quality of the Grade 3 soils.

2.11. Contamination

Throughout the study area are a number of land uses, present and historic, which are potentially contaminative. These include:

- Potentially infilled coal pits, sand pits and quarries with fill material of unknown provenance;
- Former RAF Brawdy comprising a disused airfield and associated storage facilities;
- Farms which may store and use fuels and oils and pesticides and herbicides;
- Former Southwood Colliery and associated railway lines and engine sheds;
- Former sewage works;
- Former petrol filling station; and
- Existing highway infrastructure.

2.12. Cultural Heritage

The Pembrokeshire Coast is designated as a Heritage Coast. There are a number of designated heritage assets within the study area and a wide range of non-designated assets ranging in age from Bronze Age to post-medieval.

In proximity to Option 3b there is a Grade II listed Lime Kiln. Options J and 7 are situated in proximity to a defended enclosure at Bay View Farm which is a Scheduled Ancient Monument (SAM). In addition to this two Grade II listed buildings of 18th and 19th century construction are proximate to Option 7. The Scheduled Ancient Monument (SAM) at Bay View Farm and the Brawdy Promontory Fort SAM are located in the vicinity of Option 11.

2.13. Water Environment

The 1% (1 in 100 year) floodplain of the Brandy Brook is likely to be crossed by the scheme leading to fluvial flood risk. This asset is considered to be of High Value. The route is also shown to cross a number of surface water floodplain areas associated with smaller watercourses and ditches.

2.14. Pedestrians, Cyclists, Equestrians and Community Effects

The Pembrokeshire Coastal Path (National Trail) passes through the study area. National Cycle Network Route 4 (London to Fishguard) runs through Newgale. This also forms part of the Celtic Trail.

There are a number of Public Rights of Way (PRoW) and within the study area, these predominantly cross open fields. Generally the roads in Newgale do not have pavements.

Withybush General Hospital in Haverfordwest serves as the main hospital and A&E for Newgale and St David's Peninsula. There is a surgery (St. David's Surgery) in St. David's.

Pembrokeshire College has a campus at Haverfordwest. Ysgol Dewi Sant / St. David's School is the closest secondary school to Newgale.

St. David's, the closest city to Newgale, is small and has a limited offering in terms of shops and leisure facilities. Haverfordwest offers a wider selection of shopping and leisure facilities for Newgale, St. David's and Solva.

3. Preliminary Engineering Design of Route Options

A brief description of each of the four route options is given below with their routes shown on Drawing No. 20160152-XX-ZZ-ATK-DR-D-2000/P2 in Appendix A.

In the case of all options the following assumptions have been made:

- The road needs to be designed for 120 years in order to provide a sustainable and value for money solution;
- The Pembrokeshire Coastal Path and National Cycle Route 4 would be maintained and defended;
- Access to Welsh Road from the north would be maintained;
- The existing beach road would be maintained until 2036;
- The toilets, campsite, Newsurf and Duke of Edinburgh pub businesses on the seafront would be expected to last until 2036 but after that point they would be expected to decline over time.

3.1. Engineering Standards

Taking into account the existing speed limits and the sensitivity of the landscape within the Pembrokeshire Coast National Park, a design speed of 70kph for a rural all-purpose single carriageways has generally been used, which correlates to a speed limit of 40mph (64kph). The National Speed Limit may be used on the proposed route alignments providing a number of Departures from Standard from a 100kph design speed are agreed. A 60kph design speed, which correlates to a 30mph (48Kph) speed limit, has been used where the options tie into existing 30mph zones.

3.2. Route Options

3.2.1. Option 3b

Option 3b runs behind the Duke of Edinburgh public house. This option would be approximately 520m in length. It would be carried across the flood plain of the Brandy Brook on a viaduct. At its southern end, this route would tie in to the existing A487 approximately 50m south east of the existing junction with the C3082 towards Nolton Haven. To the north, the route would tie in with the existing A487 approximately 50m north east of the existing bridge over Brandy Brook.

The advantages of this option would be:

- It would be the shortest route;
- It would replicate the existing route corridor;
- It maximises the use of the existing A487.

The disadvantages of this option would be:

- It would require a major structure to carry the road above the Brandy Brook flood plain;
- It would require the demolition of the commercial/residential properties at the northern end of the route;
- It would be located through the popular Newgale Camping Site.

3.2.2. Option J

Option J would be approximately 2.5km in length. At its southern end, it would tie into the existing A487 to the south of Wood Farm. It would then head in a north easterly direction before turning north, passing to the east of the property Pontpren, and crossing the Brandy Brook. It would then turn toward the northwest, passing to the north of Newgale Farm, before turning to the north and tying in with the existing A487 at Bay View Farm.

The advantages of this option would be:

- It is the shortest of the routes that wouldn't require a viaduct;
- It would retain the view of Newgale beach from the viewpoint at Wood;
- It would not require the demolition of any properties, although it might affect the grounds of Southwood Lodge.

The disadvantages of this option would be:

- It would require a change in direction of approximately 140 degrees for through traffic at the southern tie in, which would give the appearance of an unnatural/disjointed route;
- A roundabout would be required to facilitate this movement. Lighting and large signs would be required on the approaches to the roundabout;
- The roundabout would be located on the top of inclines from both the new route and from the existing A487 western approach making it difficult for drivers to appreciate the road layout.

3.2.3. Option 7

Option 7 would be approximately 3.25km in length. At its southern end, it would tie in to the existing A487 at the existing junction with the access track to Pontpren and Gouts. It would then head in a northerly direction along the line of the access track before crossing the Brandy Brook following the line of a small stream valley (Dolgwm). It would then turn to the north west toward Lower Llethr and turning to the west to follow the line of Erw Lon towards Penycwm. Before reaching the properties on Erw Lon, it would divert and pass to the north of Penycwm, before tying in to the existing A487 approximately 60m to the west of the settlement.

The advantages of this option would be:

- It is the most direct of the routes linking the A487 between Roch in the south and Penycwm in the north;
- It would not require the demolition of any properties.

The disadvantages of this option would be:

- It would contain a number of departures from engineering standards;
- It contains gradients of 10% over distances of up to 650m which on a single carriageway with no overtaking sections or climbing lanes could lead to delay and driver frustration;
- It would require a change in direction of approximately 90 degrees for through traffic at the southern tie in, which would require either a roundabout, or a larger radius curve;
- Lighting and large signs would be required on the approaches to any roundabout;
- A roundabout would be located on the top of a steep incline from the new route making it difficult for drivers to appreciate the road layout.

3.2.4. Option 11

Option 11 would be approximately 6.2km in length. It would follow and widen the existing diversion route of the C3062-C3063-C3010. At the south it would tie in to the existing A487 at the existing junction with the C3062 at Roch. It would cross Brandy Brook at Roch Bridge, and continue via Bramble Hill, Eweston, Silver Hill, Rhydygele to Penycwm where it reaches the existing junction with the A487.

The advantages of this option would be:

- It would mostly follow the line of existing roads;
- Cuttings and embankments would generally be less extensive than on other routes.

The disadvantages of this option would be:

- The road would be significantly below engineering standards in numerous locations and unlikely to be acceptable without significant deviations from the existing roads;
- It is the longest route of all the options;
- A new bridge would be required approximately 12m high at Roch Bridge;
- The road level would need to be raised or lowered along virtually the whole length.

4. Stage 1 WeITAG Appraisal

4.1.1. Transport Economic Efficiency (TEE)

The assessment of the scheme's impact on the economic efficiency of the transport system considers the variation in journey time and distance between the 'with scheme' and 'without scheme' scenarios in the years 2022 and 2037. All options would contribute towards reducing journey times for traffic travelling between St David's Peninsula and Haverfordwest. All options, except Option 11, would contribute towards a reduction in journey distance within the study area.

4.1.2. Noise

The assessment of noise relates to the difference in noise due to each option compared with the do nothing scenario. The results of the noise assessment show that Option 3b would result in the least change compared with the existing scenario. Options 7 and J would reduce noise levels on the A487 and have more benefits than dis-benefits. Option 11 would result in the greatest number of impacts but has a similar number of benefits.

4.1.3. Local Air Quality

The changes in emissions relate to the difference between the option and the Do-minimum (DM) option for the opening year (2022). Option 3b results in only a 1% reduction of NOx emissions and no change in PM10 emissions. Conversely Option 7 results in an overall reduction in PM10 emissions of 3% and no change in NOx emissions. Both Option 11 and Option J result in an overall increase for both pollutants, with the largest increases occurring with Option 11 with a 31% increase in NOx emissions and 24% in PM10 emissions, in line with the change in vehicle kilometres travelled.

4.1.4. Greenhouse Gas Emissions

Option 3b is the only option that leads to a reduction in CO2 emissions in both modelled years (2022 and 2037). All other options are expected to have an increase in CO2 emissions in both years, with the largest increase in both years with Option 11.

4.1.5. Landscape and Townscape

Option 3b will have least impact on landscape resource and is the shortest of the four options. However, it has been considered to have a major impact on disturbance and permanent removal and relocation of local amenities and tourist facilities along the beachfront in Newgale in addition to the alteration to the seascape setting which will result in a large adverse impact. Views in and out will also be adversely impacted on with a new prominent feature in the form of a 3m high viaduct in an exposed seafront location especially for those in Newgale, surrounding properties, users of the A487 and PRoW users which experience striking views towards the coast. However, once the new road is in place set back from the seafront there is potential for some improvement and upgrade through landscape mitigation/enhancement along the seafront benefitting user experience. The option has been assessed to have an overall moderate adverse impact on the landscape and townscape.

Options J and 7 would be detracting features in a strong rural setting cutting through important landscape features including hedgerows, woodland and trees in a high value aspect area. There will be large areas of cut and fill associated with the construction as they pass through undulating landscape altering the landform and ultimately the landscape character in addition to the impingement on adjacent properties. Mitigation in the form of translocation and new planting would help to counteract this impact and offer screening measures with regards to visual amenity. Overall this option would have a moderate adverse impact on the landscape and townscape.

Option 11 will involve proposed earthworks and widening of the existing Roch Hill and Bramble Hill Lanes which intersect with the A487. The route will have major impacts on landscape features such as hedgerows, woodland and trees resulting in a permanent loss of resources and

alteration to landform. However, translocation and new planting will help mitigate this through screening and replacement of important resources. It will also have moderate impacts on adjacent properties where widening will impinge on land and any disruption that is caused. This is, however considered in context with the existing road in place therefore impacts on setting and visual amenity will be minor adverse and for this reason when taking into account mitigation measures it will have an overall minor adverse impact on the landscape and townscape.

4.1.6. Biodiversity

From an ecological perspective, Option 3b is considered overall the most preferred option. However, this option would still result in the loss of high importance lowland marsh habitat. Out of the four options, this option is likely to result in fewer impacts to hedgerows (lowest length of hedgerow due to be lost (81 m)) and it is unlikely that any woodlands are to be affected.

Option J, from an ecological perspective, is considered the second least favourable to Option 7. This is due to the route option including 1 river crossing structure resulting in a risk of potential indirect impacts on Pembrokeshire Marine SAC, which is located immediately off shore. There is a potential risk of pollution travelling down the Brandy Brook river course, therefore placing a risk on the SAC. However, this risk will be greatly reduced with standard forms of mitigation. The scale of this option will result in a significant loss of priority habitats (lowland marsh habitat) and associated biodiversity. A length of hedgerow due to be lost is considerably less than Option 7 and so proves less of a threat than both Option 7 & 11. Woodland areas are due to be affected also. It is unlikely this loss of habitat can be fully compensated within the Scheme.

From an ecological perspective Option 7 is considered the very least favourable. This option would result in 2 river crossings resulting in a risk of potential indirect impacts on Pembrokeshire Marine SAC, which is located immediately off shore. There is a potential risk of pollution travelling down the Brandy Brook river course, with potential effects on the SAC. However, this risk will be greatly reduced with standard forms of mitigation. The scale of this option will result in a significant loss of priority habitats (lowland marsh habitat) and associated biodiversity. The second greatest linear length of hedgerow has the potential to be lost along with 8 woodland areas that are due to be affected also as well as the 2 river crossings being required. It is very unlikely this loss of habitat can be compensated within the Scheme.

From an ecological perspective, Option 11 is considered third least-preferable after Options 7 & J. Even though widening the pre-existing road will result in minimal impacts on the nearby lowland marsh habitat, it has the greatest length of linear hedgerows affected. This is the highest loss of hedgerows of all of the options, unless the hedgerows are due to be translocated it is highly unlikely that this loss of habitat can be compensated within this Scheme.

4.1.7. Heritage

Various heritage assets are distributed throughout the various study areas, although the main concentrations are to be found near Newgale Sands, Penycwm and Roch. These heritage assets largely relate to the medieval and post-medieval periods, although some assets, such as Scheduled Monuments at Bay View Farm and the fort at Brawdy Farm suggest earlier prehistoric activity. A Mesolithic submerged forest and find spots ranging from the Neolithic to the Bronze Age would further indicate prehistoric activity in the area.

Route Option 3b has the potential to affect the setting of a single Grade II Listed Building and a number of non-designated assets, which is likely to result in an overall slight adverse effect on the historic environment.

Route Option J has the potential to affect the setting of a single Scheduled Monument and a number of non-designated assets, which is likely to result in an overall moderate to slight adverse effect on the historic environment.

Route Option 7 has the potential to affect the setting of a single Scheduled Monument, 2 Grade II listed buildings and a number of non-designated assets, which is likely to result in an overall moderate to slight adverse effect on the historic environment.

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Route Option 11 has the potential to affect the setting of 2 Scheduled Monuments and a number of non-designated assets. Additionally, this route would lead to physical impacts on at least 7 non-designated heritage assets. Combined, this option is likely to have an overall moderate to slight adverse effect on the historic environment.

Taking into account the information known at this time, the early assessment tool has concluded that, out of the four options, Option J has the least overall adverse range of effects on individual heritage assets within its study area.

4.1.8. Water Environment

Impacts on water quality and flood risk from each option is assessed in this section.

In terms of impacts on water quality all options would have slight adverse effects. Option J was assessed as having the greatest environmental water risks/impacts, followed by Option 7, Option 3b and then Option 11 with the least environmental water risks/impacts.

With regard to flood risk all options are assessed as being likely to have large adverse impacts. However, due to the number of properties (20) which would be at risk from flooding as a result of Options 3b, 7 and 11, Option J is ranked as the best performing for flood risk. Option 11 is ranked second due to much of the route utilising the existing road network. As Options 7 and J are largely located on undeveloped land in the Brandy Brook floodplain these are the worst ranking options.

4.1.9. Non-Agricultural Land Use

The assessment of non-agricultural land uses considers the impacts of the options with respect to:

- Demolition of Private Property;
- Effects on Development Land; and
- Loss of Land used by the Community.

In addition, the impacts from severance of access to land uses and impacts on amenity of land uses by virtue of visual, noise and air quality impacts are considered.

All options would improve access to and from Newgale during storms. For all options the loss of existing properties and facilities could be mitigated through relocation to sites with an improved degree of protection.

For Option J, 7 and 11 the removal of through-traffic would lead to an improvement in local amenity but could potentially result in a reduction in trade for businesses in Newgale and potentially a reduction in employment.

For Options J, 7 and 11 improved access for HGVs would support redevelopment of Cawdor Barracks which in turn could provide a new revenue stream for the businesses in Newgale. In Option 3b the A487 would not be made more suitable for HGVs.

In Option 11 the A487 would be diverted through northern part of Roch bringing the road closer to a school, playground and community centre. The increase in traffic would have an adverse impact in terms of severance.

Overall the impact on non-agricultural land use would be Neutral for Options 3b and 11 and Beneficial for Options J and 7.

4.1.10. Agricultural Land Use and Soils

The agricultural impacts that allow the options to be compared are loss of Best and Most Versatile (BMV) land, total loss of farmland and severance. The greater the length, the more land will be lost and more farms and fields will be affected by severance, so that Option 11 has the greatest magnitude of impact, followed by Option 7 and Option J.

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For Options J, 7 and 11 the significance of effect of these is moderate adverse for severance and slight adverse for loss of land. Option 3b is different from the other options in that it does not cross farmland and so it has no impact in terms of loss of agricultural land. Severance is restricted to one camping field where the impact on that enterprise is large adverse. Overall, however, it is the option of least impact on soils and farming.

4.1.11. Land Contamination

It is recommended that a detailed desk study should be undertaken as part of a Stage 2 assessment to provide more detailed land quality information and more in depth historical mapping and to enable better characterisation of the land on and around the route options.

4.1.12. Permeability

Walking, cycling and bridleway routes would be impacted by the alignments of Options J and 7. However, these routes may only be used by a small proportion of residents and visitors. The road alignments of Options 3b and 11 would not impact upon any Non-Motorised User (NMU) routes. Options J, 7 and 11, which would include measures to maintain safe access for NMUs along the coast at Newgale, would increase permeability within the settlement of Newgale and between the village and amenities further south along the coast due to the removal of vehicular traffic on the existing beach road. The degree of reduced permeability caused by Options J and 7 depends upon the amount that the PRoW and bridleway are used by NMU. As this is a high level qualitative assessment due to the lack of available data, it is not possible to quantify the degree of reduced permeability at this stage.

4.1.13. Physical Fitness

Options J and 7 result in severance issues for some local walking, cycling and bridleway routes, but they also reduce traffic flows along the beach front in Newgale, improving the environment for walking and cycling, as does Option 11. In addition Options J and 7 would provide a more attractive route for NMUs between Roch and Penycwm.

Although Option 3b provides a replacement road alignment very close to the existing beach road, it does provide an alternative walking and cycling route along Newgale's beach front, therefore proving the potential to increase active travel by local residents.

4.1.14. Social Inclusion

The purpose of all options would be to provide a transport route which remains open during storm events. When compared to the 'do nothing' scenario, all the options would improve access to amenities in Haverfordwest and St. David's. In this regard the impact of changes in accessibility on social inclusion would be positive.

Option 3b would have very minimal impact on the accessibility of services for both car owners on limited incomes and people without access to a car. Options J and 7 would slightly increase travel times to services from Newgale, but reduce journey times for people travelling from St. David's Peninsula to services in Haverfordwest. Option 11 would significantly increase travel times to services for residents of Newgale and St David's peninsula. This would impact on the accessibility of services, particularly for car users on limited incomes and people without access to a car, providing reduced accessibility levels.

Although the No.411 and No.400 buses would have to re-route their services for Options J, 7 and 11, these new routes do not pass through Newgale. However, it is assumed that they will still stop in Newgale whereby buses will have to turn around in the village in order to re-join the main road again.

4.1.15. Transport Safety

All four route options under consideration would provide an opportunity to improve highway safety along the A487 through Newgale as outlined below.

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- Options J, 7, and 11 would divert through-traffic away from Newgale (more specifically away from sections of the A487 currently at risk from shingle bank debris and flooding);
- Option 3b provides a new route within Newgale albeit along an alignment proposed to mitigate against existing shingle and flooding constraints i.e. approximately 40 to 60m in land and 3 meters higher than the existing ground level.

In diverting through traffic away from Newgale (A487 Newgale Hill and Wood Hill), Options J, 7, and 11 would also significantly reduce conflict levels between pedestrians / cyclists and vehicular traffic within Newgale. In the event that Option 3b is taken forward, complimentary improvements to the sustainable transport infrastructure within Newgale would be required.

4.1.16. Equality, Diversity & Human Rights

Any impacts of the options on Equality, Diversity & Human Rights are not considered to be significant and are not differentiating factors at this stage of assessment.

5. Stage 1 Appraisal Summary Tables

Appraisal Summary Tables have been prepared for the Stage 1 Assessment of each economic, environmental and social topic. These are presented in this section.

5.1. Option 3b

Option Description: Option 3b			
Appraisal Criteria	Assessment	Distribution	Significance
Welsh Impact Areas			
Economy			
Transport Economic Efficiency	Cost - £21.55 m Option 3b will contribute towards reducing travel times between St David's Peninsula and Haverfordwest; with a Design Year journey time saving of 317 seconds compared to the Do Minimum Scenario. Option 3b will also contribute towards a reduction in veh/km within the study area (i.e. distances travelled by each vehicle) Estimated BCR – 1.97 (Medium Value for Money)	All 'through traffic' to benefit from reduced journey times and distances.	Moderate Beneficial (+2)
EALI	N/A	N/A	Neutral (0)
Environment			
Noise	Increases and decreases in noise affect a small number of properties (19 out of 264). There are more increases in noise than decreases in noise. Potentially significant noise effects are shown at 5 properties in the short term and at 1 property in the long term. Mitigation is unlikely to be needed for this option.	N/A	Neutral (0)
Local Air Quality	Slight reduction in vehicle kilometres travelled with this option in the opening year than with the Do Minimum as a result of decreases along the A487 east of the junction with Welsh Road.	No significant changes to distribution of emissions.	Neutral (0)
Greenhouse Gas Emissions	Fewer vehicle kilometres travelled with this option over the 60 year appraisal period than with the Do Minimum as a result of decreases along the A487 east of the junction with Welsh Road.	Not Assessed	Slight beneficial (+1)
Landscape and townscape	<u>PMBRKVS072: Druidston – High Value</u> Large adverse impacts on: views in and out of area. Moderate adverse impacts on: residential dwellings in Newgale including the Duke of Edinburgh Inn; leisure facilities and users in Newgale; and Brandy Brook & Valley (pending formal SSSI designation) Slight adverse impacts on: amenity grassland as part of the camping park and marshland; cycleway and Wales Coast Path.	N/A	Moderate adverse (-2)
Bio-diversity	Loss of high importance lowland marsh habitat. Limited impacts to hedgerows.	N/A	Slight Adverse (-1)
Heritage	Grade II listed building of medium importance [CADW 19081/DAT59636]. Non-designated bridge [Coflein 22423] and cottage [DAT32636] of low importance. 16 Non-designated archaeological sites of low importance.	Potential to impact on setting of listed building – Slight Adverse. Potential direct physical impact on assets – Moderate Adverse.	Slight Adverse (-1)

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		<p>Potential to impact on setting of non-designated heritage assets – Slight Adverse.</p> <p>Potential direct physical impact on any surviving below ground remains – Slight Adverse.</p>	
Water environment	<p>Potential for slight adverse impacts to water quality owing to risks associated with additional road runoff and pollution. Potential impacts on groundwater level and quality from cuttings, earthworks and piling. Works could indirectly affect surface water features and abstractions which are dependent upon groundwater inputs and may introduce new pollutant pathways to groundwater.</p> <p>Large adverse impacts in terms of flood risk without mitigation.</p>	N/A	Moderate adverse (-2)
Soils	<p>A former petrol filling station and a former lime kiln with associated culm pits were historically located in the study area. Numerous former quarries/pits and operational farms are located in the study area.</p>	N/A	Neutral (0)
Society			
Transport safety	<p>Option 3b will improve highway safety for all road users along the A487; primarily by diverting through traffic away from the Shingle Bank at Newgale</p>	<p>Positive Impact on all road users; particularly vulnerable road users at Newgale Seafront.</p>	Slight Beneficial (+1)
Personal security	N/A	N/A	Neutral (0)
Permeability	<p>No PRoW or bridleways would be severed as a result of this option. The Coastal Path and National Cycle Route No. 4 would be integrated into the revised highway alignment potentially improving NMU provision although NMUs would still encounter vehicular traffic. A positive impact on residents and visitors in the area is predicted.</p>	<p>Positive impacts for all as a result of improvements to NMU routes, particularly for residents/visitors without access to a car.</p>	Slight Beneficial (+1)
Physical fitness	<p>No pedestrian, cycle or horseback routes are severed as a result of this option. This option would incorporate NMU provision to encourage non-motorised modes of travel, however NMUs may still be discouraged due to the presence of vehicular traffic.</p>	<p>No negative or positive impacts on local NMU activity as the option does not sever any walking, cycling or bridleway routes, nor will it specifically encourage more active modes of travel.</p>	Neutral (0)
Social inclusion	<p>Improvements in accessibility during storm events would have a positive impact in respect of social inclusion. Not expected to have a negative impact on the accessibility to services with this road alignment as the route follows a very similar route to the existing alignment.</p> <p>Not expected to have a large impact on public transport users as it is assumed the No.411 and No.400 buses would re-route along a very similar route, therefore current access through Newgale maintained</p>	<p>Accessibility to services for both private car and public transport users will be neither positively nor negatively affected.</p>	Slight beneficial (+1)
Equality, Diversity & Human Rights	<p>Any impacts are not considered to be significant.</p>	N/A	Neutral (0)
Transport Planning Objectives			
<p>To improve sustainable long term highway connectivity to and within the local community, and between St David's Peninsula, Haverfordwest and the Trunk Road Network in the context of coastal erosion</p>	<p>The option would improve highway connectivity to shopping, healthcare and education/training facilities during storm events.</p> <p>Within and through Newgale traffic flows would not be reduced by Option 3b.</p> <p>Significant journey time savings of 317 seconds are forecast, improving connectivity with St David's Peninsula, Haverfordwest and within the local community.</p>		
<p>To conserve and enhance the natural beauty, wildlife and cultural heritage of the Pembrokeshire Coast National Park avoiding, or at least minimising, adverse effects on the natural environment</p>	<p>Potential impact slight adverse effect on setting of a Grade II Listed Building and several non-designated assets.</p> <p>The number of properties receiving an increase in noise would be greater than the number of properties receiving a decrease in noise. Potentially significant noise effects</p>		

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caused by traffic and associated infrastructure	<p>are shown at 5 properties in the short term and at 1 property in the long term. A slight reduction in NOx and CO2 emissions.</p> <p>Loss of lowland marsh habitat will have a minimal impact.</p> <p>Moderate adverse impacts on Brandy Brook & Valley.</p>
To improve the actual and perceived safety of the transport network in the study area for all users and residents	<p>The option would improve highway safety along the A487 through Newgale by providing a new route within Newgale to mitigate against existing shingle and flooding constraints.</p> <p>Complimentary improvements to the sustainable transport infrastructure within Newgale should form a key consideration during the design development process in order to minimise conflicts between Vehicles and NMUs.</p>
To make the transport network suitable to facilitate tourism and regeneration in the St David's Peninsula including access to the coast at Newgale	<p>Improved connectivity between Newgale and St. David's Peninsula during storm events.</p> <p>Reducing journey times to St David's Peninsula</p> <p>In longer term, as part of a Newgale masterplan, recreation and tourism attractions lost due to coastal change would be relocated to an area with a greater level of protection. The potential redevelopment of the barracks provides a potential new revenue stream for businesses in Newgale however there would be no improvement in access along the A487 for HGV vehicles.</p>
To support and facilitate the safe movement of vulnerable road users to their destination	<p>Complimentary improvements to the sustainable transport infrastructure within Newgale should form a key consideration during the design development process in order to minimise conflicts between Vehicles and NMUs.</p>
Other Factors	
Public acceptability: Degree of support from public and other stakeholders to be established through consultation	
Acceptability to other stakeholders: No Stakeholder Consultation undertaken at this stage	
Technical and operational feasibility: Construction methods would include earthworks, one structure and two junctions. Requires a major structure to carry the road above the Brandy Brook flood plain. Horizontal curves at the tie-ins substantially below desirable minimum for the 70kph design speed.	
Financial affordability and deliverability: Scheme Forecast Cost is £21.55m	
Land Use: HGV traffic which would still need to navigate the steep and twisty section of Newgale Hill to access the potential development site at Cawdor Barracks	
Agriculture: No loss of agricultural land but severance of camp field impacting on farm enterprise	
Risks: Affects flood plain, flood modelling required at future stages. Further surveys required to establish if protected species are present. Further survey may reveal further archaeological constraints. Ground investigations may identify ground conditions risks.	
Total Score	
0	

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Non-Technical Summary

5.2. Option J

Option Description: Option J			
Appraisal Criteria	Assessment	Distribution	Significance
Welsh Impact Areas			
Economy			
Transport Economic Efficiency	<p>Cost - £15.90 m</p> <p>Option J will contribute towards reducing travel times between St David's Peninsula and Haverfordwest; with a Design Year journey time saving of 381 seconds compared to the Do Minimum Scenario.</p> <p>Option J will also contribute towards a reduction in veh/km within the study area (i.e. distances travelled by each vehicle)</p> <p>Estimated BCR – 3.0 (High Value for Money)</p>	All 'through traffic' to benefit from reduced journey times and distances.	Large Beneficial (+3)
EALI	N/A	N/A	Neutral (0)
Environment			
Noise	Increases and decreases in noise affect around 35% of 264 receptors. There are around twice as many decreases in noise as there are increases in noise, and most change in noise are potentially significant. Mitigation may be used to reduce the number of adverse impacts.	N/A	Slight Beneficial (+1)
Local Air Quality	More vehicle kilometres travelled with this option in the opening year than with the Do Minimum as a result of traffic travelling along the new route outweighing any decrease through Newgale.	Fewer emissions in Newgale, increased emissions near new route option.	Slight adverse (-1)
Greenhouse Gas Emissions	More vehicle kilometres travelled with this option over the 60 year appraisal period than with the Do Minimum as a result of traffic travelling along the new route outweighing any decrease through Newgale.	Not Assessed	Slight adverse (-1)
Landscape and townscape	<p>Large adverse impacts on: fields and farmland between Penycwm and Wood Farm; mature hedgerows/hedgebanks, woodland and individual trees.</p> <p>Moderate adverse impacts on: Brandy Brook & Valley (pending formal SSSI designation) and views in and out of area.</p> <p>Slight adverse impacts on: residential properties at Penycwm and Newgale Farm to the northern end of the route and Pontpren, Wood Farm and Gouts Farm and Wood Farm to the southern end of the route; 1 PRoW across open fields.</p>	N/A	Moderate adverse (-2)
Bio-diversity	Second least favourable. 1 river crossing structure. Significant loss of priority habitats (lowland marsh habitat) and associated biodiversity. A large length of hedgerow is due to be lost however considerably less than Option 7 and so proves less of a threat than both Option 7 & 11. Woodland areas are due to be affected. It is unlikely this loss of habitat can be fully compensated within the Scheme.	N/A	Very Large Adverse (-3)
Heritage	<p>Scheduled Monument Bay View Farm Defended Enclosure of high importance [PE540/DAT2816/DAT3053].</p> <p>12 non-designated sites of low importance,</p>	<p>Potential to impact on setting of Scheduled Monument – Moderate to Slight Adverse.</p> <p>Potential to impact on setting of non-designated heritage assets – Slight Adverse.</p> <p>Potential direct physical impact on any surviving</p>	Moderate to Slight Adverse (-2)

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Non-Technical Summary

		below ground remains – Slight Adverse.	
Water environment	Potential for slight adverse impacts to water quality owing to risks associated with additional road runoff and pollution. Potential impacts on groundwater level and quality from cuttings, earthworks and piling. Works could indirectly affect surface water features and abstractions which are dependent upon groundwater inputs and may introduce new pollutant pathways to groundwater. Large adverse impacts in terms of flood risk without mitigation.	N/A	Moderate adverse (-2)
Soils	Sewage works were historically present in the study area. Numerous former quarries and pits which have potentially been infilled, and operational farms are located in the study area.	N/A	Neutral (0)
Society			
Transport safety	Option J will improve highway safety for all road users along the A487; primarily by diverting through traffic away from Newgale	Positive Impact on all road users; particularly vulnerable road users at Newgale Seafront.	Moderate Beneficial (+2)
Personal security	N/A	N/A	Neutral (0)
Permeability	Option J cuts across a PRoW (PP5 1/1) to the south of Pen-y-cwm and Bay View Farm. Although this would hinder non-motorised modes of movement, it would not stop NMU from using the PRoW. Although this option severs a PRoW, the removal of vehicular traffic from the existing beach road, along with measures to retain safe access for NMUs along the coast at Newgale, may result in an increase of NMU activity between the village and amenities/settlements to the south of Newgale.	Slightly negative impacts for NMU as they would have to cross the proposed road. Positive impact for NMUs within Newgale and along the coast. Improved gradients and a more direct route improve access between Roch and Penycwn These negative and positive impacts outweigh each other, resulting in no change in permeability.	Neutral (0)
Physical fitness	Option J cuts across a PRoW (PP5 1/1) to the south of Pen-y-cwm and Bay View Farm, however this would not stop active modes of travel made here. However a reduction in traffic flows along the beach front in Newgale coupled with the safe NMU provision along this section of the coast should improve the environment for walking and cycling.	Slightly negative impacts for NMU as they would have to cross the proposed road, however this would not stop active modes of travel. Positive impact for NMU within Newgale as the existing beach road becomes free of vehicular traffic. Improved gradients lead to improvement in use ability of road for cycling and walking	Slight Beneficial (+1)
Social inclusion	Improvements in accessibility during storm events would have a positive impact in respect of social inclusion (+) Journey times for the residents of St David's Peninsula when accessing facilities in Haverfordwest would be reduced compared to the do nothing scenario (++) Journey times for residents of Newgale when accessing facilities in Haverfordwest would be increased compared to the do nothing scenario (-) There would be a negative impact on public transport users, as the No.411 and No.400 buses would have to re-route their services along the new route but still go via Newgale resulting in longer journey times to for users when accessing services in St. David's and Haverfordwest (-)	Negative impacts would result for car users on limited incomes and cyclists living in Newgale in terms of their accessibility to services in the area. Beneficial impacts would result for car users in St David's Peninsula when accessing services in Haverfordwest A negative impact would be made on public transport users as bus services would have to be re-routed.	Slight Beneficial (+1)
Equality, Diversity & Human Rights	Any impacts are not considered to be significant.	N/A	Neutral (0)
Transport Planning Objectives			

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To improve sustainable long term highway connectivity to and within the local community, and between St David's Peninsula, Haverfordwest and the Trunk Road Network in the context of coastal erosion	<p>The option would improve highway connectivity to shopping, healthcare and education/training facilities during storm events.</p> <p>Within and through Newgale traffic flows would be reduced by Option J.</p> <p>Significant journey time savings of 381 seconds are forecast, improving connectivity with St David's Peninsula, Haverfordwest and within the local community.</p>
To conserve and enhance the natural beauty, wildlife and cultural heritage of the Pembrokeshire Coast National Park avoiding, or at least minimising, adverse effects on the natural environment caused by traffic and associated infrastructure	<p>Potential slight to moderate adverse effect on the setting of a Scheduled Monument and a number of non-designated assets.</p> <p>The number of properties experiencing a decrease in noise would be around twice the number of properties experiencing an increases in noise, and most change in noise are potentially significant.</p> <p>An increase in NOx, PM10 and CO² emissions.</p> <p>A river crossing poses a risk of potential indirect impacts on Pembrokeshire Marine SAC. Significant loss of lowland marsh habitat and hedgerow and woodland areas. It is unlikely this loss of habitat can be fully compensated within the Scheme.</p> <p>Moderate adverse impacts on farmland, mature hedgerows/hedgebanks, woodland, individual trees, Brandy Brook & Valley.</p>
To improve the actual and perceived safety of the transport network in the study area for all users and residents	The option would improve highway safety by diverting through-traffic away from sections of the A487 in Newgale which are currently at risk from shingle bank debris and flooding. The option would significantly reduce conflict levels between pedestrians / cyclists and vehicular traffic within Newgale.
To make the transport network suitable to facilitate tourism and regeneration in the St David's Peninsula including access to the coast at Newgale	<p>Access to St. David's and Newgale would be maintained during storm events.</p> <p>Significantly improved journey times (381 seconds) are forecast, reducing journey times to St David's Peninsula.</p> <p>The loss of some commercial properties due to coastal change would have an adverse economic impact on businesses in Newgale. Permanent closure of the coast road may reduce passing trade and would increase journey times for customers. However improved safety and amenity arising from a reduction in traffic is expected to have a positive impact.</p> <p>As part of a masterplan for Newgale, properties lost as a result of coastal change would be relocated to an area with an improved level of protection. Improved access for HGVs along the A487 would support redevelopment of Cawdor Barracks which in turn would have a positive economic impact on Newgale.</p>
To support and facilitate the safe movement of vulnerable road users to their destination	Removal of vehicular traffic from the existing beach road would improve conditions for pedestrians / cyclists within Newgale.
Other Factors	
Public acceptability: Degree of support from public and other stakeholders to be established through consultation	
Acceptability to other stakeholders: No Stakeholder Consultation undertaken at this stage	
Technical and operational feasibility: Construction methods would include earthworks, 1 structure and 2 junctions. A change in direction of approximately 140 degrees for through traffic at the southern tie in would require a roundabout and give the appearance of an unnatural/disjointed route. Difficult for drivers to appreciate the layout of the roundabout when approaching uphill.	
Financial affordability and deliverability: Scheme Forecast Cost is £15.90m	
Land Use: Businesses in Newgale likely to experience a reduction in trade due to removal of through-traffic. Improved HGV access on the A487 would support redevelopment of Cawdor Barracks	
Agriculture: Loss of Best and Most Versatile Agricultural Land, severance of field access	
Risks: Affects flood plain, flood modelling required at future stages. Further surveys required to establish if protected species are present. Further survey may reveal further archaeological constraints. Ground investigations may identify ground conditions risks. Route constructed through area of mine-workings and contaminative industrial use which may require additional geotechnical or land treatment works.	

Newgale

Non-Technical Summary

Total Score	-3
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5.3. Option 7

Option Description: Option 7			
Appraisal Criteria	Assessment	Distribution	Significance
Welsh Impact Areas			
Economy			
Transport Economic Efficiency	<p>Cost - £20.77 m</p> <p>Option 7 will contribute towards reducing travel times between St David's Peninsula and Haverfordwest; with a Design Year journey time saving of 429 seconds compared to the Do Minimum Scenario.</p> <p>Option 7 will also contribute towards a reduction in veh/km within the study area (i.e. distances travelled by each vehicle)</p> <p>Estimated BCR – 2.5 (High Value for Money)</p>	All 'through traffic' to benefit from reduced journey times and distances.	Large Beneficial (+3)
EALI	N/A	N/A	Neutral (0)
Environment			
Noise	Increases and decreases in noise affect around 30% of 264 receptors. The number of increases and decrease in noise are similar, although there are more potentially significant decreases in noise than potentially significant increases in noise. Mitigation may be used to reduce the number of adverse impacts.	N/A	Slight Beneficial (+1)
Local Air Quality	Fewer vehicle kilometres travelled with this option in the opening year than with the Do Minimum as a result of decreases along the A487 through Newgale.	Fewer emissions in Newgale, increased emissions near new route option.	Neutral (0)
Greenhouse Gas Emissions	More vehicle kilometres travelled with this option over the 60 year appraisal period than with the Do Minimum as a result of decreases along the A487 through Newgale.	Not Assessed	Slight adverse (-1)
Landscape and townscape	<p><u>PMBRKVS072: Druidston – High Value</u></p> <p>Large adverse impacts on: fields and farmland between Penycwm and Pontpren; mature hedgerows/hedgebanks, woodland and individual trees.</p> <p>Moderate adverse impacts on: Brandy Brook & Valley (pending formal SSSI designation) and views in and out of area.</p> <p>Slight adverse impacts on: residential properties at Penycwm, Llethr and Lower Llethr to the northern section of the route; Pontpren at the southern section; 2 PRoWs across open fields.</p> <p><u>PMBRKVS031 Skyfog Aspect Area - High Value</u></p> <p><u>PMBRKVS112 St. Bawdy Airfield Aspect Area - Low Value</u></p> <p>Minor adverse impacts on: fields and farmland and mature hedgerows/hedgebanks and individual trees.</p>	N/A	Moderate adverse (-2)
Bio-diversity	Significant loss of priority habitats (lowland marsh habitat) and associated biodiversity. Significant linear length of hedgerow potentially lost along with 8 woodland areas. It is very unlikely this loss of habitat can be compensated within the Scheme.	N/A	Very Large Adverse (-3)
Heritage	<p>Scheduled Monument Bay View Farm Defended Enclosure of high importance [PE540/DAT2816/DAT3053].</p> <p>Grade II listed buildings in Penycwm [CADW 14405/DAT2814 and CADW 14406/DAT59288] of medium importance.</p>	<p>Potential to impact on setting of Scheduled Monument – Moderate to Slight Adverse.</p> <p>Potential to impact on setting of Listed Buildings – Slight Adverse.</p>	Moderate to Slight Adverse (-2)

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	14 non-designated heritage assets of low importance.	<p>Potential to impact on setting of non-designated heritage assets – Slight Adverse.</p> <p>Potential direct physical impact on any surviving below ground remains – Slight Adverse.</p>	
Water environment	<p>Potential for slight adverse impacts to water quality owing to risks associated with additional road runoff and pollution. Potential impacts on groundwater level and quality from cuttings, earthworks and piling. Works could indirectly affect surface water features and abstractions which are dependent upon groundwater inputs and may introduce new pollutant pathways to groundwater.</p> <p>Large adverse impacts in terms of flood risk without mitigation.</p>	N/A	Moderate adverse (-2)
Soils	The former Southwood Colliery, the former RAF Brawdy, numerous former quarries and pits and operational farms are located in the study area.	N/A	Neutral (0)
Society			
Transport safety	Option 7 will improve highway safety for all road users along the A487; primarily by diverting through traffic away from Newgale	Positive Impact on all road users; particularly vulnerable road users at Newgale Seafront.	Moderate Beneficial (+2)
Personal security	N/A	N/A	Neutral (0)
Permeability	<p>Removal of traffic and retaining safe access for NMUs would reduce severance along the coastal path/National Cycle Route No. 4.</p> <p>Option 7 runs along an existing bridleway (PP5 2/2) for approximately 460m along Erw Lon between Pen-y-cwm in the west and Lower Llethr in the east. The option also intersects a PRoW (PP5 37/1) in two places; approximately 135m to the east of Lower Llethr and 345m to the west of Dolgym and east of Heart Covert. As this route severs both a bridleway and a PRoW, an alternative route for pedestrians/horse riders/cyclists would need to be sought.</p>	<p>Negative impacts for NMU outside Newgale due to severance of both a PRoW and a bridleway. Positive impact for NMUs within Newgale and along the coast.</p> <p>Improved gradients and a more direct route improve access between Roch and Penycwn</p>	Slight Adverse (-1)
Physical fitness	<p>Option 7 runs along an existing bridleway (PP5 2/2) for approximately 460m along Erw Lon between Pen-y-cwm in the west and Lower Llethr in the east. The option also intersects a PRoW (PP5 37/1) in two places; approximately 135m to the east of Lower Llethr and 345m to the west of Dolgym and east of Heart Covert. As this route severs both a bridleway and a PRoW, an alternative route for pedestrians/horse riders/cyclists would need to be sought.</p> <p>However a reduction in traffic flows along the coast and in Newgale plus provision of a safe access for NMUs along the coast should improve the environment for walking and cycling.</p>	<p>Negative impacts on active modes of travel outside Newgale due to severance of both a PRoW and a bridleway. Positive impact for NMU within Newgale as the existing beach road becomes free of vehicular traffic, encouraging active modes of travel.</p> <p>Improved gradients lead to improvement in usability of road for cycling and walking.</p> <p>These negative and positive impacts outweigh each other, resulting in no change in active modes of travel</p>	Neutral (0)
Social inclusion	<p>Improvements in accessibility during storm events would have a positive impact in respect of social inclusion (+)</p> <p>Journey times for the residents of St David's Peninsula when accessing facilities in Haverfordwest would be reduced compared to the do nothing scenario (++)</p> <p>Journey times for residents of Newgale when accessing facilities in Haverfordwest would be increased compared to the do nothing scenario (-)</p> <p>There would be a negative impact on public transport users, as the No.411 and No.400 buses would have to re-route their services along the new route but still go via</p>	<p>Negative impacts would result for car users on limited incomes and cyclists living in Newgale in terms of their accessibility to services in the area.</p> <p>Beneficial impacts would result for car users in St David's Peninsula when accessing services in Haverfordwest</p>	Slight Beneficial (+1)

Newgale

Non-Technical Summary

	Newgale resulting in longer journey times to for users when accessing services in St. David's and Haverfordwest (-)	A negative impact would be made on public transport users as bus services would have to be re-routed.	
Equality, Diversity & Human Rights	Any impacts are not considered to be significant.	N/A	Neutral (0)
Transport Planning Objectives			
To improve sustainable long term highway connectivity to and within the local community, and between St David's Peninsula, Haverfordwest and the Trunk Road Network in the context of coastal erosion	Option 7 would maintain highway connectivity to shopping, healthcare and education/training facilities during storm events. Within and through Newgale traffic flows would be reduced. Significant journey time savings of 429 seconds are forecast, improving connectivity with St David's Peninsula, Haverfordwest and within the local community.		
To conserve and enhance the natural beauty, wildlife and cultural heritage of the Pembrokeshire Coast National Park avoiding, or at least minimising, adverse effects on the natural environment caused by traffic and associated infrastructure	Potential to slight to moderate adverse effect on the setting of a Scheduled Monument, 2 Grade II listed buildings and a number of non-designated assets. The number of properties experiencing increases and decreases in noise are similar, although there are more potentially significant decreases in noise than potentially significant increases in noise. Reduction in PM10 emissions at opening year but increase in CO ² emissions over the 60 year appraisal period. Significant loss of lowland marsh habitat, a high number of hedgerow and woodland areas affected and impacts from 2 river crossings. It is unlikely this loss of habitat can be compensated within the Scheme. Moderate adverse impacts on farmland, mature hedgerows/hedgebanks, woodland, individual trees, Brandy Brook & Valley.		
To improve the actual and perceived safety of the transport network in the study area for all users and residents	The option would improve highway safety by diverting through-traffic away from sections of the A487 in Newgale which are currently at risk from shingle bank debris and flooding. The option would significantly reduce conflict levels between pedestrians / cyclists and vehicular traffic within Newgale.		
To make the transport network suitable to facilitate tourism and regeneration in the St David's Peninsula including access to the coast at Newgale	Access to St. David's and Newgale would be maintained during storm events. Journey times to St David's Peninsula on the A487 would reduce by approx. 429 seconds. The loss of some commercial properties due to coastal change would have an adverse economic impact on businesses in Newgale. Permanent closure of the coast road would reduce passing trade and increase journey times for customers. However improved safety and amenity arising from a reduction in traffic is expected to have a positive impact. As part of a masterplan for Newgale, properties lost as a result of coastal change would be relocated to an area with an improved level of protection from costal change. Improved access for HGVs along the A487 would support redevelopment of Cawdor Barracks.		
To support and facilitate the safe movement of vulnerable road users to their destination	Removal of vehicular traffic from the existing beach road would improve conditions for pedestrians / cyclists within Newgale.		
Other Factors			
Public acceptability: Degree of support from public and other stakeholders to be established through consultation			
Acceptability to other stakeholders: No Stakeholder Consultation undertaken at this stage			
Technical and operational feasibility: Construction methods would include earthworks, 1 structure, 3 junctions and approx. 6 side roads and access upgrades. A number of departures from standards, especially on approaches to junctions at Penycwm. Difficult for drivers to appreciate roundabout layout when approaching uphill. A 10% gradient could lead to delay and driver frustration. Southern tie in would require a roundabout, or a larger radius curve			
Financial affordability and deliverability: Scheme Forecast Cost is £20.77m			
Land Use: Businesses in Newgale likely to experience a reduction in trade due to removal of through-traffic. Improved HGV access on the A487 would support redevelopment of Cawdor Barracks			

Newgale

Non-Technical Summary

Agriculture: Loss of Best and Most Versatile Agricultural Land, severance of field access	
Risks: Affects the flood plain, flood modelling required at future stages. Further surveys required to establish if protected species are present. Further survey may reveal further archaeological constraints. Ground investigations may identify ground conditions risks. Route constructed through area of mine-workings and contaminative industrial use which may require additional geotechnical or land treatment works.	
Total Score	-4

5.4. Option 11

Option Description: Option 11			
Appraisal Criteria	Assessment	Distribution	Significance
Welsh Impact Areas			
Economy			
Transport Economic Efficiency	<p>Cost - £28.51 m</p> <p>Option 11 will contribute towards reducing travel times between St David's Peninsula and Haverfordwest; with a Design Year journey time saving of 358 seconds compared to the Do Minimum Scenario.</p> <p>Veh/km within the study area (i.e. distances travelled by each vehicle) would remain unchanged (compared to the Design Year Do Minimum) with Option 11 in place.</p> <p>Estimated BCR – 1.5 (Medium Value for Money)</p>	All 'through traffic' to benefit from reduced journey times.	Moderate Beneficial (+2)
EALI	N/A	N/A	Neutral (0)
Environment			
Noise	Increases and decreases in noise affect around 60% of 264 receptors. There are more decreases in noise than increases in noise. All increases in noise and most decreases in noise are potentially significant, with similar numbers of each by the design year. The provision of noise mitigation is likely to be difficult for this option.	N/A	Neutral (0)
Local Air Quality	More vehicle kilometres travelled with this option in the opening year than with the Do Minimum as a result of traffic travelling along the new route outweighing any decrease through Newgale.	Fewer emissions in Newgale, increased emissions near new route option.	Moderate adverse (-2)
Greenhouse Gas Emissions	More vehicle kilometres travelled with this option over the 60 year appraisal period than with the Do Minimum as a result of traffic travelling along the new route outweighing any decrease through Newgale.	Not Assessed	Moderate adverse (-2)
Landscape and townscape	<p><u>PMBRKVS031 Skyfog Aspect Area - High Value:</u></p> <p>Large adverse impacts on: mature hedgerows/hedgebanks, trees and woodland blocks.</p> <p>Moderate adverse impacts on: residential properties at Penycwm, Rhydygele, Upper and Lower Eweston, Roch Bridge and Roch located along the existing road, including Penuel Baptist Church in addition to scattered properties and farmsteads along the route.</p> <p>Slight adverse impacts on: 3 PRoW across open fields; Fields and farmland adjacent to the road; Brandy Brook & Valley (pending formal SSSI designation); and views in and out of area.</p> <p><u>PMBRKVS112 St. Bawdy Airfield Aspect Area - Low Value:</u></p> <p>Moderate adverse impacts on: mature hedgerows/hedgebanks, trees and woodland blocks.</p> <p>Slight adverse impacts on: residential properties at Penycwm and Rhydygele located along the existing road; 1 PRoW at Penycwm indirectly affected; National Cycle Route 4; fields and farmland adjacent to the road; and views in and out of area.</p>	N/A	Slight adverse (-1)
Bio-diversity	Minimal impacts on the nearby lowland marsh habitat but significant length of linear hedgerows affected. Unless hedgerows are translocated it is highly unlikely that this loss of habitat can be compensated within this Scheme	N/A	Large Adverse (-3)

Newgale

Non-Technical Summary

Heritage	<p>Scheduled Monument Bay View Farm Defended Enclosure of high importance [PE540/DAT2816/DAT3053] and Brawdy Promontory Fort Scheduled Monuments [PE422] of High importance.</p> <p>16 non-designated heritage assets of low importance (settings impact).</p> <p>7 non-designated heritage assets of low importance (physical impact).</p>	<p>Potential to impact on setting of Scheduled Monument – Moderate to Slight Adverse.</p> <p>Potential to impact on setting of non-designated heritage assets – Slight Adverse.</p> <p>Potential direct physical impact on any surviving below ground remains – Moderate to Slight Adverse.</p> <p>Potential direct physical impact on 7 non-designated heritage assets which could lead to demolition/partial destruction – Moderate Adverse.</p>	Moderate to Slight Adverse (-2)
Water environment	<p>Potential for slight adverse impacts to water quality owing to risks associated with additional road runoff and pollution. Potential impacts on groundwater level and quality from cuttings, earthworks and piling. Works could indirectly affect surface water features and abstractions which are dependent upon groundwater inputs and may introduce new pollutant pathways to groundwater.</p> <p>Large adverse impacts in terms of flood risk without mitigation.</p>	N/A	Moderate adverse (-2)
Soils	The former Southwood Colliery, the former RAF Brawdy, sewage works, numerous former quarries/pits and operational farms are located in the study area.	N/A	Neutral (0)
Society			
Transport safety	Option 7 will improve highway safety for all road users along the A487; primarily by diverting through traffic away from Newgale	Positive Impact on all road users; particularly vulnerable road users at Newgale Seafront.	Moderate Beneficial (+2)
Personal security	N/A	N/A	Neutral (0)
Permeability	No PRow or bridleways would be severed as a result of this option. The removal of vehicular traffic along the existing beach road along with measures to retain safe access along the coast at Newgale for NMUs, may increase the use here by NMU, improving walking and cycling conditions. Therefore having a positive impact on residents and visitors in the area.	Positive impacts for all as a result of improvements to NMU routes, particularly for residents and visitors without access to a car.	Moderate Beneficial (+2)
Physical fitness	No pedestrian, cycle or horseback routes are severed as a result of this option. A reduction in traffic flows along the coast and in Newgale plus provision of a safe access for NMUs along the coast should encourage more active modes of travel along the coast and in Newgale.	Positive impacts for all as a result of an increase in active modes of travel along the beach front in Newgale.	Moderate Beneficial (+2)
Social inclusion	<p>Improvements in accessibility during storm events would have a positive impact in respect of social inclusion.</p> <p>Option 11 would result in significantly longer journey times to access services in Haverfordwest for the residents of Newgale and St David's Peninsula.</p> <p>There would be a negative impact on public transport users, as the No.411 and No.400 buses would have to re-route their services along the new route but still go to Newgale.</p>	<p>Negative impacts would result for car users on limited incomes and cyclists living in Newgale and St David's Peninsula in terms of journey times to services in Haverfordwest.</p> <p>A significant negative impact would be made on public transport users as the bus services would have to be significantly re-routed.</p>	Moderate Adverse (-2)
Equality, Diversity & Human Rights	Any impacts are not considered to be significant.	N/A	Neutral (0)

Newgale

Non-Technical Summary

Transport Planning Objectives	
To improve sustainable long term highway connectivity to and within the local community, and between St David's Peninsula, Haverfordwest and the Trunk Road Network in the context of coastal erosion	<p>Within and through Newgale traffic flows would be reduced.</p> <p>Option 11 would ensure highway connectivity to shopping, healthcare and education/training facilities during storm events. A significant reduction of 358 seconds in journey time is forecast, improving journey times to services and facilities in Haverfordwest and St. David's as well as between local communities.</p>
To conserve and enhance the natural beauty, wildlife and cultural heritage of the Pembrokeshire Coast National Park avoiding, or at least minimising, adverse effects on the natural environment caused by traffic and associated infrastructure	<p>Potential for slight to moderate adverse effects on the setting of 2 Scheduled Monuments and a number of non-designated assets and physical impacts on several non-designated heritage assets.</p> <p>The number of properties experiencing decreases in noise is greater than those experiencing an increase. All increases in noise and most decreases in noise are potentially significant, with similar numbers of each by the design year. The provision of noise mitigation is likely to be difficult.</p> <p>An increase in NO_x, PM₁₀ and CO₂ emissions.</p> <p>Impacts are largely restricted to loss of linear hedgerows.</p> <p>Slight adverse impacts on: mature hedgerows/hedgebanks, trees and woodland.</p>
To improve the actual and perceived safety of the transport network in the study area for all users and residents	The option would improve highway safety by diverting through-traffic away from sections of the A487 in Newgale which are currently at risk from shingle bank debris and flooding. The option would significantly reduce conflict levels between pedestrians / cyclists and vehicular traffic within Newgale.
To make the transport network suitable to facilitate tourism and regeneration in the St David's Peninsula including access to the coast at Newgale	<p>Access maintained to St. David's and Newgale along the A487 during storm events.</p> <p>Change in journey time of 358 seconds is forecast on the A487, improving journey times to Newgale and St. David's Peninsula.</p> <p>The loss of some commercial properties due to coastal change would have an adverse economic impact on businesses in Newgale. Permanent closure of the coast road would reduce passing trade and increase in journey times for customers. However improved safety and amenity arising from a reduction in traffic is expected to have a positive impact.</p> <p>As part of a masterplan for Newgale, properties lost as a result of coastal change would be relocated to an area with an improved level of protection from coastal change. Improved access for HGVs along the A487 would support redevelopment of Cawdor Barracks.</p>
To support and facilitate the safe movement of vulnerable road users to their destination	Removal of vehicular traffic from the existing beach road would improve conditions for pedestrians / cyclists within Newgale.
Other Factors	
Public acceptability: Degree of support from public and other stakeholders to be established through consultation	
Acceptability to other stakeholders: No Stakeholder Consultation undertaken at this stage	
Technical and operational feasibility: Construction methods would include earthworks, 1 structure, 5 junctions and numerous side roads and access upgrades. Cuttings and embankments generally limited however a new bridge approximately 12m high will require significant earthworks at each end. Horizontal alignment likely to require significant deviations from the existing roads to meet standards. A gradient of 9% on a single carriageway with no overtaking sections or climbing lanes could lead to delay and driver frustration.	
Financial affordability and deliverability: Scheme Forecast Cost is £28.51m	
Land Use: Businesses in Newgale likely to experience a reduction in trade due to removal of through-traffic. Improved HGV access on the A487 would support redevelopment of Cawdor Barracks.	
Agriculture: Loss of Best and Most Versatile Agricultural Land, severance of field access	

Newgale

Non-Technical Summary

Risks: Affects the flood plain, flood modelling required at future stages. Further surveys required to establish if protected species are present. Further survey may reveal further archaeological constraints. Ground investigations may identify ground conditions risks. Route constructed through area of prior contaminative industrial use which may require additional geotechnical or land treatment works. Potential impact on services to Cawdor Barracks Army Base which do not show up on Statutory Undertaker searches.	
Total Score	-6

6. Well-being of Future Generations (Wales) Act 2015

The Well-being of Future Generations (Wales) Act 2015 sets out 7 goals which seek to improve the social, economic, environmental and cultural well-being of Wales. These goals, and a summary of how each option contributes to them is set out below:

- **A prosperous Wales** – Only Option 3b would support a low carbon economy and would provide the greatest support to the development of a skilled and well-educated population. All options would result in the loss of commercial properties and farmland through land-take, coastal change or severance. With the exception of Option 3b all options would decrease through-traffic in Newgale which could affect trade.
- **A resilient Wales** – All options would have adverse effects on biodiversity, with Options J and 7 have the most significant effects and Option 3b having a slight adverse effect. In terms of water quality all options are assessed as having slight adverse effects. Without mitigation each option would have large adverse impacts in terms of flood risk.
- **A healthier Wales** – Noise, air quality, landscape and biodiversity affect physical and mental health. All options would have adverse effects on biodiversity and landscape. Each option has a mix of beneficial and adverse effects on a range of these environmental factors. Similarly the four options would have a range beneficial and adverse effects on the relevant social topics of social inclusion and physical fitness. All options would improve transport safety compared with the do nothing scenario. Overall each option would contribute to and detract from this goal.
- **A more equal Wales** – Each of the options would ensure access to facilities and services is maintained during flood events although due to varying journey lengths the extent of this benefit varies between options.
- **A Wales of cohesive communities** – A number of environmental and social topics of relevance to this goal were assessed. A mix of beneficial and adverse effects are assessed for each option in terms of air quality, landscape, water and land contamination, permeability, physical fitness, social inclusion and transport safety. Overall each option would contribute to and detract from developing cohesive communities.
- **A Wales of vibrant culture and thriving Welsh Language** – The impacts of each option on the historic environment were assessed. None of the options would directly impact on designated heritage assets. The results of the social inclusion assessment bear relevance, with Option 3b having the greatest beneficial effects. In terms of accessing Welsh language courses each option would have a balance of effects with longer journey times for Newgale residents and shorter journey times of residents of St David's Peninsula.; and
- **A globally responsible Wales** – The assessment of greenhouse gas emissions is pertinent to global well-being. While Option 3b would reduce CO2 emissions in 2022 and 2037 compared with the 'do nothing' scenario, Options J, 7 and particularly 11 would result in significant increases in CO2 emissions by 2037.

7. Conclusions and Recommendations

7.1.1. Transport Planning Objectives

All options considered in this assessment would meet the TPOs but to various extents. Option 3b performs better than the other options in terms of impacts on natural beauty, wildlife and cultural heritage of the National Park.

Access within Newgale would deteriorate as a result of Options J, 7 and 11, although these options would improve journey times between St David's Peninsula and Haverfordwest. Within Newgale these three options would reduce conflicts with pedestrians and cyclists.

Options J, 7 and 11 would significantly reduce journey times to St David's Peninsula, supporting tourism and regeneration, although the reduced through-traffic associated with these options could affect trade for businesses in Newgale.

Overall Options J, 7 and 11 each achieve the TPOs to a similar extent, while outperforming Option 3b.

7.1.2. Welsh Impact Areas

The options have been appraised against the Welsh Impact Areas specified in WelTAG and are ranked below:

1. Option 3b	Total Score = 0
2. Option J	Total Score = -3
3. Option 7	Total Score = -4
4. Option 11	Total Score = -6

7.1.3. Cost of Options

Using 2016 prices, the total scheme cost of each options has been estimated. These are ranked below from lowest to highest cost.

1. Option J	Total Scheme Cost = £15.90m
2. Option 7	Total Scheme Cost = £20.77m
3. Option 3b	Total Scheme Cost = £21.55m
4. Option 11	Total Scheme Cost = £28.51m

7.1.4. Overall Conclusions and Recommendations

Accounting for the Welsh Impact Areas Assessment, the analysis of TPOs and the total scheme costs the following conclusions can be drawn:


- Option 11 should be discounted due to poor performance and high cost;
- Option 3b should be subject to more detailed design consideration and assessment; and
- Options J performs better and has a lower scheme cost than Option 7 so should be taken forward for more detailed design consideration and assessment

Options 3b and J should be taken forward to further consultation to establish the views of the local and wider communities, road users and stakeholders. The results should be used in conjunction with the outcomes of this report and used to inform the decision of which option to take forward for detailed design, further assessment and development.

Appendices

Appendix A. Plan of Scheme Options



Drawing Status	FOR INFORMATION	Suitability S2	Project Title NEWGALE BEACH ROAD					
ATKINS West Glamorgan House 12 Orchard Street Swansea SA1 5AD Tel: +44 (0)1792 641172 Fax: +44 (0)1792 472019 www.atkinsglobal.com			Drawing Title PROPOSED ROUTE GENERAL ARRANGEMENT					
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Client			Scale 1:100000		Designed C.R.	Drawn S.W.	Checked C.R.	Authorised C.R.
			Original Size A1	Date 14/11/16	Date 14/11/16	Date 14/11/16	Date 14/11/16	
			Drawing Number 20160152-XX-ZZ-ATK-DR-D-2000				Revision P2	

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