External Transportation Links to Aberdeen South Harbour

Updated Strategic Business Case

On behalf of **Aberdeen City Council**

ABERDEEN
CITY COUNCIL

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Executive Summary

This strategic business case (SBC) **sets out the case for supporting transport infrastructure interventions which can help maximise the wider economic benefits of the new Aberdeen South Harbour.** It would also benefit the proposed adjacent Energy Transition Zone development. The SBC has been developed for submission to both Scottish and UK Governments to enable progression to the detailed design of the project, principally DMRB Stages 2 and 3.

Introduction

The Aberdeen City Region Deal sets out an intention to *support the expansion of Aberdeen Harbour*[1]. A construction consortium is currently taking the **new Aberdeen South Harbour (ASH)** scheme, at Nigg Bay, forward.

Both the UK Government and the Scottish Government committed to maximising the impact of the harbour expansion on the wider regional and national economy by contributing up to an indicative amount of £25 million (£12.5 million from UK Government and £12.5 million from Scottish Government) for supporting infrastructure, building upon the access arrangements being delivered as part of the ASH planning consents. Furthermore, in March 2021, the UK Government announced £27m funding towards the creation of an Aberdeen Energy Transition Zone (ETZ) to support the oil and gas sector in its transition and diversification to greener energy, helping Scotland meet its climate change targets. In June 2021, the Scottish Government announced £26m in further ETZ development funding.

Aberdeen City Council is the scheme promotor and the accountable body for the project, which is being developed within this wider context with funding provided by the Aberdeen City Region Deal project. This SBC draws heavily on completed Scottish Transport Appraisal Guidance (STAG) based work which provides the key inputs for the Strategic and Economic Cases. The Financial, Commercial and Management Cases have been established as part of this business case development.

While the STAG work considered all transport modes, recognising that bus-based options are largely driven by the market and therefore do not form part of the funding request, this SBC sets out a clear case for progressing road-based and active travel interventions.

Strategic Case

The development of ASH is being taken forward in response to capacity constraints at the existing Aberdeen Harbour and is an expansion of activities aimed at capitalising on new and emerging markets. The proposed ETZ development is part of a long-term plan to achieve net-zero emissions. The location identified for the proposed ETZ seeks to maximise development opportunities with the proximity of the harbour a key enabler in the development and success of the zone.

Together, ASH, the proposed ETZ, and the industrial areas located nearby at East Tullos and Altens, can act as a key driver in improving the region's attractiveness for international trade and investment, and can support businesses in the oil, gas, and renewable energy supply chain to internationalise in key global markets. This will help address the economic challenges facing the region and capitalise on new opportunities. **Ensuring efficient, effective and appropriate external transport infrastructure connecting the area to the strategic transport network and wider economy is key to underpinning the economic success of ASH, the proposed ETZ and the surrounding industrial area.**

Existing strategic transport network access to the ASH / proposed ETZ area for commercial vehicles is from Wellington Road (which provides a key strategic link to the trunk road network to the south) via Hareness Road (through Altens industrial estate) and Coast Road. A traffic signal controlled bridge crossing on Coast Road (over the railway line) has constrained horizontal geometry and is a constraint

[1] https://www.gov.uk/government/publications/city-deal-aberdeen-city-region

to the use of the route by larger / wider abnormal loads and the presence of signals also increases journey times to the area. Due to these constraints, abnormal loads accessing the ASH / proposed ETZ area of more than 25m in length will need to route via the residential area of Torry to the north of the sites. At present, there is also no direct link between East Tullos industrial estate and the Coast Road.

Once ASH and the proposed ETZ sites are fully operational, the additional traffic accessing the area (specifically heavy goods traffic), if constrained to the existing prescribed routes is likely to impact on the surrounding road network. Wellington Road is already congested and this is anticipated to worsen if no improvements are made (this is being considered through the *Welllington Road Multi-modal Corridor Study).* Traffic levels and congestion on Wellington Road have knock-on effects on many of the adjoining side arm roads. This may lead to inappropriate re-routing, safety issues and poor access resilience in the event of an incident on the existing road network.

Existing active travel access to the area is mainly through the on-road National Cycle Network (NCN) Route 1 which runs from Cove along the Coast Road and continuing on Greyhope Road to the north of the ASH site. As part of the ASH development, a section of off-road cycle path has been provided on the east side of the railway line running parallel with the section of Coast Road from just north of Hareness Road to the existing railway bridge. With no designated attractive and safe active travel routes between Aberdeen City Centre and the ASH and proposed ETZ sites, active travel by workers at both sites will be limited. This has the potential to increase vehicular access to the sites, increasing the potential risks noted above.

The key opportunity for this project is to support the maximisation of the wider economic benefits of both the new ASH and the proposed ETZ sites, including for the existing surrounding industrial areas at East Tullos and Altens. Acting as a catalyst to the development of the proposed ETZ will support the UK and Scottish Government's commitments to climate change while encouraging the growth of key sectors, including, decommissioning, renewables, subsea and cruise tourism through improved transport connectivity which provides business operational efficiencies and attracts appropriately skilled staff. Facilitating such opportunities also tightly aligns with national, regional and local policy.

With a clear project aim to improve transport connectivity in the area and thus maximise the impact of the harbour expansion and proposed ETZ on the wider economy, project objectives have been developed to reflect this ambition and are set out in the table below.

Project Objectives

No	Objective
1	Provide a designated Heavy Goods Vehicle (HGV) route to/from ASH which is more efficient than alternative routes to: • minimise journey times to Aberdeen Western Peripheral Route (AWPR) / Charleston junction and King George VI Bridge • help minimise inappropriate routeing, and environmental and nuisance impacts
2a	Maximise connectivity between ASH / proposed ETZ and prospective workers at the site
2b	Maximise connectivity between proposed ETZ and other energy-related businesses in the Aberdeen area (Business to Business)
3	Futureproof access to the proposed ETZ / ASH for the widest range of abnormal loads possible and minimise the impact of abnormal loads travelling from and to the proposed ETZ / ASH
4	Improve the resilience of transport connections to and from ASH /proposed ETZ
5	Maximise the intermodal opportunities between the proposed ETZ and the existing rail network

From these objectives, a range of options were developed to address the identified problems and realise the potential opportunities. A long list of road options was developed which varied in scale from minor junction improvements to new routes to connect the ASH / proposed ETZ sites to the wider strategic network. These options were appraised and sifted against the project objectives. Active travel

options (including those as part of the road schemes) and stand-alone options were also considered and subject to a similar initial sifting exercise.

Six road-based options and four active travel options were progressed for appraisal. The road options included new routes through East Tullos to connect Wellington Road with the Coast Road (requiring either a new underpass or over bridge of the railway line) as well as new connections between Souter Head and the Coast Road to the south of the area. An option to provide a new Coast Road bridge and remove the existing bridge was also progressed both as a standalone option, and in combination with other options. Four active travel options, including new route provision to connect the Coast Road with Wellington Road as well as the potential for a cycle hub at ASH were also progressed.

Key dependencies, constraints and risks were considered which included interface with the developing **ETZ masterplanning exercise**, risks with regards to the **Ness Landfill Site** (and the inherent uncertainty around project costs and deliverability should a route through the landfill be taken forward), and the provision of new railway crossings which would need to be undertaken in line with **Network Rail requirements** (including allowance for the future electrification).

During the development of the strategic case, engagement was undertaken with a range of stakeholders and the public.

Economic Case

A more in-depth appraisal against the project objectives and STAG criteria (environmental, safety, economy, integration, and social accessibility criteria) further sifted the options to be progressed down to four road options and two active travel options which were then further progressed. These remaining options were considered through a more detailed appraisal process considering their engineering and operational feasibility as well as further stakeholder and public engagement.

The more detailed economic appraisal of the road-based options used a microsimulation traffic model to provide an estimate of the quantitative impacts of the interventions. This enabled an economic assessment of the road-based interventions as well as feeding into other elements of the appraisal. Key points arising through the appraisal, and which form key elements in the rationale for further sifting the options include:

- The compounding of existing congestion issues on Wellington Road if the prescribed route between the external road network and the ASH / ETZ area were further north of Hareness Road (i.e., via Greenwells or Greenbank Road through East Tullos)
- The road gradient required from Coast Road to a new bridge across the railway (around 18%) to then link to East Tullos directly is far higher than that recommended for HGVs on a strategic route and would not be useable by abnormal loads. In addition, a new Scottish Water access road would be at a gradient of 20%.
- Underpass height clearance / alignment of any route linking the ETZ site directly with East Tullos would limit route use by some abnormal loads
- Very high levels of engineering, cost risk and uncertainty associated with any intrusion into Ness landfill site
- The interface with St Fitticks Park by any route through this area considering current and potential future uses
- The potential noise, vibration and severance impacts to Burnbanks residents of any new connection from Souter Head to the Coast Road

An exercise considering each road option's costs and monetised economic benefits highlighted the new standalone Coast Road bridge (Option A4) as the lowest cost option. During the design process, the full required extent of carriageway widening, or carriageway replacement due to the new bridge and potential Coast Road widening, will be considered in detail. Consideration during the design

process will also be given to the potential for Crawpeel Road, within Altens industrial estate, to be utilised as a prescribed route to join Wellington Road further south, reducing traffic impacts on Wellington Road between the Souter Head Road and Hareness Road junctions. An assessment of the Value for Money of the schemes, which included greenhouse gas emission benefits, accident benefits, Transport Economic Efficiency (TEE) benefits and indirect taxation benefits showed the new Coast Road bridge option (and a further option where the bridge was combined with a new link between the Coast Road and Souter Head Road) provided a benefit to cost ratio of greater than 1.

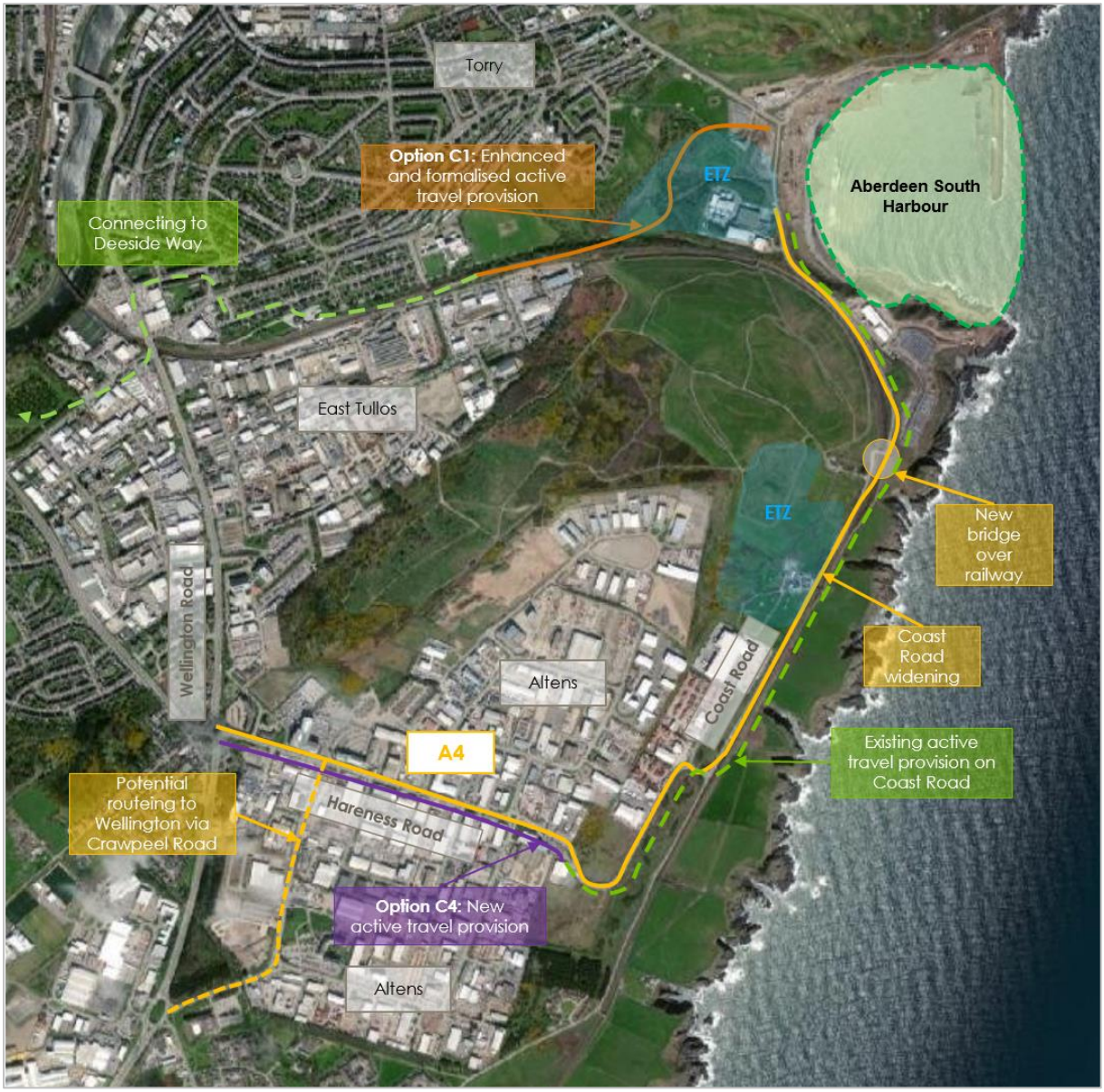
The appraisal process highlighted that Option A4 and a further option where Option A4 was combined with a new link between the Coast Road and Souter Head Road (Option A5) provide the greatest monetised economic benefits over the 60-year assessment period (benefit to cost ratio). Both options provide consistently reduced journey times to ASH / proposed ETZ area across all time periods and there would be no additional traffic on Wellington Road north of Hareness Road.

Both options also remove the current constraint caused by the signal controlled bridge over the railway on the Coast Road. Option A4 provides the lowest cost estimate and has the least risk attached to it. In the public consultation Option A4 was the only option where the overall feeling was net-agreement with the option as opposed to net-disagreement.

The technical feasibility for Option A4 from an environmental, topographical, ground and transport perspective would make construction of this option significantly less problematic when compared with other options. The appraisal suggests that if Option A4 is preferred, then in the longer term the extension to include a link through Souter Head Road within Option A5 would provide additional benefits. However, the significant additional cost and risk means that its provision is not supported in the shorter term.

At the Aberdeen City Council City Growth and Resources Committee on 3rd February 2021, it was therefore recommended, agreed and instructed that Option A4 (and the complementary active travel options, Option C1 and Option C4) be progressed within the context of the City Region Deal funding. The two progressed active travel options complement Option A4 in that they provide active travel provision from Aberdeen (South) to both the Aberdeen South Harbour area and a route through to the city centre.

Given the above, the focus of the Financial, Commercial and Management cases presented in the remaining sections of this report focus on the delivery of Option A4 (and the complementary active travel options, C1 and C4). These options are shown in the figures below. Option A4 does not preclude the future development of Option A5, or any future exploration of connections which impact on the Ness Landfill Site.



Financial Case

Initial capital cost estimates for the preferred Option A4 and Active Travel Options C1 and C4 are presented in the table below. As the proposals are at the feasibility design stage, only high-level construction cost estimates have been developed. The cost estimate has been prepared using approximate estimating rates extracted from '*SPON's Civil Engineering and Highway Works Price Book 2019*'. It should also be noted that no formal assessment of risk has been undertaken in preparing the cost estimates due to the limited information available at present. As per HM Treasury Green Book Guidance (2020), Optimism Bias is not included in the Financial Case. The cost estimates also do not include allowances for:

- Costs associated with land / property acquisition
- Statutory approvals / consents
- Adjustments to existing public utility apparatus

- Surveys and investigations
- Design and works supervision fees
- Value Added Tax (VAT) and Inflation, as the date of construction is yet to be established

Estimated Capital Costs (Excluding Land, Consents, Utilities, Surveys, Design/Supervision Fees, and Optimism Bias adjustment)

	Cost (£)
Route Corridor - Option A4	£4,665,425
Active Travel Option C1	£1,269,293
Active Travel Option C4	£595,826
TOTAL	**£6,530,545**

As noted above, the project's funding was approved as part of the Aberdeen City Region Deal by Aberdeen City Council and Aberdeenshire Council on 17th August 2016 and by the UK and Scottish Governments on 21st November 2016. Within the Aberdeen City Region Deal, £25m has been allocated for transport infrastructure to support the harbour expansion. The budget for this project will come from this funding stream. **At this stage in the project, it is important to note the costs presented in the table above are estimated at a high level and are subject to substantial uncertainty and risk. A more detailed assessment of the budgetary implications of the project will be undertaken during the next stages of the business case process and at this stage there is therefore a need to retain the £25m allocated funding for the scheme.**

The cost for DMRB Stages 2 & 3 design of Option A4, C1 and C4 has been estimated at **£1,200,000** inclusive of surveys and project management costs, based on the currently understood scope of works, initial capital cost estimates developed above, and allowances for the noted exclusions.

Key risks and uncertainties associated with the delivery and operation of Option A4 are detailed in the Risk Register (Appendix B) and can be summarised as delays to funding delivery or no funding at all, and additional costs resulting from unanticipated factors.

Commercial Case

An appraisal of transport connections for the new ASH commenced in 2017 with the aim of examining transport connectivity for the site and identifying appropriate transport infrastructure and connectivity upgrades. Opportunities were then taken forward for detailed appraisal in the context of the Aberdeen City Region Deal. The Commercial Case demonstrates that Option A4, selected through the options appraisal process and the subsequent Economic Case presented in this SBC, is commercially viable and deliverable. The Commercial Case takes account of the involvement of other parties, the procurement strategy and identifies the key challenges and risks. To ensure the project is delivered without conflict with other operations close consultation and programme coordination with key public and private stakeholders will be carried out. Key stakeholders with an interest in the infrastructure design, particularly Network Rail, Transport Scotland, Scottish Water, SEPA and utilities are being consulted in relation to their requirements.

The project will be procured by Aberdeen City Council who will be responsible for the operation and maintenance of the road and associated transport infrastructure and will be responsible for the proposed new road over-bridge. All procurement will be carried out in accordance with national procurement guidelines which set out key considerations in relation to a range of issues such as sustainability, community benefits and advertising through public contracting frameworks. The procurement strategy for the development will also align with the Aberdeen City Council, Aberdeenshire Council and the Highland Council Joint Procurement Strategy (2017 – 2022) Version 2.0. The approach to procurement will be consistent with the requirements of the main funding parties,

and hence, in line with capturing community benefits for local people and businesses as per the local and national strategic priorities where possible.

Part of active travel Option C1 falls within the area of land zoned in the Aberdeen Development Plan for the proposed ETZ. A master-planning process is being initiated for this area of land, and the active travel route will form part of the considerations, so as to integrate and complement other activities in this area. Accordingly, the immediate emphasis will be on Active Travel Option C4.

All identified commercial risks and uncertainties are considered in the Risk Register (Appendix B). The key risks and uncertainties identified are the necessary statutory approvals for the development not being gained or are delayed, programme slippage occurs resulting in additional project costs and difficulties encountered when trying to acquire third party land. Mitigations for these risks will be considered during the design development phase. A further key risk is that the project programme extends beyond the agreed funding window of the City Region Deal (2026). In such a case, funding would need to be secured beyond this date.

Management Case

All delivery aspects of the project will be managed by Aberdeen City Council, through their Roads Project Team. Wider project governance processes have been established for capital plan projects, through their Transportation Capital Plan Project Board. The focus will be on progression of the project to cost, programme and scope, dealing with key risk items.

The City Region Deal's Transport Working Group will continue to monitor the progression of the project and report on progress to the Programme Board. Regular updates will be provided to the CRD Joint Committee, with specific reports by exception. The focus will be on management of funding for the project, and the tracking of wider benefits.

The CRD Implementation Board is the key mechanism for interface between the Aberdeen City Region Deal at regional partner level, and the Scottish Government and UK Government. It is anticipated that Transport Scotland and Department for Transport will continue to provide advice to this group on transportation matters.

Aberdeen City Council, as local roads authority, is the most appropriate body to delivery this scheme. It has powers available to it to ensure the required land assembly and other consents. In some instances, the cooperation of other agencies will be required to apply their powers in the delivery of the project, where that is the case early engagement and consultation will be undertaken to ensure delivery of the project is not hindered by delays.

Aberdeen City Council will assume the ongoing liabilities for the proposed new railway crossing, and the maintenance of any new infrastructure including active travel routes.

A project programme and timeline for delivering the project is included in Appendix C. Currently, this proposes completion of DMRB Stage 3 within 2024. At this stage, up to 36 months would be considered an appropriate allocation for the remaining elements, ie Stage 4 (Final design and tender preparation), Stage 5 (Construction Procurement) and Stage 6 (Construction). Any PLI associated with land acquisition would have to be incorporated into this programme.

Aberdeen City Council will have responsibility for creation and implementation of a Benefits Realisation Strategy to ensure the delivery of the project outcomes for economic development and regeneration. This is being progressed within the context of the City Region Deal, with a focus on the Gross Value Added (GVA) impacts of the construction activity, alongside wider beneficial economic impacts arising from improved regional connection to the ASH and proposed ETZ sites.

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1 Introduction

1.1 Background

1.1.1 The Aberdeen City Region Deal sets out a clear intention to *support the expansion of Aberdeen Harbour*[2]. A construction consortium is currently taking the new Aberdeen South Harbour (ASH) scheme, at Nigg Bay, forward.

1.1.2 Both the UK Government and the Scottish Government committed to maximising the impact of the harbour expansion on the wider regional and national economy by contributing up to an indicative amount of £25 million (£12.5 million from UK Government and £12.5 million from Scottish Government) for supporting infrastructure building on the access arrangements for the Harbour agreed as part of their planning consent. Aberdeen City Council and Aberdeenshire Council also committed to contributing up to £11 million.

1.1.3 This strategic business case (SBC) sets out the case for supporting transport infrastructure interventions which can help maximise the wider economic benefits of the harbour and proposed Energy Transition Zone development. The SBC has been developed for submission to both Scottish and UK Governments to progress the project to the next stage in development, namely DMRB Stage 2 and Stage 3 design stages.

1.1.4 Aberdeen City Council is the scheme promotor and the accountable body for the project, which is being developed within the wider context and funding provided by the Aberdeen City Region Deal.

1.2 The Project

1.2.1 The project has investigated a range of multi-modal supporting transport interventions which can help maximise the wider economic benefits of the new ASH at Nigg Bay, and taking account of a wide range of factors, is seeking to progress to detailed design of the most appropriate interventions.

1.2.2 The new harbour is located approximately 0.8km to the south-east of Aberdeen City Centre and the existing Aberdeen harbour. Once complete, the new harbour will provide:

- 1,400m of quay at water depths of up to 10.5m
- a turning circle of 300 metres
- a channel width of 165m
- a laydown area of 125,000 m2
- heavy lift capacity

1.2.3 An *External Transportation Links to Aberdeen South Harbour Study* was commissioned in 2017 by Aberdeen City Council with the aim of examining transport connectivity to / from the new harbour. The study identified and appraised a range of transport connectivity improvements. The study was an Aberdeen City Region Deal project, fully funded by the Scottish and UK Governments and undertaken in line with the Scottish Transport Appraisal Guidance (STAG).

[2] https://www.gov.uk/government/publications/city-deal-aberdeen-city-region

1.2.4 The 'Initial Appraisal: Case for Change' and 'Preliminary Options Appraisal' stages of the STAG work were completed in 2018, with the subsequent 'Detailed Options Appraisal' stage completed and reported on in March 2021.

1.2.5 The initial study focus was on connectivity to ASH. However, in June 2020, the Scottish Government announced £62m in funding (focussed on north-east Scotland) to support the oil and gas sector in the transition and diversification to greener energy, helping Scotland meet its ambitious targets on climate change. The funding will go towards several projects, including a proposed Aberdeen Energy Transition Zone (ETZ). In March 2021, the UK Government announced £27m funding towards the creation of the ETZ and, in June 2021, the Scottish Government announced £26m in further ETZ development funding.

1.2.6 The Aberdeen City Council Proposed 2020 Local Development Plan ('Proposed Plan') published in March 2020, set out the proposed ETZ land use changes, identifying two key sites for the proposed ETZ:

- OP56 – St. Fitticks Park: 18.2ha site
- OP61 – Doonies Farm: 16.3ha site

1.2.7 Figure 1:1 shows the two sites for the proposed ETZ, OP56 and OP61, in relation to ASH (OP62). It is also important to note that the proposed ETZ is not just about the greenfield elements at St. Fitticks Park and Doonies Farm but covers the utilisation of facilities and industrial land already in place in the adjacent industrial zones, including within Altens and East Tullos industrial estates.

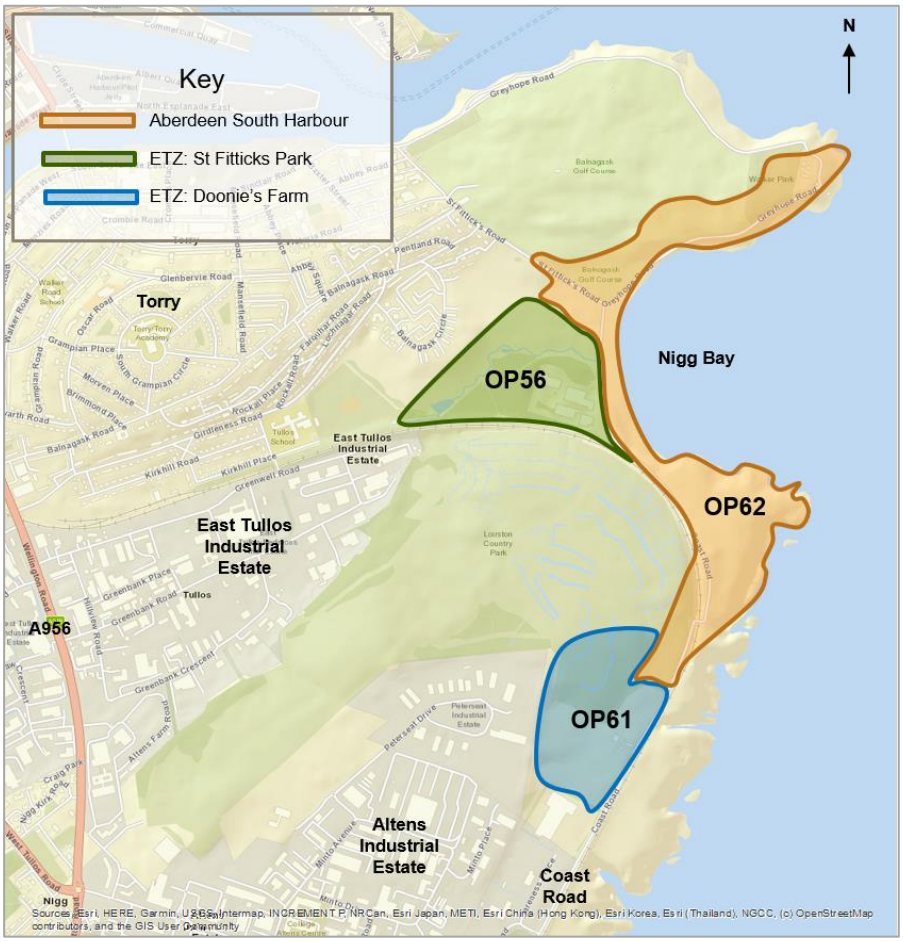


Figure 1:1: Energy Transition Zone and Aberdeen South Harbour Locations

1.2.8 Given the emergence of the proposed ETZ, with ASH and ETZ zone activities tightly connected, the STAG study focus broadened during the Detailed Options Appraisal stage. This broader focus considered interventions which maximised connectivity to both ASH and the ETZ sites, taking cognisance of the activities planned to be undertaken at both sites and the opportunities for the realisation of wider economic benefits due to both, including those within East Tullos and Altens industrial estates.

1.2.9 The STAG work considered new connectivity to the ASH and proposed ETZ sites across all transport modes and sifted a long list of options, based on an appraisal (i) against the study objectives, (ii) against environmental, safety, economic, integration, accessibility and social inclusion criteria, (iii) through consideration of the operational and engineering feasibility and public acceptability of interventions, (iv) through consideration of scheme cost to government and value for money, and (v) through an appreciation of project risk.

1.2.10 This SBC draws heavily on the completed STAG work which provides the key inputs for the Strategic and Economic Cases within this business case. The Financial, Commercial and Management Cases have been established as part of this business case development. The process for the development of this SBC, and how this aligns with the STAG process is shown in Figure 1:2.

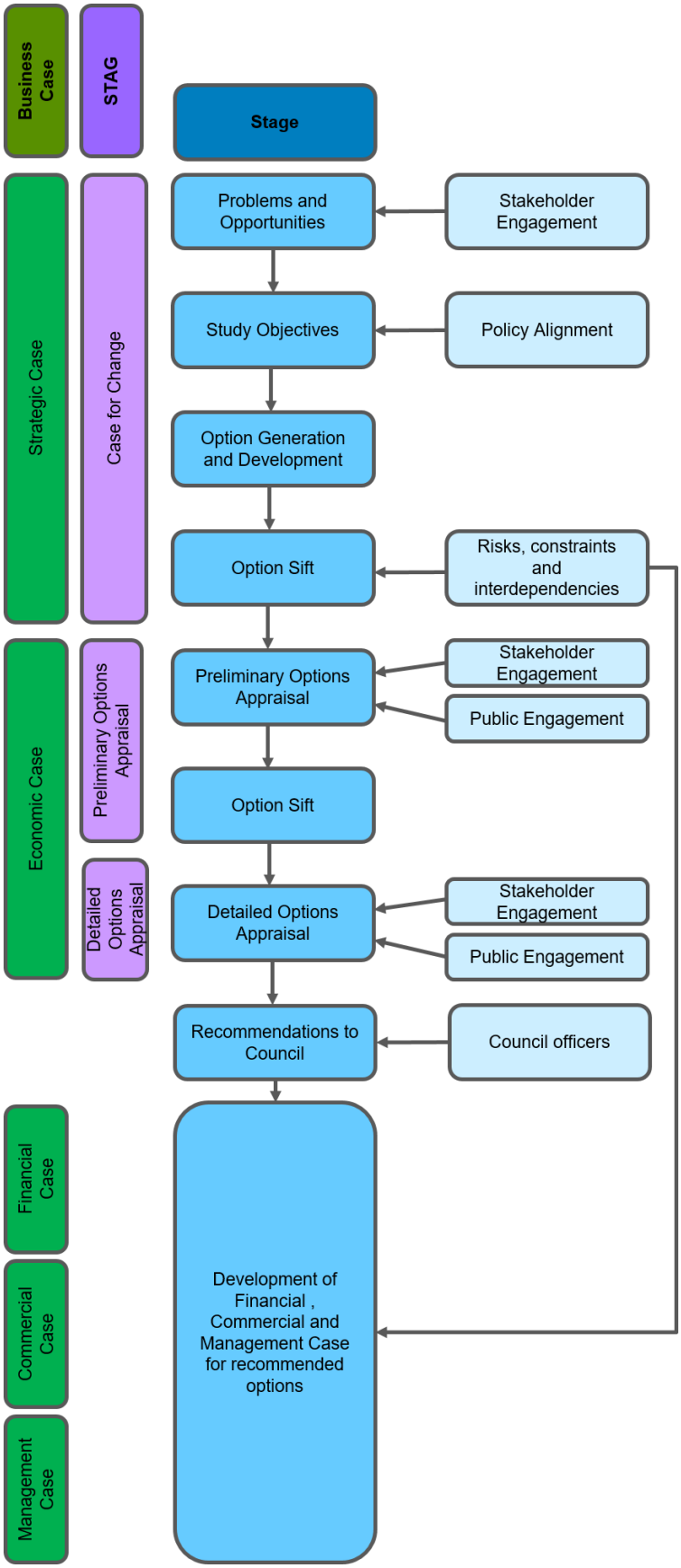


Figure 1:2: SBC development process

1.2.11 While the STAG work considered all transport modes, recognising that bus-based options are largely driven by the market and therefore do not form part of the funding request, this SBC sets out a clear case for progressing a road-based and active travel interventions.

1.3 Business Case Development

1.3.1 This report is structured into five distinct chapters reflecting the best practice five case model approach, namely:

- Chapter 2: Strategic Case
- Chapter 3: Economic Case
- Chapter 4: Financial Case
- Chapter 5: Commercial Case
- Chapter 6: Management Case

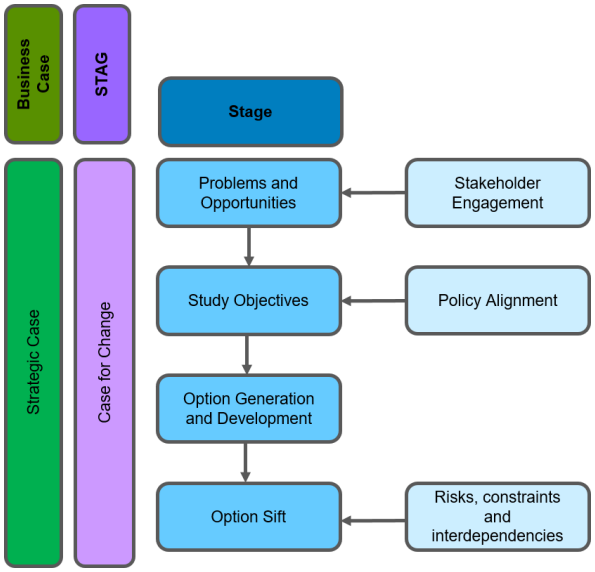
1.3.2 The Business Case has been developed taking cognisance of Transport Scotland's *Guidance on the Development of Business Cases* (March 2016) and the Department for Transport's the Transport Business Cases document (January 2013), and has been developed in line with UK Treasury's advice on evidence-based decision making as set out in the Green Book (2020).

2 Strategic Case

2.1 Introduction

2.1.1 The strategic case determines whether or not an investment is needed, either now or in the future. It demonstrates the case for change – that is, a clear rationale for making the investment and the strategic fit in terms of how investment will meet the intended aims and objectives of the project.

2.1.2 The flowchart opposite shows the main stages of the Strategic Case (or Case for Change) which are set out in sequence in this chapter.



2.2 Problems and Opportunities

2.2.1 The development of ASH is being taken forward in response to constraints at the existing Aberdeen Harbour and is an expansion of activities aimed at capitalising on new and emerging markets.

2.2.2 The proposed ETZ development is part of a long-term plan to achieve net-zero emissions and protect the climate from further damage. Changes to the oil and gas sector in recent years means the industry is having to adapt and evolve and consider the potential for new more sustainable and lower/zero carbon energy resources and the proposed ETZ site land is allocated within the Aberdeen Proposed 2020 Local Development Plan for the development of low or zero-carbon or renewable energy industries. It is expected to directly support 2,500 green jobs by 2030[3], in addition to 10,000 transition related jobs. The proposed ETZ aims to transform the area into a hub for cleaner energy, with developments likely to include offshore wind, high value manufacturing and assembly, a floating offshore wind centre of excellence, offshore hydrogen production landing facilities and green hydrogen test and demonstration facilities. The proposed ETZ will contribute towards the Scottish Government's *Just Transition* principals as set out by the Scottish Just Transition Commission in March 2021.

2.2.3 The location identified for the proposed ETZ, in close proximity of the harbour, is a key enabler in the development of the zone. Access to the harbour is key to encouraging and supporting the delivery of these low carbon energy and technologies and alternative fuel production at the site, all facilitating the transition from oil and gas to green energy production.

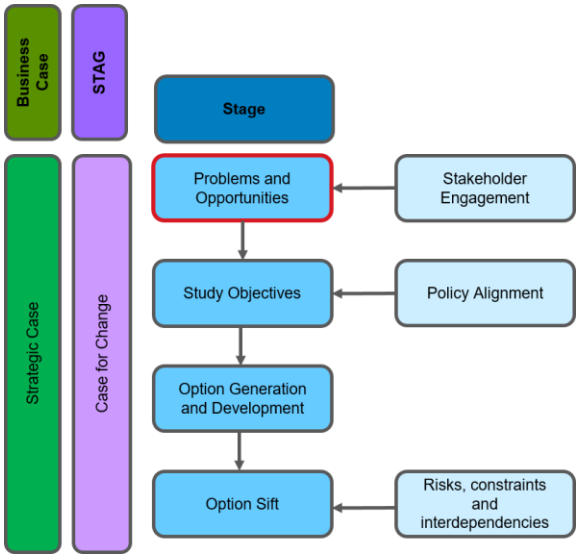
2.2.4 ASH, the proposed ETZ, and the industrial areas located nearby at East Tullos and Altens, can act as a key driver in improving the region's attractiveness for international trade and investment, and can support businesses in the oil, gas, and renewable energy supply chain to internationalise in key global markets. This will help address the economic challenges facing the region and capitalise on new opportunities. **Ensuring efficient, effective and appropriate external transport infrastructure connecting the area to the strategic transport network and wider economy is key to underpinning the economic success of ASH, and wider economic opportunities.**

[3] https://www.energylivenews.com/2021/06/21/energy-transition-zone-in-aberdeen-gets-26m-funding-boost/

Current Connectivity and Associated Problems

Vehicular Connectivity

2.2.5 At present, access to ASH and the two proposed ETZ sites for commercial vehicles is via the Coast Road. Coast Road is a single carriageway road which runs along the eastern edge of both sites. The Coast Road provides a connection to St. Fitticks Road at its northern extent enabling access (for light vehicles only and abnormal loads unable to use the Coast Road bridge, if necessary) through the Torry residential area and onwards into Aberdeen centre via Victoria Bridge, as shown in **Error! Reference source not found.**.



2.2.6 South of both the St. Fitticks and Doonies Farm proposed ETZ sites, Coast Road connects to Hareness Road (providing access through Altens Industrial Estate to Wellington Road) and to Langdykes Road (providing access though the northern part of the Cove residential area to join Wellington Road at Souter Head roundabout). There is a traffic signal controlled bridge crossing located on Coast Road between the two sites. Due to the alignment of the bridge and its approaches, the bridge operates on a shuttle basis using signals to control the flow of vehicles. The bridge has no identified weight restriction and Network Rail has stated that the bridge can accommodate 'Construction and Use Traffic' of up to 44 tonnes and may be able to accommodate heavier loads[4].

2.2.7 Hareness Road is a wide single carriageway with a speed limit of 30mph. The link runs through Altens Industrial Estate connecting to Wellington Road and West Tullos Road via Hareness Roundabout. From Hareness Road, Crawpeel Road and Blackness Road run south to Souter Head Road, providing an alternative route to Wellington Road which bypasses Hareness Road Roundabout.

2.2.8 Wellington Road is a main corridor for access to Aberdeen City Centre from the south and provides a strategic link between

[4] As noted in the Aberdeen Harbour Expansion Transport Assessment

Aberdeen City Centre and the trunk road network. The corridor is a key freight route into Aberdeen.

2.2.9 The northern section of the Wellington Road corridor, from Balnagask Road to Victoria Bridge, is designated as an Air Quality Management Area due to high concentrations of nitrogen dioxide and particulates, both of which can be attributable to emissions from road traffic.

2.2.10 The Aberdeen Western Peripheral Route (AWPR) connects to Wellington Road at the A90(T) Charleston Junction.

2.2.11 At present, there is no direct link between East Tullos industrial estate and the Coast Road.

2.2.12 As part of the InterrgIVB StratMos project, a freight route map[5] for Aberdeen was developed. At present, heavy goods vehicles accessing the new ASH are required to use Hareness Road and the Coast Road (as shown in **Error! Reference source not found.**). If accessing the area from the north, heavy goods vehicles are therefore required to avoid the route though the Torry residential area.

2.2.13 If accessing the area from the west of Aberdeen, heavy goods vehicles are required to route via Riverside Drive and Great Southern Road to cross the River Dee and join West Tullos Road, due to a width restriction (<7'-0") on the Bridge of Dee (A92).

2.2.14 Due to the constraints at the railway bridge on Coast Road, abnormal loads accessing the proposed ETZ / new harbour area of more than 25m in length need, however, to route via Torry.

2.2.15 Once ASH and the proposed ETZ sites are fully operational, the additional traffic accessing the area (and specifically heavy goods traffic), if using the prescribed Hareness Road / Coast Road route, are likely to impact on the surrounding road network. Transport modelling was undertaken to consider a 'Do Minimum' situation. The Do Minimum position reflects a future situation with committed development and transport schemes in place, and where the ASH and proposed ETZ sites are operational but no further improvements are made to existing transport infrastructure. The transport modelling work highlighted that, under this Do Minimum scenario, the road network in the area was at capacity, and that existing infrastructure was unable to accommodate the future traffic levels without significant congestion. In particular, additional traffic on Wellington Road made it very difficult for side arm traffic to find sufficient gaps in the carriageway to join Wellington Road, with significant queues building up on many side roads, particularly on Girdleness Road, Greenwell Road and Craigshaw Road (mainly in the morning period). On Girdleness Road in particular, the presence of buses and the greater gap required by these larger vehicles to join the Wellington Road carriageway causes additional delay on the side arm. Queueing is also evident on Wellington Road itself on the northbound approach to Souter Head roundabout in the morning. In the evening period, the model shows queuing on Hareness Road and South Head Road on the approaches to the Wellington Road roundabouts, caused by the volume of traffic on heading south on Wellington Road limiting the gaps in the traffic flow for traffic to join the Wellington Road corridor from these side arms. As would be expected, the network is more congested, and queueing more significant in 2041 than 2026 due to the assumed higher background traffic growth by 2041.

2.2.16 If improvements to transport infrastructure are not made, this has the potential to create risk in terms of:

- Increased congestion on Wellington Road with subsequent knock-on effects on many of the adjoining side arm roads

[5] https://www.aberdeencity.gov.uk/sites/default/files/freightmapaberdeenlarge.pdf

- Congestion on Hareness Road within the Altens Industrial estate impacting on ASH and proposed ETZ activities and business activities within the Altens estate
- Inappropriate routing and amenity impacts on Langdykes Road, impacting on Cove community residents
- Congestion and accidents at the railway bridge on Coast Road
- Impacting on the activities that can be undertaken at ASH and the ETZ sites given the constraint the existing rail bridge places on abnormal loads (loads greater than 25m in length)
- Safety and amenity concern due to a potential increase in general (non-HGV/coach) traffic travelling through the residential area of Torry
- Circuitous routes being taken between East Tullos Industrial Estate and ASH
- Circuitous routes being taken between Aberdeen City Centre and ASH for larger vehicles (HGVs and Coaches)
- A perception of poor-quality access, impacting on the take up of premises / activities within the proposed ETZ sites
- Poor access resilience in the event of an incident on the existing road network

Public Transport Connectivity

2.2.17 While improved bus connectivity to the area, as noted above, is not a focus of this Business Case, it is however worth noting that there are currently no bus routes serving the ASH harbour / proposed ETZ site area directly. The closest bus stops are located approximately 550m to the north west of the new harbour / St. Fitticks ETZ site on Balnagask Road and St. Fittick's Road.

2.2.18 As part of the Aberdeen South Harbour development, a new bus turning circle is being provided adjacent to the main harbour access, allowing for the development of a bus stop off the carriageway. This would enable public transport access directly with the new harbour and the proposed ETZ site at St. Fittick's Park.

2.2.19 Aberdeen Railway Station is the nearest station to the ASH and ETZ sites, located approximately 3km to the north-west.

2.2.20 The Aberdeen to Dundee Rail Line, as shown in **Error! Reference source not found.**, runs to the east of the Doonie's Farm ETZ site parallel to the Coast Road before heading west along the southern edge of the proposed St. Fitticks Park ETZ site. The Craiginches Rail Freight Terminal is located on Greenwell Road in East Tullos in close proximity to ASH and the proposed St. Fitticks ETZ site.

Figure 2:2: Existing Access Arrangements (Rail Network)

Active Travel Connectivity

2.2.21 The mainly on-road National Cycle Network (NCN) Route 1 routes through the area, running from Cove along the Coast Road and continuing on Greyhope Road to the north of the ASH development site. As part of the ASH development, a section of off-road cycle path has been provided on the east side of the railway line running parallel with the section of Coast Road from just north of Hareness Road to the existing railway bridge. There are several unsurfaced informal paths which route through St Fitticks Park between the south east of Torry and the Kelda Water site (located within the proposed St. Fitticks ETZ site).

2.2.22 A 2018 study by Aberdeen City Council concluded that St Fitticks Road, Victoria Road and Market Street provided the most appropriate walking routes between the new harbour and the city centre. However it was noted that high traffic volumes, speeds and gaps in provision impact the coherence, attractiveness and comfort of the route and there is potential for improvements. Parked cars, bus stops, heavily trafficked routes, cobbled surfaces and indirect existing routes were issued raised with regards to current cycle connections between the area and the city centre.

2.2.23 With no designated attractive and safe active travel routes between Aberdeen City Centre and the ASH and proposed ETZ sites, this will limit active travel by workers at both sites. This has the potential to increase vehicular access to the sites, increasing the potential risks noted above in relation to vehicular access.

Opportunities

2.2.24 Improving transport connectivity between the ASH and ETZ sites and the strategic transport network has clear benefits in:

- Supporting the UK and Scottish Government's commitments to Climate Change, as clearly stated in the UK Prime Ministers Ten Point Plan for a Green Industrial Revolution (November 2020) and in the Scottish Government's *Updated Climate Change Plan*

(December 2020). Off-shore wind and expanding hydrogen production and use are specifically noted. Ensuring connectivity to the ETZ and ASH area that facilitates the movement of abnormal loads will support the maximisation of the potential for such activities at the sites.

- Encouraging the growth of key sectors, including, decommissioning, renewables, subsea and cruise tourism through improved transport connectivity which provides business operational efficiencies and attracts appropriately skilled staff

- Aiding in the redevelopment of East Tullos and Altens Industrial Estates. A link directly connecting or strengthening the connections between East Tullos / Altens and the ASH / proposed ETZ area has the potential to support the regeneration of both estates and also ASH / proposed ETZ related activities. East Tullos industrial estate is a large area of land close to the harbour that has been specified for redevelopment as the building stock is ageing. Altens industrial estate is a large estate to the south of the harbour where there are a number of redevelopment opportunities. Improved connectivity between these industrial estates and the new harbour has the potential to support future harbour activities and the regeneration aspirations and redevelopment opportunities for the estates and unlock inward investment in the area.

- Capitalising on any outcomes emerging from the Aberdeen Roads Hierarchy, City Centre Masterplan and Sustainable Urban Mobility Plan (SUMP) refresh; and enhanced walking and cycling route provision as part of the ongoing Wellington Road Multi-modal Study (which is considering options along the corridor and side roads from A90(T) / A956 Charleston Interchange to the Queen Elizabeth Bridge)

- Opportunity to safeguard the potential for rail freight. There is a high level of policy support for the transport of freight by rail rather than road and the relative proximity of Craiginches Rail Freight Terminal to ASH and the proposed ETZ site may present an opportunity to safeguard the potential for multimodal freight transport.

2.3 Stakeholders

2.3.1 A range of stakeholder and public engagement activities were undertaken as part of the *External Transportation Links to Aberdeen South Harbour* STAG study, and these have informed this Business Case.

2.3.2 Engagement activities undertaken during the *Initial Appraisal: Case for Change* stage of the STAG study are noted in Table 2:1 below alongside the engagement method and key points raised. While further engagement was undertaken during the latter stages of the STAG study, the key points from these are noted the Economic Case chapter of this SBC as they relate to the appraisal of options. Also note that while various engagement activities were undertaken with the main bus operators in the region, these are not noted here given the focus on this business case.

Table 2:1: Summary of Engagement Activity (undertaken during *Initial Appraisal: Case for Change)*

Stakeholder	Engagement Method	Summary of Key Points
Aberdeen Harbour Board (AHB)	Formal face-to-face meeting	• The new harbour has been developed due to existing constraints at the existing harbour and is an expansion of activities aimed at capitalising on new and emerging markets • There will be no road freight movements between the existing Aberdeen Harbour and ASH as moving between the ports would require 'double handling' of freight which is inefficient and costly. Charges will be uniform across both sites to prevent 'competition' between the two locations

Stakeholder	Engagement Method	Summary of Key Points	
		• AHB see there being significant potential to expand harbour activities and industry in the hinterland area surrounding the new harbour. Key locations identified include East Tullos, farmland to the east of the railway, and the former Ness Landfill site. • The existing bridge across the railway on Coast Road is a significant constraint in terms of access to / from the harbour • The railway itself presents a significant constraint for any new connection	
Officers from Aberdeen City and Aberdeenshire Council	Several stakeholder workshops	• The facilities at ASH are designed to be flexible and adaptable in order to accommodate a range of industry sectors • There are several potential markets for the new harbour, including oil and gas, decommissioning, subsea activities, renewables, cruise tourism, and general and bulk cargo • Traditional industries such as fishing and ship building are not target areas, with the former having seen a significant decline and the latter no longer competitive in Europe. In addition, marina uses will not be a focus of activity. • Visit Aberdeenshire has produced a research report examining the opportunities associated with cruise tourism for Aberdeenshire[6]. This notes that logistical and economic concerns are decisive factors in cruise liners' decision regarding which ports to visit and therefore ensuring good transport to and from the harbour will be important to help maximise the opportunities presented by the sector. • There is potential for a wave / tidal energy test centre to be constructed at Nigg Bay and that this is something being explored over the longer time frame (10-15 year period) • AHB believe that both the existing harbour at Aberdeen and ASH will cater for small and medium size decommissioning work. However, it is not envisaged that topside decommissioning will be undertaken at either port. • Given the constraints around vessel size at the existing Aberdeen harbour and the general trend for large vessels in subsea decommissioning, it is likely that this activity would be undertaken at ASH rather than the existing harbour • Passenger levels have gone up on the West Coast as a consequence of the Road Equivalent Tariff (RET) fares scheme and there is potential that the introduction of RET on the North Sea routes will have a similar impact which could, in turn, lead to an increase in the number of sailings and/or larger vessels. Should the latter occur, it may be necessary to use ASH rather than Aberdeen Harbour due to the limitations in terms of vessel size at the existing harbour. • The development of ASH is a significant opportunity for both Altens and East Tullos with the proximity to ASH likely to add to the appeal of both areas • There is an opportunity to develop the food and drink sector as a consequence of the development of ASH	
Key Industry Sectors (potential ASH / ETZ site users)	Face-to-face and telephone consultations	Oil& Gas	• Recognised that the oil and gas industry in Aberdeen has passed its peak, it was stressed that oil and gas will remain the single largest industry in Aberdeen for some time to come • Envisaged that there will be a decrease in the day-to-day need for shipping from

[6] Cruise Ready Research and Business Opportunities Guide: Knowledge Resource Report, June 2017

Stakeholder	Engagement Method	Summary of Key Points	
			Aberdeen for the oil and gas sector in the medium to longer-term
		Decommission-ing	• Decommissioning is a growing industry and offers potential for development. • The new harbour does not include the facilities required for large-scale decommissioning
		Subsea	• The availability of deeper berths at ASH seen as an opportunity given the trend for larger subsea vessels • To attract subsea work to ASH, a road network at the harbour which does not interfere with the laydown space would be required
		Renewables	• Agreement that ASH would be well placed to support the renewable industry, particularly offshore wind energy
		General Bulk & Cargo	• General cargo market is currently predominantly based on meeting the sea-based supply-chain needs of the oil and gas industry and has therefore seen a decline in the recent period • The development of ASH and the availability of larger berths / deep water may provide an opportunity for Aberdeen to become the trans-shipment hub for such activity in future
		Cruise Tourism	• Agreement that the development of ASH would lead to significant opportunities to grow and develop the cruise industry in Aberdeen • Import to supply appropriate transport connections in order to deliver a quality customer experience and ensure both cruise liners and passengers return to the city in the future
		Rail Freight	• Currently limited potential for rail freight in the North East • Rail is more cost effective when transporting bulk commodities over long distances and, due to the relatively short distance between Aberdeen and the Central Belt, it is difficult for rail to compete with the road freight market • Other issues include: limited availability of passing loops, difficulty getting backloads, height and gauge restrictions and lack of connections to Grangemouth and Eurocentral
		General Transport Problems	• **Poor quality access to / from the new harbour** – there was a general perception that access to and from ASH was poor, with both Coast Road and Victoria Road viewed as unsuitable for large volumes of HGV and general traffic

Stakeholder	Engagement Method	Summary of Key Points	
			• **Traffic travelling through Torry** – concerns raised about harbour traffic routing via the residential area of Torry and the potential amenity and safety impacts which may result • **Poor road journey time reliability** – journey time reliability, particularly with regard to cruise tourism, was identified as a potential issue. • **Unsuitable routes** – the designated route to and from ASH for HGVs and coaches which passes through the industrial area of Altens would not create a good first impression of Aberdeen amongst cruise tourists. This was felt to be particularly the case should there also be high levels of congestion and therefore longer journey times. • **Congestion and longer journey times** – the existing bridge over the railway on Coast Road is a significant constraint in the network and the additional traffic may lead to congestion at this location and a resultant increase in journey times for trips via Coast Road. • **Poor access for abnormal loads** – the railway bridge on Coast Road identified as an issue with respect to the transportation of abnormal loads. This was felt to be a particular issue for the renewables sector.
Aberdeen & Grampian Chamber of Commerce		• Since the downturn in oil, the new ASH is now about maximising the economic benefit in the future • To help make it a success, the new harbour will need good road connections to the city centre and AWPR, and good rail connections from the harbour	
Network Rail	Telephone Discussion	• Focused on the organisation's requirements with regard to the delivery of options involving new overbridges / under-bridges across the railway • Where options involve a new overbridge across the railway, the bridge would need to be constructed to facilitate future electrification of the railway • Disruptive Possession would likely be required to enable the construction of a new bridge • Should a new bridge be constructed, Aberdeen City Council would need to take ownership of the bridge • In comparison to constructing a new bridge, delivering a new underbridge is generally more challenging	

2.3.3 It is clear from the discussions with stakeholders that in order to ensure the success of ASH (and the proposed ETZ site) and to enable the growth of existing industries and attract new industries to utilise the harbour area, there must be appropriate transport links which: provide quality access; reduce business operational impacts; enable the movement of abnormal loads; are resilient; and minimise the impact of commercial activities on local communities.

2.3.4 These key points have been taken into consideration when developing the objectives and subsequent range of potential interventions for the project.

2.4 Policy Alignment

2.4.1 A review of the relevant transport, planning and economic policies at local, regional and national level is presented in Table 2:2 to highlight the project's policy alignment and ensure alignment when developing the study objectives.

2.4.2 The review clearly demonstrates the alignment of the project with local, regional and national policy across a range of policy areas.

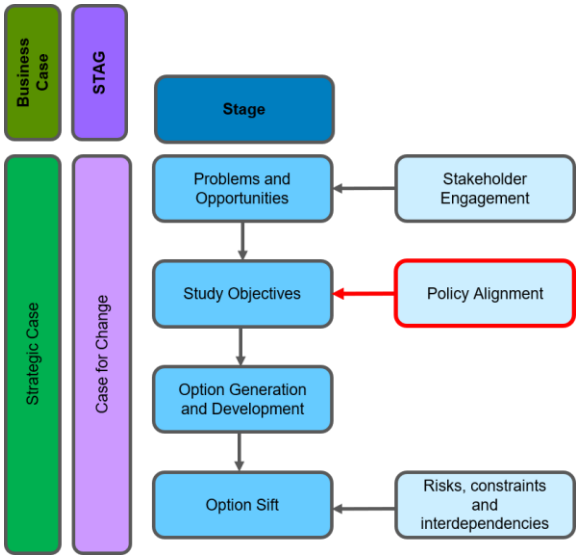


Table 2:2: Local, regional and national policy alignment

Policy	Key Point
National	
Scotland's Economic Strategy (SES) (2015)	Recognises the importance of the North Sea oil and gas industry to the Scottish economy and the need to strengthen links with the global economy and increase trade and investment. In terms of emerging industries, both decommissioning and renewables are identified as key opportunities. The development of ASH and the proposed ETZ further develop the potential to capitalise on these emerging markets and help strengthen trade and investment within the North-East.
National Planning Framework 3 (2014)	Specifically supports the development of ASH and, as with the SES, identifies a number of potential growth areas for the North-East, including the oil and gas reserves west of Shetland, decommissioning and renewables, the potential development of all of which will have a significant bearing on future activity in and around ASH
National Transport Strategy 2 (2020)	Includes a number of key priorities and outcomes, including a shift to sustainable modes of transport; supporting new technologies; and reducing emissions. The document also identifies a range of objectives to improve the efficiency of freight transport, including improving strategic hubs such as ports, enhancing road, rail and port infrastructure; promoting freight modal shift to rail and water; and improving the efficiency and sustainability of road transport.
Strategic Transport Projects Review 2 (2021)	Identifies the need to support active travel and sustainable transport modes; the decarbonisation of transport; and encourage the shift to rail freight. The document also includes objectives which aim to reduce carbon emissions; improving journey times; and shift to more sustainable freight modes. Initial options being considered include the development of 'Active Freeways' to enable more active travel; deliver mobility hubs; and encourage rail freight, with analysis being conducted on potential freight terminus in Aberdeen.
Update to the Climate Change Plan 2018-32 (2020)	Includes a number of key policies and proposals, including greater reliance on sustainable energy sources; decarbonised HGVs and rail services; and investment in hydrogen and carbon capture and storage. In terms of freight movement, there is focus on the development of green technologies and consolidation centres which can reduce carbon emissions. In the North East, the Energy Transition Fund will see the shift away from oil and gas, to a low carbon industry.
National Renewable Infrastructure Plan (2010)	Identifies the need for sites specialising in the construction and installation of wind energy equipment; the manufacture of wind energy equipment; and the maintenance and repair of wind energy equipment and identifies Aberdeen Harbour (without the extension into the Bay of Nigg) as holding the potential for both distributed manufacturing and operation and maintenance. With the development of ASH, the

Policy	Key Point
	potential for the development of the offshore wind industry at Aberdeen is likely to be greater due to the ability to accommodate larger vessels and the availability of more laydown space at the Bay of Nigg.
Regional	
Aberdeen City and Aberdeenshire Regional Economic Strategy (2015)	Identifies a number of potential growth industries in the oil and gas sector, including small pool development, well construction, asset integrity and decommissioning, and notes the potential of the renewable industry, including and hydrogen, energy from waste. The document supports the expansion of ASH and identifies the regeneration of East Tullos and ensuring the availability of land and infrastructure to support both decommissioning and carbon capture and storage as key actions
Regional Transport Strategy (RTS:2040) (2021)	Includes key priorities which focus on improving journey times; reducing carbon emission to support net-zero aim; and induce a modal shift away from the private car. From the actions, it is a priority to upgrade active travel infrastructure, with 'Active Travel Freeways' being considered in the Torry and South Harbour area. Road improvements, and the development of connections from Craiginches Rail Freight Terminal to ASH are both included within the actions. It is noted that there will be continued investment into the ports and harbours of the North East.
Nestrans Freight Action Plan 2 (2014)	Identifies the expansion of Aberdeen Harbour into Nigg Bay as a significant opportunity noting the following benefit for freight: the proximity to the existing Altens/East Tullos industrial estates and an expanded harbour into Nigg Bay; the avoidance of city centre traffic level increase and no loss in potential benefits provided by the AWPR; and the opportunity for integration with the nearby rail freight terminal at Craiginches. States support for ASH in the promotion of short sea, and international shipping opportunities. Seeks to identify and promote wider improvements for regional freight and logistics services and facilities which will support the north-east economy. A specific early focus will be with respect to multimodal freight transfer, and freight hub development. Notes the intention to further explore the potential to move freight by rail and seeks to harness opportunities that might emerge from new freight flows.
Nestrans Active Travel Action Plan (2014)	States objectives to: increase active travel mode share and work towards achieving 10% of all trips in Scotland by bike in line with the National vision for cycling by 2020; and Improve safety for pedestrians and cyclists by reducing the total number of pedestrian and cycle casualties, the percentage of total accidents and rate per 1000 population.
Local	
Aberdeen Local Development Plan (2020 Proposed Plan)	Includes the outlining of the Low Emissions Zone; the need for a modal shift away from cars; and further investment into active travel and rail stations. It also includes a focus on the ASH and the potential industrial services and low-carbon energy development and production which can evolve in this area. The transition to low-carbon / renewable energy it also noted as a priority to aid in the reduction of carbon emissions.
Aberdeen Local Transport Strategy (2016)	Notes the need to: • Ensure that Aberdeen Harbour remains a world class port and the main port of call in Scotland for the Northern Isles ferry services; (going on to make specific reference to ensuring appropriate access to Nigg Bay given its status as a National Development • Ensure the efficient movement of freight to, from and within the North East of Scotland • Supporting improvements to the trunk road network for the benefit of passengers and freight travelling to, from and within Aberdeen • Realise the benefits of the Aberdeen Western Peripheral Route noting a specific objective to improve key junctions on Wellington Road to allow easier manoeuvring of HGVs • Improve air quality across the City

Policy	Key Point
Aberdeen City Centre Masterplan (CCMP) (2015)	The Aberdeen CCMP aims to remove a substantial volume of general traffic from the city centre reducing private car use and encouraging more sustainable options such as walking, cycling and/or public transport. The implementation of the CCMP will have important implications for the potential routing options available to ASH and ETZ traffic and it has been important to take cognisance of this in both the development and appraisal of options for this project.
Aberdeen Routes Hierarchy Study (2019)	The new roads hierarchy forms the basis of identifying future network changes following the completion of the AWPR and provides a framework for the future development of transport in Aberdeen. As with the Aberdeen CCMP, the implementation of the roads hierarchy will have important implications for the potential routing options available to ASH and proposed ETZ traffic, with all traffic without a destination in Aberdeen City, including peripheral traffic (e.g. traffic destined for the Bridge of Don) directed to the AWPR rather than routing through the city.
Aberdeen Active Travel Action Plan (2017)	Notes active travel infrastructure improvements including, of relevance,: • **A956 / A90 South (Aberdeen to Stonehaven)** – there is currently very limited cycle provision south of Aberdeen along the A956 and A90, despite these being key strategic transport routes lining Aberdeen City and Aberdeenshire. A southbound cycle route, linking Aberdeen with Portlethen and Stonehaven is a key priority area over the life of the Action Plan • **Access to Cove / Altens** - as a significant employment area in the city, there is a significant number of movements to and from Cove / Altens on a daily basis from all around the region, however opportunities for active travel, particularly cycling to and within these sites is limited. Given the potential for achieving modal shift and the impacts this could have on both areas, improving access to these areas will be a priority of the Action Plan. The AATAP identifies Wellington Road and NCN1 as priority areas for the next five-year period. Since the publication of the AATAP a number of improvements have been made to NCN1 as part of the ASH development and both the Craigshaw Drive and Marywell studies have been taken forward. In addition, an appraisal of transport connections on Wellington Road has been taken forward.
Aberdeen Strategic Infrastructure Plan (2014)	Identifies key goals such as better transport and the general regeneration of some areas in Aberdeen. It is noted that reducing journey times, congestion, and improving cross-city connections are the main targets in terms of transport. Regeneration is to be achieved with a combination of new, mixed-use housing developments and improvement in active travel routes.
Aberdeen Air Quality Action Plan (2011)	Outlines a series of measures to improve air quality. Those of particular relevance to this project include: • Modal shift from road to rail • HGV priority measures • Development of a commercial vehicle delivery strategy (including the consideration of routing delivery restrictions and timing) • Consider shipping actions available at Aberdeen Harbour • Development of a freight consolidation centre Wellington Road is designated as an AQMA due to the high concentration of nitrogen dioxide and particulates attributable to emissions from road traffic. As such emissions generated primarily by road traffic are continually monitored at this location and where they exceed relevant criteria an assessment will be completed to determine whether further detailed assessment is required. The designation of Wellington Road as an AQMA will therefore be particularly relevant to any proposals which may result in additional traffic within the area.
Bay Of Nigg Development Framework	The Bay of Nigg Development Framework outlines a phased programme of transport investment designed to release potential development at both Altens and Tullos over the 20-year period following the opening of the harbour. The document identifies a range of potential transport infrastructure improvements, including enhancements to existing connections and several options involving the delivery of new road links both to the south and north of the study area. The options developed as part of the Bay of

Policy	Key Point
	Nigg Development Framework have formed an important input into the option generation process for this project.
Economic Impact of Aberdeen Harbour Nigg Bay Development (2013)	Notes that to maximise the efficiency of ASH it will be necessary to upgrade the roads infrastructure to enable enhanced access to the neighbouring industrial areas at Altens and East Tullos and therefore help make these areas more attractive to potential investors.

2.5 Vision And Objectives

2.5.1 The project aims to improve transport connectivity in the area and thus maximise the impact of the harbour expansion and Energy Transition Zone on the wider economy.

2.5.2 Several project transport objectives were defined based on the project aim, the problems and opportunities identified, and through stakeholder discussion. These transport objectives are presented in Table 2:3.

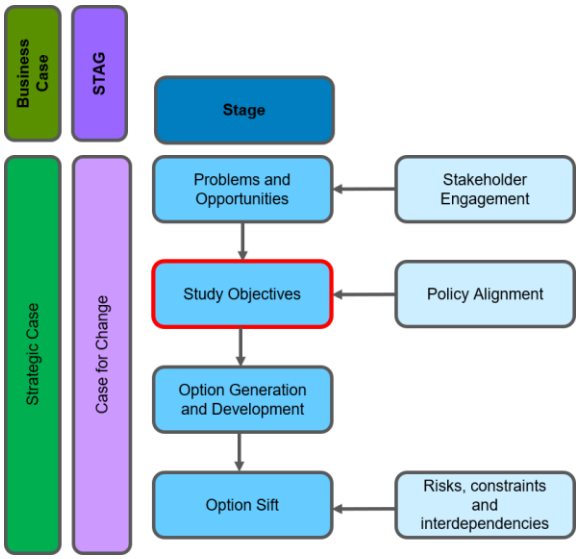
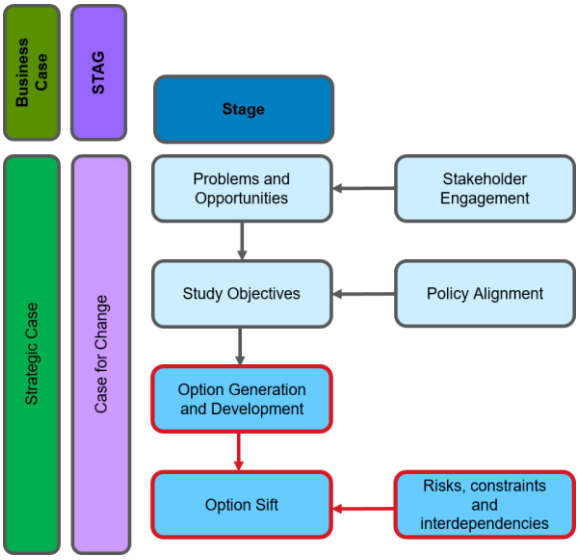


Table 2:3: Project Objectives

No	Objective
1	Provide a designated Heavy Goods Vehicle (HGV) route to/from ASH which is more efficient than alternative routes to: • minimise journey times to Aberdeen Western Peripheral Route (AWPR) / Charleston junction and King George VI Bridge • help minimise inappropriate routeing, and environmental and nuisance impacts
2a	Maximise connectivity between ASH / proposed ETZ and prospective workers at the site
2b	Maximise connectivity between proposed ETZ and other energy-related businesses in the Aberdeen area (Business to Business)
3	Futureproof access to the proposed ETZ / ASH for the widest range of abnormal loads possible and minimise the impact of abnormal loads travelling from and to the proposed ETZ / ASH
4	Improve the resilience of transport connections to and from ASH /proposed ETZ
5	Maximise the intermodal opportunities between the proposed ETZ and the existing rail network

2.6 The Proposed Investment

2.6.1 A range of potential options were identified to meet the project objectives, alleviate the identified problems and realise the potential opportunities. An initial long list was developed and following a sifting and development process a shortened list of options was taken forward for assessment.



2.6.2 The long list of road-based options considered is presented in Table 2:4, alongside the key rationale for sifting out a number of these options at this initial stage. Options considered varied in scale from minor junction improvements to entirely new routes to connect the ASH / proposed ETZ sites to the wider strategic network. Any options providing a new route are assumed to incorporate active travel provision as part of the route design, to link into the wider existing active travel network. Active travel specific options are presented in Table 2:5.

Table 2:4: Initial Long List of Interventions (Road)

Intervention Type	Option	Select or Reject	Key Reason for Select or Reject
Minor Improvements / Junction alterations	Minor Improvements to facilitate ease of movement at the Coast Road Bridge (moving stops lines / vehicle detector technology)	×	Option would provide only minimal benefits but could be combined with other options
	Roundabout improvements on Wellington Road (Harness / Souter Head)	×	Option is likely to provide minimal benefits in terms of access to ASH if taken forward in isolation but could be combined with other options
	Increased capacity on Wellington Road (between Souter Head and Hareness roundabouts)	×	
New Roue Designation	New Designated Route: Wellington Road to Coast Road via Langdykes Road	×	Would involve directing traffic through a residential area (Cove or Torry)
	New Designated Route: Wellington Road to ASH / proposed ETZ area via roads to the north of ASH / ETZ area	×	
New Connections	**New bridge** over the Coast Road (removing the need for signals and awkward geometry limiting use by abnormal loads)	✓	Removes existing bridge constraint and would provide abnormal load access (currently required to access the ASH / proposed ETZ area via Victoria Road through the Torry residential area)
	Souter Head Road (east) to Coast Road including widening Coast Road (Hareness to Souter Head) and parking restrictions (Souter Head Road). Would include appropriate active travel provision to link to existing provision on Coast Road.	✓	Provide new access from the south reducing traffic impact on Wellington Road north of Souter Head Roundabout and reduces impact on Hareness Road.

Intervention Type	Option	Select or Reject	Key Reason for Select or Reject
			Could be combined with a new bridge over the Coast Road (as above) to enable improved access for abnormal loads
	Greenwell Road to Coast Road (via Ness landfill) **connecting to Coast Road south of existing railway bridge**, including signalising Greenwell Road / Wellington Road junction and parking restrictions (Greenwell Road). Would include appropriate active travel provision to link to existing provision on Coast Road.	✓	Provides more direct link between East Tullos industrial estate and ASH / proposed ETZ area
	Greenbank Road to Coast Road (via Ness landfill) **connecting to Coast Road south of existing railway bridge**, including improvement to signalised Greenbank Road / Wellington Road junction and parking restrictions (Greenbank Road). Would include appropriate active travel provision to link to existing provision on Coast Road.	✓	
	Greenwell Road to Coast Road (via **underbridge** of railway line to link East Tullos to St. Fitticks Park) connecting to Coast Road close to ASH access junction, including signalising Greenwell Road / Wellington Road junction and parking restrictions (Greenwell Road). Would include appropriate active travel provision to link to existing provision on Coast Road.	✓	Provides direct access between ASH / ETZ and East Tullos Industrial Estate and removes existing Coast Road constraint (subject to suitable underbridge design to cater or abnormal loads)
	Greenbank Road to Coast Road (via **underbridge** of railway line to link East Tullos to St. Fitticks Park) connecting to Coast Road close to ASH access junction, including improvement to signalised Greenbank Road / Wellington Road junction and parking restrictions (Greenbank Road). Would include appropriate active travel provision to link to existing provision on Coast Road.	✓	
	Greenwell Road to Coast Road (via **new bridge** to link East Tullos to Coast Road through Ness landfill) connecting to Coast Road north of existing Coast Road bridge but south of ASH access / Scottish Water access, including signalising Greenwell Road / Wellington Road junction and parking restrictions (Greenwell Road). Would include appropriate active travel provision to link to existing provision on Coast Road.	✓	Provides direct access between ASH / proposed ETZ and East Tullos Industrial Estate and removes existing Coast Road constraint (subject to suitable new railway design to cater or abnormal loads and ensure sufficient line clearance / route gradient)
	Greenbank Road to Coast Road (via **new bridge** to link East Tullos to Coast Road trough Ness landfill) connecting to Coast Road north of existing Coast Road bridge but south of ASH access / Waste Water Treatment Works access, including improvement to signalised Greenbank Road / Wellington Road junction and parking restrictions (Greenbank Road). Would include	✓	

Intervention Type	Option	Select or Reject	Key Reason for Select or Reject
	appropriate active travel provision to link to existing provision on Coast Road.		
	Wellington Road to Coast Road (via **Tullos Hill**) with either an **underbridge or bridge** (as in options above) to connect to Coast Road either north of Waste Water Treatment Works (if underbridge) or south (if bridge)	×	Likely to provide limited benefit over existing Coast Road designated route
	Wellington Road to Coast Road on alignment south of Souter Head Road	✓	Provide new access from the south reducing traffic impact on Wellington Road north of Souter Head Roundabout and reduces impact on Hareness Road. Could be combined with a new bridge over the Coast Road (as above) to enable improved access for abnormal loads
	Wellington Road to Coast Road via **Cove** (route alignment south of Langdykes Road)	×	Impact on residential properties
	Wellington Road to Coast Road via **Cove** (route alignment of Core Path 83)	×	Impact on residential properties close to the Core Path

Table 2:5: Initial Long List of Interventions (Active Travel)

Intervention Type	Option	Select or Reject	Key Reason for Select or Reject
Enhancements / Formalisation	Formalise and enhance provision through St. Fitticks Park - linking the Coast Road with Torry / Wellington Road and onwards to the Deeside Way to enable access to ASH / proposed ETZ ETZ sites from the north and west	✓	Would enable active travel access for commuters from the Aberdeen urban area to the ASH and proposed ETZ ETZ sites
	Dedicated cycle route through Tullos Hill to the A956 and onward connections to the Deeside Way	✓	Provides a traffic free route to connect the ASH and ETZ sites to Wellington Road
New Provision	Dedicated cycle route provision on Hareness Road (linking with existing provision on the Coast Road and planned improvements on Wellington Road) to enable access to ASH / ETZ sites from the south	✓	Would enable active travel access for commuters from the to the ASH and proposed ETZ sites from south of the sites (i.e. from Cove etc.)
Facility	Cycle hub at ASH providing dedicated cycle information and a hire scheme at the harbour aimed at cruise tourists.	✓	Would provide sustainable transport option for cruise tourists wishing to explore the area

2.6.3 It is recognised that several of the road options would provide a link between Wellington Road (via East Tullos industrial estate) and the proposed ETZ and ASH sites, with the alignment of these road options passing through the proposed ETZ site at St. Fitticks Park. This clearly has

implications on the potential layout and useable land within the proposed ETZ. This is also the case for the active travel option which provides a more formalised and enhanced route through the park.

2.6.4 ETZ Ltd is now leading on the development of the proposed ETZ, previously being developed by Opportunity North East with work having been undertaken on an Outline Business Case (OBC) for the proposed ETZ, including the development of an outline masterplan. While this business case and the work being undertaken to develop the proposed ETZ are being undertaken separately, this project is fully cognisant of the work being undertaken to develop the ETZ OBC. Clearly the proposed ETZ site at St. Fitticks has the potential to benefit from improved connections to East Tullos but the scale of the benefit will be dependent on the activities being undertaken at the proposed ETZ site – at this stage these are not fully established. These activities will, in turn, dictate the availability of land for any new road within the proposed ETZ site. There is an option to provide a link to East Tullos via a route through St Fitticks Park. However, this route would materially impact on the range and extent of development options at this proposed ETZ site, were this to be approved.

2.6.5 It is also worth noting that the Wellington Road Multimodal Corridor Part 1 Appraisal (undertaken on behalf of Aberdeen City Council) identified options to be taken forward for more detailed appraisal at the Part 2 Appraisal stage, which is ongoing. These include options to enhance HGV, public transport and active travel access on Wellington Road; to provide crossing facilities at Souter Head and Hareness Road Roundabouts / revised junction layouts; to improve capacity between Souter Head and Hareness Road Roundabouts; and to review right turn traffic signals on Wellington Road. Wellington Road is an important strategic route in and will form a key access to ASH / proposed ETZ area for vehicles travelling both north and south from the area. It has therefore been important to take cognisance of the options emerging from the Wellington Road Multi Modal Corridor Appraisal study and areas of overlap / mutual support have been considered.

2.6.6 Given the narrative above in relation to the various options, Figure 2:3 provides an overview of all the types of road options considered and these are described in Table 2:6 below. Road options which provided only minor improvements / junction alterations or new route designations *only* were sifted out of any further development at this stage (for the reasons as noted in Table 2:4 above).

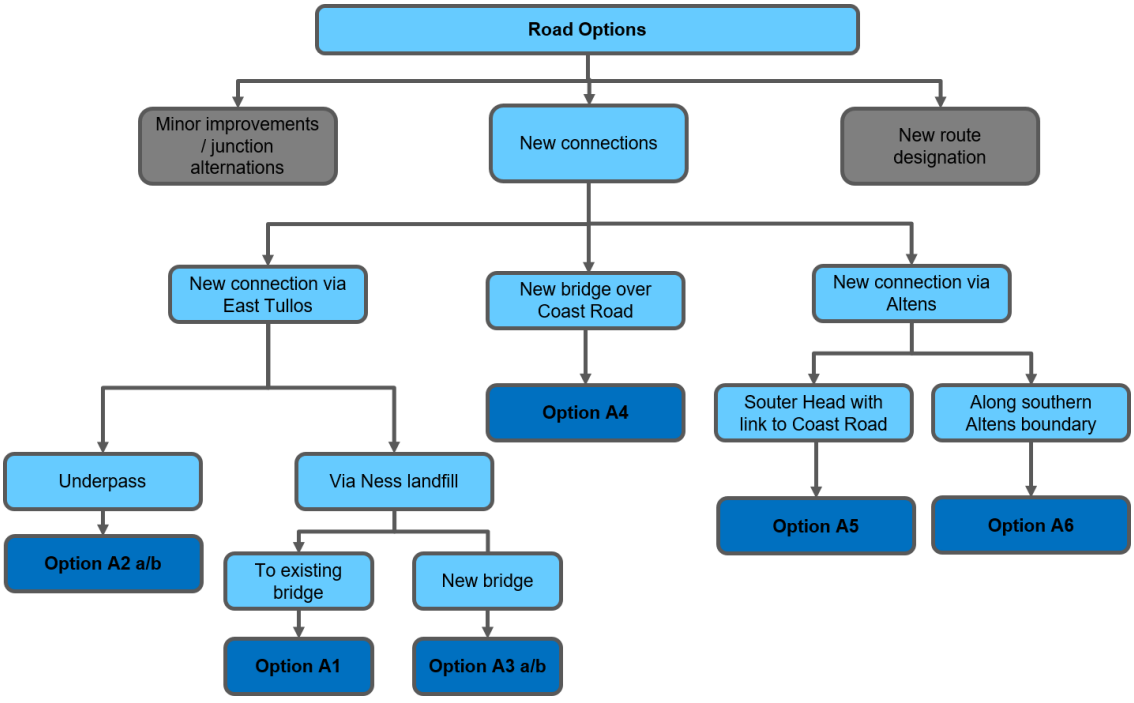


Figure 2:3: Road Option Sifting

2.7 Sifted List of Interventions for Appraisal

2.7.1 The following final set of six road- based interventions (as shown in Table 2:6 and presented diagrammatically in Figure 2:4), have been considered further as part of this business case. All these interventions incorporate appropriate active travel provision within any new road infrastructure, linking to existing active travel provision. Similarly, Table 2:7 and Figure 2:5 provide corresponding information for the specific active travel interventions.

Table 2:6: Road Interventions for Appraisal

Option No.	Option Description
A1	New road connection from Greenwell / Greenbank Road across the former Ness Landfill site to the existing railway bridge on Coast Road. Route would become designated route to the ASH / proposed ETZ area for HGV traffic.
A2	New road connection from Greenwell Road (2a) / Greenbank Road (2b) via St Fitticks Community Park to Coast Road with a new underbridge under the railway line. Route would become designated route to the ASH / proposed ETZ area for HGV traffic.
A3	New road connection from Greenwell Road (3a) / Greenbank Road (3b) via the former Ness Landfill site and a new bridge over the railway. Route would become designated route to the ASH / proposed ETZ area for HGV traffic. A further variant of this option to be explored which considers the link through the landfill to the existing bridge (removing the need for a new railway bridge)
A4	New bridge over the railway on Coast Road and Coast Road capacity improvements. Designated route to ASH / proposed ETZ area would remain via Hareness Road
A5	New road connection between Coast Road and Souter Head Road and a new bridge over the railway on Coast Road (as per Option A4). Route would become designated route to the ASH / proposed ETZ area for HGV traffic.
A6	New connection to the south of Souter Head Road, a new bridge over the railway on Coast Road (as per Option A4) and capacity improvements on Coast Road. Route would become designated route to the ASH / proposed ETZ area for HGV traffic.

Figure 2:4: Options for Appraisal

Table 2:7: Active Travel Interventions for Appraisal

Option No.	Option Description
C1	Formalise and enhance provision through St. Fitticks Park - linking the Coast Road with Torry / Wellington Road and onwards to the Deeside Way to enable access to ASH / ETZ sites from the north and west
C2	Cycle hub at ASH providing dedicated cycle information and a hire scheme at the harbour aimed at cruise tourists.
C3	Dedicated cycle route through Tullos Hill to the A956 and onward connections to the Deeside Way
C4	Dedicated cycle route provision on Hareness Road (linking with existing provision on the Coast Road and planned improvements on Wellington Road) to enable access to ASH / ETZ sites from the south

Figure 2:5: Options for Appraisal (Active Travel)

2.7.2 All the options noted above, with the exception of Option C2, would provide a range of benefits against the project objectives as noted in Table 2:8.

Table 2:8: Key Benefits of Intervention against Project Objectives

Option	Objectives						Key Points
	1	2a	2b	3	4	5	
	Provide a designated HGV route to/from ASH / ETZ area which is more efficient than alternative routes	Maximise connectivity by all modes between ASH / ETZ and prospective workers at the sites	Maximise connectivity between the ETZ and other energy-related businesses in the Aberdeen area	Futureproof access to ASH / ETZ for the widest range of abnormal loads and minimise impact of abnormal loads	Improve the resilience of transport connections to and from ASH / ETZ	Maximise the intermodal opportunities between ASH / ETZ and the existing rail network	
A1	-	✓	✓	-	✓✓	-	• Unlikely to provide quicker route to ASH / proposed ETZ harbour area from the strategic road network given circuitous route around Ness landfill • Provides direct link between ASH / ETZ area and East Tullos Industrial Estate maximising supporting activities in the industrial estate and realising the wider economic benefits of ASH and the proposed ETZ • Does not future proof access to the ASH / proposed ETZ area for abnormal loads due to the retention of the existing Coast Road bridge • Increases access resilience to ASH / proposed ETZ area through provision of additional route
A2	✓✓✓	✓	✓	✓	✓✓	✓	• New route likely to be quicker and more efficient than existing route to ASH / proposed ETZ harbour area from the strategic road network (south)– benefits for HGV and general (commuter) traffic access • Provides direct link between ASH / proposed ETZ area and East Tullos Industrial Estate maximising supporting activities in the industrial estate and realising the wider economic benefits of ASH and the proposed ETZ • Would future proof access to the ASH / proposed ETZ area for abnormal loads, subject to suitable engineering route design at the underbridge • Increases access resilience to ASH / proposed ETZ area through provision of additional route • Potential, at later date, to provide access from the link to the rail network at Craiginshes, increasing the potential for inter-modal opportunities
A3	✓✓✓	✓	✓	✓	✓✓	✓	• New route likely to be quicker and more efficient than existing / alternative routes – benefits for HGV and general (commuter) traffic access

Option	Objectives						Key Points
	1	2a	2b	3	4	5	
	Provide a designated HGV route to/from ASH / ETZ area which is more efficient than alternative routes	Maximise connectivity by all modes between ASH / ETZ and prospective workers at the sites	Maximise connectivity between the ETZ and other energy-related businesses in the Aberdeen area	Futureproof access to ASH / ETZ for the widest range of abnormal loads and minimise impact of abnormal loads	Improve the resilience of transport connections to and from ASH / ETZ	Maximise the intermodal opportunities between ASH / ETZ and the existing rail network	
							• Provides direct link between ASH / proposed ETZ area and East Tullos Industrial Estate maximising supporting activities in the industrial estate and realising the wider economic benefits of ASH and the proposed ETZ • Would future proof access to the ASH / proposed ETZ area for abnormal loads, subject to suitable engineering route design for the new railway bridge • Increases access resilience to ASH / proposed ETZ area through provision of additional route
A4	✓✓	-	-	✓✓	✓	-	• Likely to provide quicker route to ASH / proposed ETZ harbour area from the strategic road network (south) through removal of existing traffic lights on Coast Road bridge • Does not provide any increased connectivity for business-to-business activities (although new bridge would provide improved movement for abnormal loads and minor journey time improvement due to removal of traffic lights at existing bridge) • Would future proof access to the ASH / proposed ETZ area for abnormal loads, subject to suitable design of the new railway bridge • No increased resilience to ASH / proposed ETZ area as no additional route provided
A5	✓✓	✓	✓	✓✓	✓✓	-	• New route likely to be quicker and more efficient than existing route to ASH / proposed ETZ harbour area from the strategic road network (south) – benefits for HGV and general (commuter) traffic access • Likely to provide some increased connectivity for business-to-business activities (with new bridge providing improved movement for abnormal
A6	✓✓	✓	✓	✓✓	✓✓	-	

Option	Objectives						Key Points
	1	2a	2b	3	4	5	
	Provide a designated HGV route to/from ASH / ETZ area which is more efficient than alternative routes	Maximise connectivity by all modes between ASH / ETZ and prospective workers at the sites	Maximise connectivity between the ETZ and other energy-related businesses in the Aberdeen area	Futureproof access to ASH / ETZ for the widest range of abnormal loads and minimise impact of abnormal loads	Improve the resilience of transport connections to and from ASH / ETZ	Maximise the intermodal opportunities between ASH / ETZ and the existing rail network	
							loads and journey time improvement due to removal of traffic lights at existing bridge) • Would future proof access to the ASH / proposed ETZ area for abnormal loads • Increases access resilience to ASH / proposed ETZ area through provision of additional route
C1	-	✓✓	-	-	✓	-	• Would enable safer active travel access to the ASH and proposed ETZ sites for those commuting from the Aberdeen urban area to the north and west
C2	-	-	-	-	-	-	• Would support cruise tourism at ASH and enable more sustainable movement of tourist into the city centre and enable other sustainable day trips to places of interest • Does not meet any of the study objectives
C3	-	✓	-	-	-	-	• Would enable more direct active travel access to the ASH and proposed ETZ sites for those commuting from the Kincorth and west area of Aberdeen.
C4	-	✓	-	-	-	-	• Would enable safer active travel access to the ASH and proposed ETZ sites for those commuting from the Kincorth and west area of Aberdeen. Would also benefit those commuting to work within Altens industrial estate.

2.8 Risks, Constraints, and Interdependencies

2.8.1 A risk register is included at Appendix B. There are a number of key risks and constraints relevant to various intervention. These include:

- The Edinburgh – Aberdeen **Railway Line** represents a constraint for road transport between ASH / proposed ETZ sites and the strategic road network, with only one road bridge across the railway. The presence of the railway to the east of Coast Road also impacts on the options available for the widening of this route. As noted in the various interventions, improving access to the area would therefore require alterations to either the existing railway bridge and / or the road network adjacent to the railway line, or the provision of new railway crossings.

- Any alterations to the road network or any interventions involving the provision of new railway line crossings would need to be undertaken in line with **Network Rail requirements** which would include allowance for the future electrification of the route

- There are a number of **environmental designations** which the intervention(s) may impact upon including: a Site of Special Scientific Interest; Local Nature Conservation Sites and a community park; several listed buildings and scheduled monuments

- The northern section of Wellington Road is an **Air Quality** Management Area and interventions which increase traffic on Wellington Road are likely to cause further air quality worsening

- National Cycle Route 1 routes along Coast Road and any intervention which impacts on this would need to be designed such that **active travel provision** was maintained and incorporated into the intervention

- Given the timeframes involved, any intervention would have to be constructed following the opening of ASH and it would be necessary to **maintain full levels of access to the harbour during the construction period**.

- The key **interdependency** affecting Options A2a/b and Option C1 is the ongoing masterplanning work for the proposed ETZ sites, planning considerations, and the outcomes of this. As noted above, at this stage it is difficult to establish if the proposed ETZ site's activities can accommodate a road connection (as proposed in Option A2a/b). A similar interdependency exists between Option A2a/b and C1 regardless of the proposed ETZ masterplanning, in that if Option A2a/b were to be progressed, then the road route through St. Fitticks would need to accommodate (where appropriate) and take account of the proposed Option C1 active travel route through the site.

- Any interventions which require a new route through / around the site of the former **Ness Landfill site**,located to the south-west of Nigg Bay adjacent to Coast Road, likely to incur very high investment cost. A significant investment has recently been made to appropriately cap the site. More detailed assessment and further research, potentially including intrusive investigation and testing at the landfill site would be required for those options impacting on the site (Options A2a/b and A3a/b), with key considerations being:

    - the potential for total and differential settlement
    - a significant cost of ground improvement
    - difficulty in creating stable slopes in the waste material
    - disruption to the control measures, which control and prevent migration of liquid and gaseous contamination.

- There is also an **interdependency** affecting Options A3a/b and Option C3 with both options crossing the landfill site, and if option A3a/b were to progress then the design would need to take account of option C3 if that were to progress also.

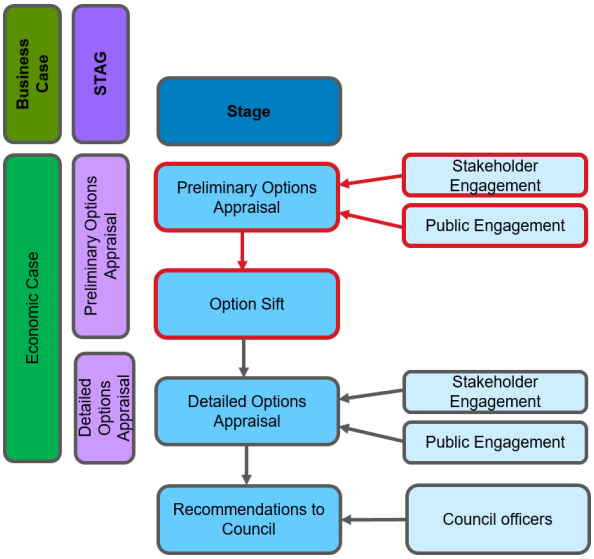
3 Economic Case

3.1 Introduction

3.1.1 The economic case assesses interventions to identify all their impacts, and the resulting value for money. The economic, environmental, social and distributional impacts of the inventions are examined in this Case, using qualitative, quantitative and monetised information, where available and appropriate.

3.1.2 The six road-based interventions (as described in Table 2:6) are examined here. An initial qualitative appraisal (discussed below) of these six interventions derived a short list of four interventions which have been the subject of a more detailed economic appraisal reported in Section 3.3.

3.2 Long-List (preliminary) Options Appraisal



3.2.1 The initial qualitative appraisal for the six road-based interventions (Table 2:6) and the four active travel based interventions (Table 2:7) considered the environmental, safety, economic, integration and accessibility and inclusion impacts of the options, as well as their deliverability and public acceptability.

3.2.2 The public acceptability element of this appraisal was informed by an engagement exercise which included:

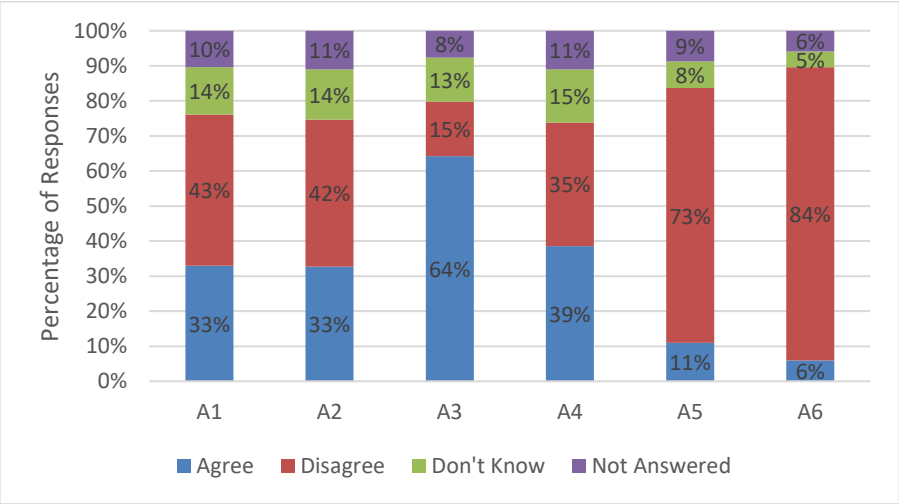
- A series of telephone consultations with representatives from the Transport sector (Network Rail and bus operators Stagecoach and First)
- A meeting with Cove and Altens, Kincorth and Leggart, Nigg, and Torry Community Councils
- Two public drop-in events
- An online public survey and linked public survey (undertaken in September 2018 and to which 355 responses were received)

3.2.3 Key points raised through this engagement exercise are presented in Table 3:1.

Table 3:1: Summary of Engagement Activity (undertaken during *Preliminary Options Appraisal)*

Stakeholder	Summary of Key Points
Network Rail	• Where options involve a new overbridge across the railway, the bridge would need to be constructed to facilitate future electrification of the railway • Disruptive Possession would likely be required to enable the construction of a new bridge - where the line is closed for, for example, a 24-hour period, to enable construction works. Generally, when constructing a new asset, overnight access is provided to avoid disrupting travel on the line / ensure safety. However, where this is not sufficient, disruptive possession of the railway is required. Network

Stakeholder	Summary of Key Points
	Rail's Outside Parties Team would facilitate this process should the options involving a new bridge be progressed to this stage. • Should a new bridge be constructed, Aberdeen City Council would need to take ownership of the bridge. Network Rail does not generally take ownership unless the bridge is built for railway purposes. • In comparison to constructing a new bridge, delivering a new underbridge is generally more challenging. This is because the underpass must support the track and therefore there are more restrictions in terms of delivery. There would also be different discussions regarding ownership, management and liability as Network Rail would have more of an interest given that the structure would be supporting the track. It would also be likely that the period of disruptive possession required would be longer than that required for a new overbridge
Stagecoach	• Stagecoach has two depots on Hillview Road and the company requires easy access and egress between these locations and the town centre. The proposals which involve links on Greenbank / Greenwell Road have the potential to increase HGV traffic within the vicinity of these depots. However, providing a route via Greenwell / Greenbank Road would improve access between the depots and the harbour which may bring some benefits. • Wellington Road is relatively congested and options which involve additional traffic on this route would add to congestion • Victoria Road will likely be the primary public transport access to / from the harbour and on street parking can be problematic in this area
First	• Nothing of specific relevance to the road-based or active travel based interventions
Community Councils	• Option A6 would have a significant impact on the local community as the route would pass through a number of community facilities, including allotments, a recreational football ground; and several informal footpaths, including a number of paths which link the residential area of Cove and the industrial area of Altens and which are used as travel to work routes. • Cables have very recently been laid along the route shown in Option A6 as part of the Kincardine Offshore Wind Farm Project and these may restrict the potential to develop a route at this location. • Wellington Road is heavily congested during peak times and the options in the north of the study area would add traffic to this key link and potentially increase congestion • Lochside Academy recently opened on the site of Calder Park, Redmoss Road and there are safety concerns regarding children from the residential areas of Cove and Torry crossing Wellington Road to access the school. Additional traffic on Wellington Road could have a detrimental impact in this regard. • It is noted that several of the options could lead to increases in traffic on Abbotswell Road which could have a detrimental impact.
Public (drop in events and online survey)	The graph below shows the overall public agreement with each of the **road-based** interventions, based on the results of the public survey.

Stakeholder	Summary of Key Points
	 Overall: • A large number of respondents noted that Option A5 and Option A6 should not be progressed because of the impact of these options on the local community, with several noting that Option A6 would impact the woodland, football ground and allotments • Several respondents noted that Option A2 would have a negative impact on St Fitticks Community Park • Several respondents raised concerns regarding safety, particularly with regard to children walking to school • The operator of the Waste Water Treatment Works raised concerns regarding Option A3 and the potential impact of the option on the Works. A separate email submission was received from both Kelda Water and Scottish Water regarding the option and it was noted that there are several high value assets to the north of the Treatment Works which it would not be possible to move. • The potential impact of Option A6 on several community facilities, including the recreational sports ground, allotments and several informal paths within the area. It was also noted that cables for the Kincardine Offshore Wind Farm Project have recently been laid along the route of Option A6 which may restrict the potential of delivering a route at this location. • The potential for Options A5 and A6 to lead to increased traffic on the southern section of Coast Road and associated amenity impacts. Concerns were raised, in particular, by residents of Burnbanks Village. • The potential for Options A5 and A6 to restrict walking and cycling access to key amenities in Cove for residents of Burnbanks Village • The suitability of Coast Road to act as the primary route to and from the harbour and whether it is feasible to widen the route given the location of Burnbanks Village and the railway • The presence of several informal paths to the west of Burnbanks Village (including Core Path 83) which would be impacted should Option A5 or A6 be taken forward. It was also noted that the car park to the south of Burnbanks Village is used by visitors accessing the coastal path and additional traffic on Coast Road would restrict access in this regard. • Several tracks across Tullos Hill have been widened and resurfaced and a new section was constructed. The improved routes are located close to the units immediately south of Greenbank Crescent rather than near Peterseat Drive and are less steep than the latter. • There is an existing outfall pipe from the United Fish Products Factory which crosses St Fitticks Community Park which would need to be considered in any options which route along this section. • There were general concerns about the planned energy from waste facility on Greenbank Road and the potential interaction with the facility and the harbour

Stakeholder	Summary of Key Points
	• A large number of respondents noted that efforts should be made to avoid traffic going through the residential areas of Cove and Torry In terms of the **active travel**-based interventions, based on the results of the public survey, the following was noted: • Improvements in active travel much needed and beneficial • While the route through Tullos would be scenic and traffic free, the gradient of Option C3 would be unappealing to potential users and the route is indirect in accessing the city centre / Deeside Way area • Cycle hub at harbour is unlikely to be used

3.2.4 Table 3:2 shows the key points from this appraisal and whether each option was recommended for progression to further detailed appraisal as part of this business case. At this stage, Options A1 and A6 were not considered suitable for progressing to more detailed assessment. Greater detail on the appraisal of all six options at this stage can be found in *External Transport Links to Nigg Bay - Pre and Part 1 Appraisal Report*, *Stantec, 2018.*

Table 3:2: Preliminary Appraisal – Key Points

Option	Option Description	Select / Reject	Key Points
A1	New road connection from Greenwell / Greenbank Road across the former Ness Landfill site to the existing railway bridge on Coast Road. Route would become designated route to the ASH / ETZ area for HGV traffic.	Reject	The route between ASH / proposed ETZ sites and the AWPR Charleston junction via this route would be longer than all existing routes. While the intervention provides a route between ASH and George VI Bridge which is shorter than the existing designated HGV route via Hareness Road, the new route is relatively circuitous and is significantly longer than the other interventions assessed. There is therefore a risk that the intervention would not be utilised, particularly by traffic travelling between ASH / ETZ and the AWPR, which would likely continue to use Hareness Road and therefore add to congestion in this area. The intervention also relies on the existing railway bridge and therefore would not improve access for abnormal loads; would have a limited impact on the perception of poor access; and would not enhance transport resilience. In terms of public acceptability, 40% of respondents to the public survey disagreed with the intervention compared to 33% who agreed. Amongst those who disagreed with the route, several raised the issues outlined above, including the circuitous nature of the route and the reliance on the existing railway bridge.
A2 (a & b)	New road connection from Greenwell Road (2a) / Greenbank Road (2b) via St Fitticks Community Park to Coast Road with a new underbridge under the railway line. Route would become designated route to the ASH / ETZ area for HGV traffic.	Select	This intervention contributes positively to all of the TPOs. It provides a route to both the AWPR Charleston Junction and King George VI Bridge which is shorter than Hareness Road and which HGV traffic is therefore likely to use. The intervention also provides a connection between ASH / proposed ETZ sites and East Tullos, helping to maximise the landside opportunities associated with both sites, and provides positive impacts in terms of perception and resilience through the provision of a new means of crossing the railway. However, the intervention is likely to be high cost and there are several potential issues in terms of deliverability, including whether there is sufficient clearance under the railway line to deliver the route and the extent to which the route can avoid the Ness landfill site and any associated environmental impacts. The intervention also passes through St Fitticks Community Park which is a key facility, particularly for the local Torry community. In terms of

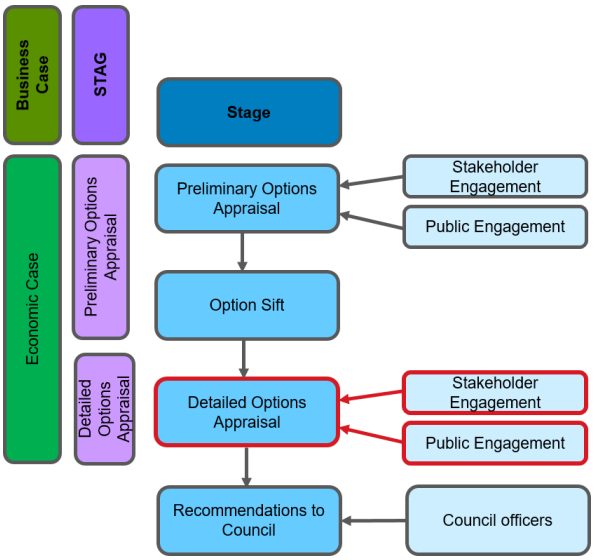
Option	Option Description	Select / Reject	Key Points
			public acceptability, 40% of respondents to the public survey disagreed and 33% agreed with the intervention, with a large proportion of those disagreeing noting the potential negative impact on St Fitticks Community Park / recreational space. Other comments also included the potential for higher traffic in Torry and the high cost of the intervention compared to the other interventions. Overall, while it is recognised that there is potential for negative impacts, detailed work is required to understand possible alignments and potential mitigation strategies, and therefore the potential extent of these impacts. This work would also need to examine the potential deliverability of the new underbridge given the constraints around the landfill site and whether there is sufficient clearance beneath the railway.
A3 (a & b)	New road connection from Greenwell Road (3a) / Greenbank Road (3b) via the former Ness Landfill site and a new bridge over the railway. Route would become designated route to the ASH / ETZ area for HGV traffic. A further variant of this option to be explored which considers the link through the landfill to the existing bridge (removing the need for a new railway bridge)	Select	This intervention contributes positively to all of the TPOs and provides much of the same benefits as Option A2 as noted above. In contrast to Option A2, the route does not have the same constraints with regard to clearance above the railway and therefore may have more potential of providing a route for abnormal loads. In addition, unlike Option A2, A3 does not pass through St Fitticks Community Park and would therefore have less impact on the local community. However, Option A3 passes through a larger section of the former Ness Landfill Site which may impact the deliverability of the route and is likely to lead to additional costs due to the risks associated with building on the landfill. In terms of public acceptability, the intervention received the highest approval rating with 64% (n=228) of respondents stating that they agreed with this intervention compared to 15% (n=55) who disagreed. During the consultation, it was also commented that Option A3 could be extended to include an additional link from the western side of the new bridge around the perimeter of the landfill site to the existing bridge on Coast Road. However, this would involve passing through a larger section of the landfill site. Overall, detailed assessment of the potential to deliver Option A3 given the constraints of the landfill site is required. The potential of including the extension to the existing bridge and the benefits this would provide will also be explored as a variant of Option A3.
A4	New bridge over the railway on Coast Road and Coast Road capacity improvements. Designated route to ASH/ ETZ area would remain via Hareness Road	Select	This intervention contributes positively to the majority of the TPOs. The provision of a new bridge crossing on Coast Road combined with Coast Road widening would assist in improving journey times via Hareness Road. In addition, the new bridge crossing would enhance the perception of access to the ASH / proposed ETZ sites, improve transport resilience, and potentially enable the transport of abnormal loads. The intervention would not, however, improve access to East Tullos or between East Tullos and the ASH / proposed ETZ sites or minimise the impact of traffic in Altens and, as with Options A2 and A3, there are potential deliverability issues with regards to providing a new bridge on Coast Road. In terms of public acceptability, the proportion agreeing with the intervention (39%) was marginally higher than those who disagreed (35%), with those disagreeing raising concerns around traffic levels, the relative indirectness of the route to ASH / proposed ETZ (from the strategic road network), and the suitability of the route for cruise tourists. More detailed assessment is required to assess the potential benefits and dis-benefits of the intervention, particularly with regard to potential traffic impacts. As with

Option	Option Description	Select / Reject	Key Points
			Options A2 and A3, further more detailed assessment of the potential to deliver the route given the constraints around the landfill site(s) (both the Ness landfill and a much smaller historical landfill site – to the east of the proposed new bridge (Taylor's landfill) is also required.
A5	New road connection between Coast Road and Souter Head Road and a new bridge over the railway on Coast Road (as per Option A4). Route would become designated route to the ASH / ETZ area for HGV traffic.	Select	This intervention contributes positively to the majority of the TPOs. The intervention would provide a shorter route to the AWPR Charleston junction (to which the majority of harbour traffic is assumed to be travelling) than the existing route via Hareness Road. In addition, through the provision of a new bridge over the railway there would be improvements in transport resilience and the perception of access. The intervention could also potentially provide a route for abnormal loads although this would be subject to achieving the required alignment. However, the route to King George VI Bridge via this route would be slower than Hareness Road. There is therefore a risk that traffic travelling between the harbour and King George VI Bridge would continue to use the existing route via Hareness Road. In addition, in contrast to Options A1, A2 and A3, Intervention A5 does not enhance access to East Tullos and therefore the intervention would not help maximise the landside opportunities associated with the ASH and proposed ETZ sites. The intervention would also result in a range of environmental impacts, including: potential visual amenity, noise and vibration, and severance impacts for local residents (particularly those of Burnbanks village) and impacts on local wildlife. The intervention did not score well in terms of public acceptability, with a high proportion (75%) of those responding to the public survey stating that they disagreed with the intervention and high numbers noting the potential impact on Burnbanks Village, recreational space / local wildlife and safety concerns. As with Option A4, the route would also require the delivery of a new bridge on Coast Road, the deliverability and environmental impact of which are uncertain given the constraints around the landfill site(s) as noted above. Overall, while it is recognised that there is potential for negative impacts, more detailed work is required to understand possible alignments and potential mitigation strategies which could be employed and therefore the potential extent of these impacts. This work also needs to examine the potential deliverability of the new bridge on Coast Road given the constraints around the landfill site(s).
A6	New connection to the south of Souter Head Road, a new bridge over the railway on Coast Road (as per Option A4) and capacity improvements on Coast Road. Route would become designated route to the ASH / ETZ area for HGV traffic.	Reject	This intervention would provide similar benefits and have similar impacts to Option A5. In addition to the wider impacts noted above for Option A5, the intervention would also affect residential properties towards the north of Cove; would result in the removal of the existing tree line between Altens and the residential area of Cove; would route near several community assets, including a recreational sports ground and nearby allotments; and may result in severance issues if the implementation of the intervention results in the removal of the north-south walking routes between Cove and the industrial estate. The intervention would also result in an increase in traffic on both the southern section of Coast Road and the new link between Cove and the industrial estate and could therefore result in visual amenity, noise and vibration, and severance impacts for residential properties across several locations. In terms of public acceptability, the route received the lowest overall approval rating, with 84% (n=297) of respondents to the public survey disagreeing with the intervention.

Option	Option Description	Select / Reject	Key Points
C1	Formalise and enhance provision through St. Fitticks Park - linking the Coast Road with Torry / Wellington Road and onwards to the Deeside Way to enable access to ASH / ETZ sites from the north and west	Select	The option avoids some of the heavier trafficked routes between the harbour and the urban Aberdeen area (for instance Victoria Road). However, it is relatively indirect for access to Aberdeen centre itself and may be less well used, particularly by experienced cyclists. The route would link into the existing Coast Road provision offering access to the proposed ETZ site at Doonies Farm and St. Fitticks.
C2	Cycle hub at ASH providing dedicated cycle information and a hire scheme at the harbour aimed at cruise tourists.	Reject	The option does not provide benefit against any of the project objectives. While delivering a cycle hub would enhance opportunities for leisure cycling, including amongst cruise tourists, it would likely have a more limited impact on improving access to the ASH and proposed ETZ sites. It is therefore recommended that this option not be progressed within the context of this study.
C3	Dedicated cycle route through Tullos Hill to the A956 and onward connections to the Deeside Way	Reject	Given the ability to link Option C1 to the Deeside Way, which would provide more direct access to the ASH and proposed ETZ sites from the west Aberdeen urban area, it is not recommended to progress Option C3 further. The option also routes through a remote area across Tullos Hill offering limited security for users.
C4	Dedicated cycle route provision on Hareness Road (linking with existing provision on the Coast Road and planned improvements on Wellington Road) to enable access to ASH / ETZ sites from the south	Select	Would enable safer active travel access to the ASH and ETZ sites for those commuting from the Kincorth and west area of Aberdeen. Would also benefit those commuting to work within Altens industrial estate. The route would link into the existing Coast Road provision offering access to the proposed ETZ site at Doonies Farm and St. Fitticks.

3.3 Economic Appraisal

3.3.1 As noted in the introduction to this case, the economic case assesses interventions to identify all their impacts, and the resulting value for money and the economic (both monetised benefits and wider economic impacts), environmental, social and distributional impacts of the inventions are examined, using qualitative, quantitative and monetised information, where available and appropriate. This appraisal has been aided by several key components, which are discussed below, and include:



- Option Feasibility assessment
- Traffic Modelling
- Further Engagement

Option Feasibility

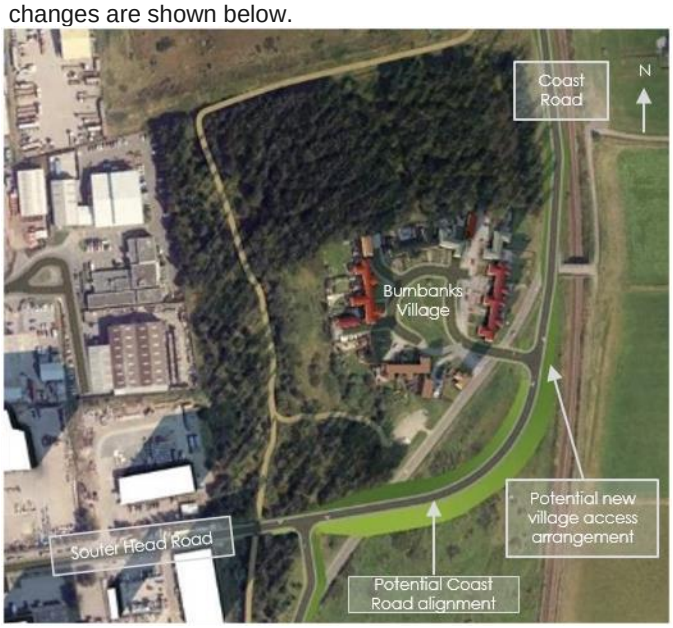
3.3.2 The feasibility of each intervention was considered in greater detail, taking account of engineering and environmental constraints. Table 3:3 sets out the key findings from the feasibility investigations. Greater detail on the findings is presented in *45816_2001_R_001 - External Transportation Links to ASH Feasibility Study_DRAFT - Rev 1.pdf, (Stantec, March 2020).*

Table 3:3: Key Feasibility Findings

Option	Summary of Key Points
A2a/b	• For Option A2b, capacity upgrades at Greenbank Road/Wellington Road junction are unlikely to be possible due to the proximity to residential properties. • Traffic Road Order (TRO) needed to control parking on one side of the Greenwell/Greenbank Road carriageway for the options. • For both Option A2a and A2b, new road construction would necessitate private land acquisition at the eastern end of Greenwell Road, and car parking would be lost at the associated premises. • Based on the available data, Option A2a/b encroaches (with encroachment greater for Option A2a) into a portion of the Ness Landfill site where asbestos containing materials (ACMs) are likely to be present. ACMs would be a health and safety consideration and introduce additional costs for excavation and disposal. The diagram below provides an indication of the land take required by the earthworks (shown in green) for both Options A2a and A2b. As can be seen, as the road is on a hill and needs to go under the railway line (assumed 7.5m clearance to provide headroom and structure) the earthworks footprint will be significant. The earthworks will be unusable space as they are on a 1 in 3 slope. The earthworks may be reduced by increasing the slope to 1 in 2 (if geotechnics allow) or a structural solution (e.g. retaining walls) could reduce the footprint.

Option	Summary of Key Points
	 *Option A2a – Approximate land-take requirements (from Infraworks)*  *Option A2b – Approximate land-take requirements (from Infraworks)* • An underpass would be formed underneath the railway line, on a skewed alignment to reduce encroachment into the landfill (slightly different skew proposed between Options A2a and A2b). However, the passage of the road beneath the railway line and specific alignment would require agreement with Network Rail. The underpass construction would be a complex and expensive operation and require extensive consultation. Initial discussions with Network Rail indicated that underpasses are not their preference and if taken forward they may insist on taking responsibility for the design and construction to maintain control and limit the risk to the railway. Network Rail has concerns over the tightness of the route alignment geometry on approach and would potentially insist on widening of the structure to minimise the risk of bridge strikes. Network Rail also confirmed that disruptive weekday possessions may be required to construct the underpass, but as a minimum it is anticipated that a weekend possession would be required.

Option	Summary of Key Points
A3 a//b	• TRO needed to control parking on one side of the Greenwell/Greenbank Road carriageway for Option A3a/b. • Under both Option A3a and A3b, new road construction would necessitate private land acquisition at the eastern end of Greenwell Road, and car parking would be lost at the associated premises. • Routes A3a and A3b would both encroach upon the Ness Landfill and be constructed along the line of the existing perimeter access track. This would require excavation of landfill material over an extended length, adding complexity, risk and cost to the scheme to manage the excavation and disposal of potentially hazardous materials. Similarly to Option A2a and A2b, the diagram below provides an indication of the land take required by the earthworks (shown in green) for both Options A3a and A3b.  *Option A3a/b – Approximate land-take requirements (from Infraworks)* • A new overbridge would be constructed across the railway line under both A3a and A3b, and Network Rail has indicated that a minimum headroom of 6.3m would be required. This creates a significant constraint on the coast side of the railway where there is only a short distance between the crossing point and Coast Road. This would require a carriageway gradient of 18% - approximately three times the recommended gradient for a strategic traffic route – which would be unsuitable for regular use by HGVs and buses. The increased elevation of the carriageway on both sides would also introduce the need for extensive retaining walls of significant height to mitigate encroachment on the railway and into the Scottish Water Wastewater Treatment Works site. Additional engineering feasible work was undertaken to consider a variant of both Option A3a and A3b to overcome the geometric constraints noted above. This variant removes the need for the new railway bridge and continues the new road through the landfill site to join Coast Road south of the existing bridge. There are significant deliverability issues with the reconfiguration of the landfill site that would be required. Given its circuitous alignment, such a link would not provide a meaningful connection between the strategic road network and ASH, but the potential benefits of a direct East Tullos to ASH link for the regeneration of East Tullos and in support of ASH related operations are noted. • A new access to the Scottish Water site from the new road would also be required in close proximity to the junction with Coast Road under both Options A3a and A3b. The new access would feature a 20% gradient and may be unacceptable to the road authority on account of tight junction spacing.

Option	Summary of Key Points
A4	• A traffic regulation order would be required to control parking on Hareness Road. • Hareness Road meets Coast Road at a priority junction. While this junction was expected to be sufficient to accommodate ASH traffic, further modelling may be necessary to ensure it can also accommodate proposed ETZ traffic and identify whether signalisation is required. Consideration could also be given to reconfiguring the junction priority. • Third party land take may be required to accommodate the widening of Coast Road but this could potentially be avoided if the Road Authority were to accept narrow verges in constrained sections. • A new railway overbridge would replace the existing structure and be constructed in such a way that continuity of access is maintained; however, this crossing would require realignment of Coast Road and the Coastal Path and construction of a new access to the Ness Landfill site. • An historical registered landfill site (Taylor's Industrial Landfill) is situated immediately east of the railway line adjacent to the proposed railway crossing point. Therefore, the option may encroach upon this feature after crossing the railway line. This would require excavation of landfill material adding complexity, risk and cost to the scheme to manage the excavation and disposal of potentially hazardous materials. • As with Options A2a/b and Option A3a/b, the new bridge over the railway line and specific alignment would require agreement with Network Rail who may wish to take ownership of the design process.
A5	• A traffic regulation order would be required to control parking on Souter Head Road. • A new road link would be constructed between Souter Head Road and Coast Road via existing industrial premises. This will require the demolition of one building and may compromise access to another. • Beyond the industrial yard the new carriageway would have a gradient of 5% (max recommended for an industrial road). A section of the existing Coast Road would be realigned to tie into the new road to maintain Burnbanks Village's connection to the road network. This may be a steep connection due to the profile of the new road coming down from Souter Head Road but would be of less concern as it is a residential access road. In addition, a second junction onto the new road would be required to reconnect the eastern end of Langdykes Road to the network. The potential network changes are shown below.  • Third party land take may be required to accommodate widening of Coast Road to the north, but this could potentially be avoided if the Road Authority were to accept narrow verges in constrained sections. • A new railway overbridge would replace the existing structure and be constructed in such a way that continuity of access is maintained; however, this crossing would

Option	Summary of Key Points
	require realignment of Coast Road and the Coastal Path, and construction of a new access to the Ness Landfill site. • An historical registered landfill site (Taylor's Industrial Landfill) is situated immediately east of the railway line adjacent to the proposed railway crossing point in Option A5. Therefore, the option may encroach upon this feature after crossing the railway line. This would require excavation of landfill material adding complexity, risk and cost to the scheme to manage the excavation and disposal of potentially hazardous materials. • As with the other road options, the new bridge over the railway line and specific alignment would require agreement with Network Rail who may wish to take ownership of the design process.
C1	The proposed route would provide a new shared use path linking through St. Fitticks Park from Kirkhill Place to the Coast Road. The route should be considered and included in any proposed ETZ Masterplanning for the site. Within the park, the route splits into two sections, providing a link through the park to the new harbour entrance, and also south of the Waste Water treatment works, providing linkage through to the existing Coast Road off-road shared use path. This then provides onward connectivity to the proposed ETZ site at Doonies Farm. If Option A2a/b were implemented, it is assumed that the route would connect with the new road link with associated active travel crossings and provision through the proposed ETZ site. There is currently a network of informal tracks across the park which would be formalised and upgraded to provide an active travel route suitable for commuting. The route would require appropriate lighting to improve user security through the parkland and a new widened bridge over the Burn would be required. There are no major technical challenges to provision but there are several pinch points on the route where the footway is less than the required minimum standard for a shared use facility and there is limited potential for widening. This would need to be explored at the detailed design stage.
C4	Two proposed route variations have been considered and costed. The first assumes no major change to Hareness Road other than on-road cycle way marking to delineate space for cyclists in both directions. The second requires more significant works to provide a tiered cycleway alongside a segregated footway. This second option would require realignment of existing drainage and would present a greater degree of technical challenge. However, the option would be technically feasible.

Traffic Modelling

3.3.3 The more detailed economic appraisal of the road-based options (A2 (a/b), A3 (a/b), A4 and A5) used a microsimulation traffic model to inform the appraisal and provide an appreciation of the potential quantitative impacts of the interventions. This enabled an economic assessment of the road-based interventions as well as feeding into other elements of the appraisal including: the safety appraisal (accident impacts), the environmental appraisal (carbon impacts) and the accessibility appraisal (through informing the development of 'Hansen' accessibility indicators).

3.3.4 The 2019 'Base model' simulates the behaviour of individual vehicles within the modelled road network and formed the base platform for predicting the traffic patterns resulting from changes to traffic volumes and changes to the road network. The model covers an AM period (07:00 – 09:00), Inter-peak period (09:00 – 16:00) and PM period (16:00 – 18:00).

3.3.5 Future year traffic demands were generated for 2026 (the assumed opening year of any road option) and 2041 (15-years post opening). 'Do Minimum' models were developed to provide a representation of the future in 2026 and 2041 in the absence of any changes to the network.

These, and each of the equivalent future models with the interventions in place, included additional traffic demand over and above the 2019 Base model. This additional demand represents underlying background growth, local committed developments and the traffic estimated for the new harbour and proposed ETZ sites.

3.3.6 Four future year scenarios were developed for the 2026 and 2041 future years. These scenarios include:

- Core scenario (core ASH traffic and core proposed ETZ traffic) with low background growth (2.5% by 2041)
- Core scenario (core ASH traffic and core proposed ETZ traffic) with high background growth (10% by 2041)
- High scenario (high ASH traffic and high proposed ETZ traffic (+25% for each)) with low background growth (2.5% by 2041)
- High scenario (high ASH traffic and high proposed ETZ traffic (+25% for each)) with high background growth (10% by 2041)

3.3.7 Traffic generation estimates for **ASH** were derived by:

- estimating annual cargo tonnage based on the relationship between quay length and cargo tonnage seen at comparator UK ports; and
- estimating annual trip generation – influenced by the anticipated cargo to be handled by the port – with an understanding of this derived through discussion with the Aberdeen Harbour Board and consideration of broad freight types at the comparator ports; and profiling trips across an average day, based on the 2015 Transport Assessment[7].

3.3.8 In the absence of definitive information on the exact nature of development at the **proposed ETZ**, the Siemens Green Port Hull (SGPH) at Alexandra Dock in Hull was used as a 'model' of the type of activity which could emerge at the site. SGPH comprises a wind turbine manufacturing facility, offices, warehousing, and a marine installation/commissioning base. Information from the Traffic and Transportation Chapter of the Environmental Statement for the Hull site was used to inform estimates of trip generation at the proposed ETZ. The ETZ site has a greater propensity for commuter traffic to the site (compared to ASH which is predominantly heavy goods traffic) and as such the traffic distribution from the site reflect a greater proportion of traffic originating from Aberdeen city itself (as opposed to from the strategic road network).

3.3.9 Outputs from the transport model (journey times, journey distance and demand) have been input to the Department for Transport's TUBA software to generate Benefit to Cost ratios for the interventions (discussed below). TUBA software undertakes the economic appraisal of transport schemes in accordance with the Department for Transport's cost-benefit analysis guidance (TAG Unit A1). More detailed information on the traffic modelling approach can be found in *External Links to Aberdeen South Harbour - STAG Detailed Appraisal Report_FINAL (with ASTs and OSTs), Stantec, March 2021.*

3.3.10 As well as providing traffic demand, trip distance and journey time data to feed into the assessment of the interventions, the traffic model provided visual representations of the operational performance of the options, with the key points in relation to each intervention summarised in Table 3:4.

[7] Transport Assessment for the ASH completed in 2015 as part of the consents process

Table 3:4: Key Operational Findings

Option	Summary of Key Points
A2a/b	Options A2a/b provide a new link to the harbour / proposed ETZ area and direct traffic to / from the south further north on Wellington Road to either Greenwell Road (Option A2a) or Greenbank Road (Option A2b). As such, a greater volume of traffic is predicted to route on Wellington Road (between Hareness roundabout and Greenwell Road / Greenbank Road junctions). This has an impact on network performance in this area. Option **A2a** includes an additional set of signals on Wellington Road along an already busy stretch of carriageway with several existing signals. The cycle time for the new signals has been set to optimise the signals and balance the traffic flow on both Wellington Road and Greenwell Road. It should be noted that the inclusion of these signals creates queuing back on Wellington Road and causes difficulties and delays to traffic trying to join Wellington Road from the side arms further south (Abbotswell Road, Craigshaw Drive etc.) which are blocked by mainline traffic. In addition, queuing on Greenwell Road can delay vehicles in East Tullos industrial estate from exiting the area. The signals on Greenwell Road do however, overall, provide a significant benefit to harbour / proposed ETZ development traffic by allowing vehicles out onto Wellington Road (with a queue reduction of around 400m compared to the Do Minimum situation (where the congestion on Wellington Road significantly reduces capacity on Greenwell Road as it is a priority junction). In the scenarios with higher growth, (the 10% background growth and high development traffic scenarios) the options provide the greatest benefits to harbour / proposed ETZ traffic by enabling egress onto Wellington Road. There are significant impacts on through traffic journey times on Wellington Road due to the new set of signals and additionally some further network wide impacts as a result of the extra vehicles released from Greenwell Road (which results in additional traffic on Wellington Road). This has a knock-on effect on any give way minor arms along Wellington Road with traffic then struggling to find gaps in the mainline traffic (the impact reduces as the distance from Greenwell Road increases and vehicles disperse within the model). Unlike Option A2a, Option **A2b** does not involve any additional traffic signals on Wellington Road and as such does not impact as greatly on existing traffic within the Wellington Road corridor. Traffic volumes within the modelled network show an increase in traffic on Wellington Road (between Hareness Road and Greenwell Rd / Greenbank Road) and also a minor increase in traffic on Souter Head Road (westbound in the AM and eastbound in the IP and PM periods) and Langdykes Road south / westbound – highlighting that some traffic (light goods vehicles only) are seeking alternative routes to avoid congestion on Wellington Road. Naturally, there is a large increase in traffic on Greenwell Road in Option A2a and on Greenbank Road in Option A2b. St. Fitticks Road also sees a decrease in traffic southbound in the AM and IP periods and northbound in the PM period in both Options A2a and A2b. **Overall, the journey time benefits to harbour / proposed ETZ traffic come with a significant disbenefit to existing traffic.** Option A2a/b requires an underpass under the railway line which may present height clearance issues for abnormally high loads wishing to access the harbour / proposed ETZ area. In addition, the alignment of the underpass may present HGV 'swept path' clearance issues for abnormally long loads, although there will be a similar issue at the junction of Greenbank Rd / Greenwells Road for traffic routeing to the harbour / proposed ETZ area from further afield due to the tight geometry at the junctions.

Option	Summary of Key Points
A3 a//b	Options A3a/b provide a new link to the harbour / proposed ETZ area and directs traffic further north on Wellington Road to either Greenwell Road (Option A3a) or Greenbank Road (Option A3b). As such, a greater volume of traffic is predicted to route on Wellington Road (between Hareness roundabout and Greenwell Road / Greenbank Road junctions). This has an impact on network performance in this area. Similar to Option A2a, Option A3a includes an additional set of signals on Wellington Road and causes the same traffic operational issues as noted above for Option A2a. Unlike Option A3a, Option A3b (similar to Option A2b) does not introduce any additional traffic signals on Wellington Road and as such does not impact as much on existing traffic within the Wellington Road corridor. Traffic volumes within the modelled network in the AM, IP and PM periods show similar traffic patterns and changes to that seen for Options A2a/b as noted above. **Like Options A2a/b, overall, the journey time benefits to harbour / proposed ETZ traffic come with a significant disbenefit to existing traffic.**
A4	Option A4 does not make any change from the Do Minimum in terms of the designated route to the harbour / proposed ETZ area, which remains as Hareness Road. This results in no major operational impact on existing traffic volumes or patterns on the road network. Coast Road traffic experiences a benefit due to the removal of the signals with a new bridge over the railway line, creating a straighter road alignment. Traffic volumes within the modelled network in the AM, IP and PM periods show, as expected given the smaller scale of the option compared to others, no significant changes in traffic flow, journey times or congestion on any of the routes in all three modelled periods.
A5	Option A5 routes harbour / proposed ETZ bound traffic from Wellington Road further south (at Souter Head roundabout) as opposed to at the Hareness Road junction as in the Do Minimum. This benefits Wellington Road traffic. There is some disbenefit to northbound traffic at Souter Head Roundabout (more pronounced in the AM period) as there is now a greater volume of traffic turning right at the roundabout onto Souter Head Road – which requires larger gaps to be found in the circulating traffic. Similarly, in the PM period, there are issues on Wellington Road Southbound and Souter Head Road. These arms oppose each other at the Souter Head roundabout. Adjusting the signals to help minimise any additional queueing only serves to move the congestion between the roundabout arms. The queueing on Wellington Road doesn't impact any other junctions so doesn't cause further network issues upstream. The Souter Head Road queue reaches the roundabout with Crawpeel Road and traffic can be seen to queue up Crawpeel Road (reaching Hareness Road in the highest demand scenario). Note though that queuing back from the Souter Head roundabout to the Souter Head Road / Crawpeel Road roundabout is noted in the observed traffic counts i.e. the option does not result in a significantly worse situation than the existing. Traffic volumes within the modelled network in the AM, IP and PM periods show, as expected given the new Souter Head Road to Coast Road link, major reductions in traffic on both Hareness Road and Langdykes Road and a significant increase in traffic on Souter Head Road.

Further Engagement

3.3.11 Four further key elements of engagement were undertaken at the more detailed appraisal stage to further inform the assessment. These included:

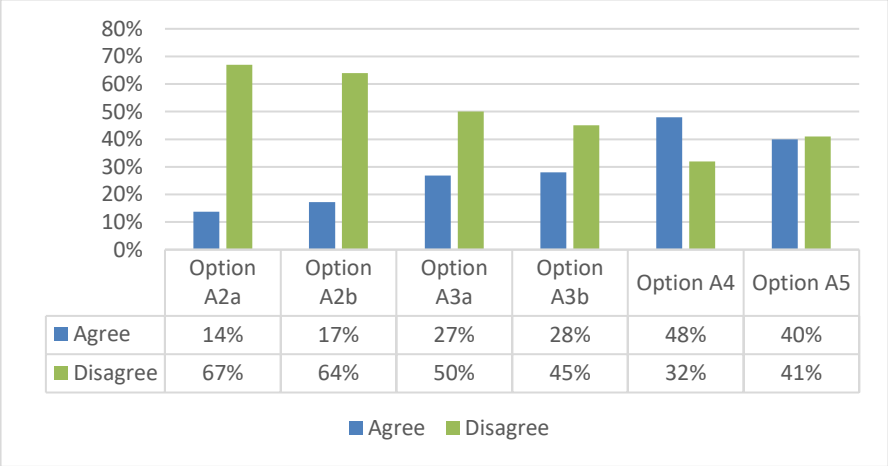
- A workshop with the Energy Transition Zone Working Group
- Further face-to-face (Teams) discussion with Aberdeen Harbour Board
- Contact (via post) with all potentially impacted businesses

- A Public Engagement exercise (undertaken from mid-November to mid-December 2020)
- Statutory Environmental Consultees

3.3.12 The key points raised through this additional engagement is presented in Table 3:5.

Table 3:5: Summary of Engagement Activity (undertaken during *Detailed Options Appraisal)*

Stakeholder	Summary of Key Points
Energy Transition Zone Working Group	• A 'critical success factor' identified by the group was that the proposed ETZ must "be integrated with the Aberdeen City Region to attract employment, provide societal benefits, generate jobs and provide wider economic benefits to Scotland and the UK". Providing appropriate transport connectivity support this success factor. • Clear confirmation around the importance of not touching St Fitticks Park (reinforced also by the proposed ETZ utilities plan) • Concern around the future constraints that would be imposed by an underbridge from St Fitticks to East Tullos constraining future access, if this was to be a principal ASH access • The difficulties of the landfill site and the geometry/topography (including cuttings/embankments etc) were also recognised, despite the prize of opening up East Tullos • Challenge around quantifying the large / exceptional load capabilities of the routes which are emerging • The prospect of a later stage "private link" underbridge between St Fittick's Park and East Tullos was raised • Potential of hydrogen for rail, road and longer-term marine was highlighted • Longer term "multi-modal" distribution hub, including rail freight highlighted • Future proofing and agility also recognised, due to the expectation that the ETZ project will require to be able to respond to market opportunities
Aberdeen Harbour Board (AHB)	• AHB maintain an interest in the provision of a constraint free direct link between ASH, and the East Tullos industrial estate, alongside the improvement in strategic connectivity of ASH • ASH stressed the significant economic benefit of directly liking ASH with East Tullos • A variant of Option A3a/b suggested by AHB (following the Ness landfill to the new bridge proposed in Option A4) overcomes these geometric constraints, and may work as a future add-on to Option A4, provided deliverability issues with the reconfiguration of the land-fill site could be overcome • AHB recognised the profile of deliverability risks/constraints associated with options A2 a/b and A3 a/b
Impacted Businesses	A local business noted regeneration of the road network is much needed for the area as they feel it is in decline and disrepair. The occupier of the site at the east end of Souterhead Road whose premises would be significantly impacted by this option noted that since 2014, the company has made significant investment at the site in refurbishing and constructing buildings, as well as upgrading facilities. In addition, on-going investment decisions are being made in relation to the site and the outcomes of this study could significantly impact on these. Therefore, there is a need to keep the occupier fully up to date on the progression of the options and the project. The company holds a SEPA PPC permit for a blast and paint facility at the site and a SEPA permit is also in place for the non-destructive testing and hydro testing facility. Such facilities are far more difficult to relocate compared to other buildings on the site. Another suitable site would need to be found where permits associated with them could be re-applied for. The blast and paint facility, in particular, was highlighted as the most difficult to relocate and ideally would remain at the current site. Given this, it was noted that it may be possible for future acquisition of *some* of

Stakeholder	Summary of Key Points
	the site, due to the way that the potential road option would interact with the facility i.e. it might not be necessary for the whole business to be acquired and relocated
Public Survey	Responses were received from 126 members of the public and 19 organisations. A high-level overview of agreement / disagreement towards the road-based options is shown in the graph below. Overall, Option A4 is the only option where there was net-agreement with the option as opposed to net disagreement. There is particularly negative feeling towards Options A2a and A2b.  Key points raised include: • Torry residents and environmental organisations articulated very strong feelings around the proposed impacts to St Fitticks Park (Options A2) and the neighbouring East Tullos Burn Project (which has been heavily invested in). This may also be a factor with the proposed ETZ development on the park site. The loss of this green space for the health and wellbeing of the local community was strongly noted by many alongside the negative impacts of increased noise and air pollution in the area – with Options A2a/b and A3a/b routeing close to Tullos Primary School • The associated likely increase of traffic on Wellington Road (Options A2a/b and A3a/b) was another key concern given the already highly congested nature of the route • The constraint of the proposed underpass to cater for large / abnormal HGVs and other vehicles (Option A2a/b) • The gradient issue in Option A3a/b was noted by many respondents who had concerns that large vehicles would reroute via residential streets • Serious concerns were raised about construction through the Ness landfill site with potentially adverse environmental and health impacts and the negative impact of Option A3a/b on Tullos Hill was noted with the destruction of habitats and loss of biodiversity. The cost risk and uncertainty with landfill excavation was also a concern. • Option A4 was preferred by many with the proposal not impacting on green space and larger vehicles being kept away from residential areas however, there was concern that the scenic route along Coast Road would be impacts by high traffic volumes and the route would need to accommodate safe active travel movements. • Strong opposition to Option A5 from residents of Burnbanks village in particular highlighted that there would be a substantial impact to the Burnbanks community if this option went ahead, with the community isolated from Cove Bay where the local primary school, doctors and shops are located. Noise, vibration and air pollution generated from the close proximity of houses to HGVs traffic on the road was a key concern raised.

Stakeholder	Summary of Key Points
	• It was noted that Options A4 and A5 do not provide any increased opportunity for rail freight In term of the active travel options: • The need to shift to active travel was recognised by many • Both Aberdeen Cycle Forum and Sustrans noted it would be more effective to connect ASH to the city via Torry (rather than through St. Fitticks) and that shared paths are not appropriate for cyclists and there should be full segregation between modes • Sustrans noted that the safety of active travel should inform design • There was concern raised about any reduction in carriageway space for motorists and heavy good vehicles (Option C4) and also the need to separate cyclist from routes with a high volume of heavy goods traffic • The need to link new routes into existing provision to ensure a connected network was noted
Environmental Consultees	• NatureScot, RSPB Scotland and The North East Scotland Biodiversity Partnership organisations (as well as Sustrans) emphasised their concerns around the potential loss and impact on the East Tullos Burn Project and the environment of St Fitticks Park if Option A2/b were implemented. The project is award-winning and provides a wetland habitat for fauna and flora, as well as a natural solution to pollution. This view is also supported by Cove and Altens Community Council • Historic Environment Scotland (along with members of the public) raised concern over the potential impacts to St. Fitticks Kirk, a historical site in St. Fitticks Park if Option A2/b were implemented. • Option A4 was considered amongst the consultees to be the most environmentally friendly due to the avoidance of developing in existing green space

3.4 Economic Costs

3.4.1 Economic appraisal was undertaken as part of the STAG assessment based on the following methodology.

3.4.2 As the proposed road and active travel interventions are at the feasibility design stage, only high-level construction cost estimates can be provided. The cost estimates were prepared using approximate estimating rates extracted from '*SPON's Civil Engineering and Highway Works Price Book 2019*'.

3.4.3 No formal assessment of risk has been undertaken in preparing the cost estimates due to the limited information available at present. As the project is at the feasibility stage, an estimate including 'Optimism Bias' of 44%, as per *Table 13.4 - Stage 1: Programme Entry, 'The Scottish Transport Appraisal Guidance (STAG) Technical Database, 2014'*, has been provided to reflect the uncertainties. The cost estimates do not include allowances for:

- Costs associated with land / property acquisition
- Statutory approvals / consents
- Adjustments to existing public utility apparatus
- Surveys and investigation
- Design and works supervision fees

- Value Added Tax (VAT) and Inflation, as the date of construction is yet to be established

3.4.4 The outline construction cost estimates for the route alignments for the six road options, and two active travel options are shown in Table 3:6.

Table 3:6 Construction Cost Estimates (2019 SPON's) – Excluding Land, Consents, Utilities, Surveys, Design, VAT

Option	Costs	
	Excluding Optimism Bias	Including Optimism Bias @ 44%
A2a*	£7.7m	£11.2m
A2b*	£6.2m	£8.9m
A3a*	£10.5m	£15.1m
A3b*	£9.7m	£13.9m
A4	£4.5m	£6.5m
A5	£5.4m	£7.7m
C1	£1.3m (assuming 5m segregated path) £1.0m (assuming 3m shared-use path)	£1.8m (assuming 5m segregated path) £1.4m (assuming 3m shared-use path)
C4	£0.04m (assuming cycleway through on road markings) £0.5m (assuming tiered segregated cycleway)	£0.05m (assuming cycleway through on road markings) £0.8m (assuming tiered segregated cycleway)

**while the cost estimate includes some allowance for the cost of required earthworks (excavation, transport and disposal), a high degree of uncertainty surrounds the costs associated with landfill site excavation given the potential for hazardous material to be present. Such material would also present significant environmental risks that would need to be managed and mitigation measures employed. Such elements would likely significantly increase overall option costs above that presented here.*

3.4.5 It should be noted that costs could increase or decrease once more information becomes available and the design process advances. Consequently, the estimates provided should only be used as a broad indication of construction costs for the proposed works.

3.4.6 Option A2a costs are greater than Option A2b, owing to the greater potential land take required by the earthworks. As the road is on a hill and needs to go under the railway line (assumed 7.5m clearance to provide headroom and structure) the earthworks footprint will be significant. Similarly, Option A3a costs are greater than Option A3b, owing to the greater potential land take required by the earthworks. The construction costs for Option A3a/b are greater than that for Option A2a/b owing to the excavation work required to remove a greater volume of material from the landfill site and reseal the site. Option A4 is the lowest cost option of all the road options, requiring the new bridge section on the Coast Road and some widening of Coast Road, with the full required extent of carriageway widening, or carriageway replacement due to the new bridge to be considered in detail during the design process.

3.5 Value For Money

3.5.1 Table 3:7 presents the Net Present Value (NPV) of all quantitative benefits derived for the road options including greenhouse gas emission benefits, accident benefits, Transport Economic Efficiency (TEE) benefits and indirect taxation benefits as estimated for each scheme from the TUBA software. These benefits are then compared against the scheme costs as presented in Table 3:6, to derive a Benefit to Cost Ratio (BCR) for each option and understand the value for money of each scheme.

3.5.2 It should be noted that the BCR figures presented are an estimate and would be subject to more detailed refinement with:

- a more detailed option costing exercise
- a revision of the development scenarios and associated traffic for both the ASH and proposed ETZ sites (as the developments progress); in combination with any options taken forward with regards to the Wellington Road Corridor Multi-modal study
- a larger traffic modelling exercise able to capture all wider strategic routeing changes which may occur with each option.

3.5.3 As such, the figures below provide an *indication* of the likely economic 'success' of the scheme but should not be taken as definitive.

3.5.4 A *negative* BCR indicates where a scheme generates a disbenefit i.e., the scheme has a cost to implement, and overall, the traffic network experiences negative impacts (i.e., longer journey times). A BCR of less than one, but greater than zero, indicates that a scheme provides transport benefits, but that these benefits do not offset the cost of the scheme. A BCR of greater than one indicates that a scheme provides transport benefits that are greater than the cost of the scheme.

3.5.5 Table 3:7 shows that:

- Only Option A4 and A5 consistently provide a BCR greater than 1 across all modelled scenarios
- Option A2a generates a negative BCR in two of the four scenarios indicating overall negative benefits of the scheme
- BCRs of less than 1 for almost all Option A2a/b and Option A3a/b scenarios, indicating that these schemes would not be considered 'value for money' based on purely monetised grounds alone

Table 3:7: All Road Options – Monetised Economic Summary (includes TEE, carbon and accident benefits)

Benefit / Cost	Option	Core	High	Core + 10%	High + 10%
Present Value of TEE Benefits	Option A2a	-£2,210,000	£1,622,000	-£319,000	£2,373,000
	Option A2b	£3,810,000	£4,657,000	£4,185,000	£5,678,000
	Option A3a	-£188,000	£902,000	£388,000	£1,123,000
	Option A3b	£2,379,000	£2,543,000	£3,407,000	£6,095,000
	Option A4	£5,985,000	£7,288,000	£5,598,000	£8,286,000
	Option A5	£7,190,000	£10,814,000	£9,244,000	£9,728,000
Present Value of Accident Benefits	Option A2a	£78,200	£73,700	£107,700	£122,100
	Option A2b	£102,000	£89,400	£113,300	£138,100
	Option A3a	£77,700	£60,500	£89,900	£99,700
	Option A3b	£74,200	£76,900	£91,500	£114,600
	Option A4	-£12,000	-£15,100	-£8,700	£16,500
	Option A5	-£14,400	-£13,500	-£3,700	£28,500
Present Value of Greenhouse Gas Benefits	Option A2a	£197,000	£281,000	£166,000	£275,000
	Option A2b	£233,000	£272,000	£207,000	£288,000
	Option A3a	£202,000	£255,000	£170,000	£241,000

Benefit / Cost	Option	Core	High	Core + 10%	High + 10%
	Option A3b	£189,000	£288,000	£182,000	£263,000
	Option A4	£124,000	£152,000	£109,000	£165,000
	Option A5	£177,000	£230,000	£177,000	£248,000
Present Value of Taxation Impacts	Option A2a	-£346,000	-£499,000	-£308,000	-£487,000
	Option A2b	-£421,000	-£490,000	-£382,000	-£524,000
	Option A3a	-£356,000	-£460,000	-£302,000	-£432,000
	Option A3b	-£347,000	-£420,000	-£336,000	-£472,000
	Option A4	-£238,000	-£290,000	-£217,000	-£314,000
	Option A5	-£329,000	-£438,000	-£337,000	-£461,000
Total Present Value of Benefits	Option A2a	-£2,280,800	£1,477,700	-£353,300	£2,283,100
	Option A2b	£3,724,000	£4,528,400	£4,123,300	£5,580,100
	Option A3a	-£264,300	£757,500	£345,900	£1,031,700
	Option A3b	£2,295,200	£2,487,900	£3,344,500	£6,000,600
	Option A4	£5,859,000	£7,134,900	£5,481,300	£8,153,500
	Option A5	£7,023,600	£10,592,500	£9,080,300	£9,543,500
Present Value of Cost to Government (Scheme Cost)	Option A2a	£6,057,000			
	Option A2b	£4,861,000			
	Option A3a	£8,223,000			
	Option A3b	£7,579,000			
	Option A4	£3,543,000			
	Option A5	£4,197,000			
Net Present Value	Option A2a	-£8,337,800	-£4,579,300	-£6,410,300	-£3,773,900
	Option A2b	-£1,137,000	-£332,600	-£737,700	£719,100
	Option A3a	-£8,487,300	-£7,465,500	-£7,877,100	-£7,191,300
	Option A3b	-£5,283,800	-£5,091,100	-£4,234,500	-£1,578,400
	Option A4	£2,316,000	£3,591,900	£1,938,300	£4,610,500
	Option A5	£2,826,600	£6,395,500	£4,883,300	£5,346,500
Benefit-Cost to Government Ratio (BCR)	**Option A2a**	**-0.4**	**0.2**	**-0.1**	**0.4**
	Option A2b	**0.8**	**0.9**	**0.8**	**1.1**
	Option A3a	**0.0**	**0.1**	**0.0**	**0.1**
	Option A3b	**0.3**	**0.3**	**0.4**	**0.8**
	Option A4	**1.7**	**2.0**	**1.5**	**2.3**
	Option A5	**1.7**	**2.5**	**2.2**	**2.3**

3.5.6 While a detailed demand and benefits modelling exercise would be required to fully capture and understand the potential benefits of the active travel schemes, should these schemes be progressed further, the following is noted:

- Option C1 routes outwith a dense urban environment and would predominantly provide access to the ASH and proposed ETZ areas. It is highly unlikely that overall user demand on the route would be sufficient to provide benefits (through health benefits from

increased physical activity, savings from reduced absenteeism, journey quality improvements, decongestion, accidents and reduced environmental costs) that would outweigh the cost of construction and on-going maintenance.

- Option C4, routes directly through Altens industrial estate and would offer improved active travel connectivity to businesses within Altens industrial estate as well as the proposed ETZ and ASH areas to the north. If the provision of a coloured screed cycle way and on-road line marking version was taken forward, then the benefits the option could deliver are more likely to provide a higher BCR than Option C1.

3.6 Detailed Appraisal Outcomes (Monetised and Non-Monetised Benefits)

3.6.1 The detailed appraisal outcomes for each scheme are presented below in Table 3:8. This includes the key points as noted in the tables above and further key points in relation to non-monetised benefits.

Table 3:8: Option Key Advantages and Disadvantages

Option	Description	Key Advantages	Key Disadvantages
A2a/b	New road link from either Greenwell Road (Option A2a) or Greenbank Road (Option A2b) across St Fitticks Park to new Coast Road junction (new underbridge at the railway line	• Provides less circuitous routeing to the new ASH / proposed ETZ area for HGV traffic from the city centre / West (George VI bridge) • Enhances transport resilience and improves perceptions through provision of additional route and crossing of the railway (underbridge) • Provides connection between the new ASH / proposed ETZ and East Tullos Industrial estate helping to maximise and support the regeneration of East Tullos • Minor accident benefits (vehicles on lower speed roads) • Provides the greatest increase in overall workforce accessibility to the area	• Route requires cutting into the Ness landfill site to south of the railway line, likely to be a costly exercise, with need to remove material and hazardous substances. High cost uncertainty associated with this. • Underpass height clearance / alignment would limit route use by some abnormal loads • Increased HGV traffic on Wellington Road (between Hareness Road and Greenbank / Greenwells Road) • Benefit Cost Ratio (BCR) is estimated in range: A2a: -0.3 to +0.3 and A2b: +0.8 to +1.1. *BCRs less than one indicate benefits less than scheme costs. Negative BCR indicates overall negative benefits – driven by the impact to existing traffic on Wellington Road – more pronounced in A2a due to new signals on Wellington Road at Greenwell Road* • Impact on commercial property at eastern extent of Greenwell / Greenbank Road • Constrains potential for sustainable transport options on Wellington Road (developed as part of the Wellington Road Multi-modal Corridor study) • Constrains land availability within the proposed ETZ site at St. Fitticks due to space required for new road and associated earthworks / flood treatment • Would impact on St Fitticks Community Park and potentially the northern tip of Tullos Hill Conservation Site
A3a/b	New road link Greenwell Road across the former Ness Landfill Site and a new bridge across the railway to Coast Road	• Provides less circuitous routeing to the new ASH / proposed ETZ area for HGV traffic from the city centre / West (George VI bridge) • Enhances transport resilience and improve perceptions through provision of additional route and crossing of the railway (bridge) • Provides connection between the new ASH / proposed ETZ and East Tullos Industrial estate helping to maximise and support the regeneration of East Tullos	• Road gradient required from Coast Road to new bridge across railway (around 18%) is far higher than that recommended for HGVs on a strategic route and would not be useable by abnormal loads. In addition, a new Scottish Water access road would be at a gradient of 20% • Retaining wall required would encroach on Scottish Water land and require significant cutting into the landfill site south of the railway line, likely to be a costly exercise, with need to remove material and hazardous substances. Very high levels of

Option	Description	Key Advantages	Key Disadvantages
		• Does not constrain proposed ETZ activities as road does not route through the proposed site • Minor accident benefits (vehicles on lower speed roads)	engineering & cost risk & uncertainty associated with this scale of intrusion into Ness landfill site • Benefit Cost Ratio is estimated in range: A3a: 0.0 to +0.1 and A3b: +0.3 to +0.8. *BCRs less than one indicate benefits less than scheme costs – with low benefits driven by the impact on existing traffic on Wellington Road – more pronounced in A3a due to new signals on Wellington Road at Greenwell Road* • Increased HGV traffic on Wellington Road (between Hareness Road and Greenbank / Greenwells Road) • Impact on commercial property at the eastern extent of Greenwell / Greenbank Road • Constrains the potential for sustainable transport options on Wellington Road (developed as part of the Wellington Road Multi-modal Corridor study)
A4	New bridge on Coast Road combined with potential widening of Coast Road	• Enhances existing route to Aberdeen South Harbour via Hareness Road • Provides consistently reduced journey times to the Harbour / proposed ETZ area across all time periods • Potential to provide access for long abnormal loads currently constrained by the alignment of the bridge on Coast Road • Positive impact in terms of perception although Coast Road and Hareness Road remain the primary route to the harbour • No additional traffic on Wellington Road north of Hareness Road • Less constraint on the potential for sustainable transport options on Wellington Road (developed as part of the Wellington Road Multi-modal Corridor study) • Provides improved link between the proposed ETZ site at Doonies Farm and ASH / proposed ETZ site at St. Fitticks • One of the lowest cost road options • Benefit Cost Ratio estimated in range: +1.4 to +2.0 *A BCR figure greater than 1 indicates the benefits of the scheme are greater than the estimated scheme costs*	• Hareness Road would remain the primary route and therefore traffic in Altens and at the Hareness Road roundabout would increase with ASH and proposed ETZ traffic • Parking restriction may be required on Hareness Road, impacting on businesses within the industrial estate • Would not provide a direct new connection between ASH / proposed ETZ and East Tullos • Delivery of new bridge may require construction works through the Taylor's former landfill site and therefore feasibility is uncertain and there is potential for negative environmental impacts

Option	Description	Key Advantages	Key Disadvantages
A5	New road link between Coast Road and Souter Head Road and new bridge over the railway	• Provides additional route to Aberdeen South Harbour • Provides a shorter route to the AWPR than all existing routes • Provides consistently reduced journey times (from Charleston junction and King George VI bridge) to Harbour / proposed ETZ area across all time periods (particularly to/from Charleston junction) • Potential to provide access for long abnormal loads currently constrained by the alignment of the bridge on Coast Road • Positive impact in terms of perception of access to the harbour • Positive impact in terms of transport resilience • No additional traffic impact on Wellington Road north of Hareness Rd and reduced traffic between Souter Head roundabout and Hareness Road • Benefit Cost Ratio estimated in range: +1.5 – +2.3 *A BCR figure greater than 1 indicates the benefits of the scheme are greater than the estimated scheme costs* • Less constraint on the potential for sustainable transport options on Wellington Road (developed as part of the Wellington Road Multi-modal Corridor study) • Improved link between the proposed ETZ site at Doonies Farm and ASH/proposed ETZ site at St. Fitticks • Reduces traffic on Langdykes Road	• Despite the realignment of Coast Road, there would be noise, vibration, and severance impacts, to some residents in Burnbanks Village – although this could be partly mitigated against through use of a low noise road surface • Would not provide a direct connection between ASH / proposed ETZ and East Tullos • Delivery of new bridge may require construction works through the Taylor's former landfill site and therefore feasibility is uncertain and there is potential for negative environmental impacts • Increased traffic levels on Souter Head Road impacting on commercial properties there • Impact on commercial property at east end of Souter Head Road which would be required to relocate • Parking restriction may be required on Souter Head Road, impacting on businesses within the industrial estate
C1	Formalise and enhance provision through St. Fitticks Park - linking the Coast Road with Torry / Wellington Road and onwards to the Deeside Way to enable access to ASH / ETZ sites from the north and west	• Would provide a reasonably direct cycleway between Aberdeen city centre and new harbour / both proposed ETZ sites • Connects the harbour / proposed ETZ area to the Deeside Way • Partly off-road/segregated route which avoids heavily trafficked routes improves the safety of active travel access to the area • Sustainable travel option strengthens the 'green transition' ethos of the proposed ETZ	• There are several pinch points on the route where the footway is less than the required minimum standard for a shared use facility and there is limited potential for widening. This would need to be explored at the detailed design stage. • Potential for providing improved active travel provision on Wellington Road may conflict with some of the proposals outlined in Wellington Road multi-modal corridor study

Option	Description	Key Advantages	Key Disadvantages
C4	Dedicated cycle route provision on Hareness Road (linking with existing provision on the Coast Road and planned improvements on Wellington Road) to enable access to ASH / ETZ sites from the south	• May encourage modal shift • Aligns with policy aspirations to improve active travel access, including on Wellington Road • Potential to build into the active travel proposal improvements on Wellington Road being considered in the Wellington Road multi-modal corridor study	• Interaction with HGV traffic on Hareness Road would need to be fully considered to avoid significant safety concerns. This would need to be explored at the detailed design stage • Concerns may be raised from drivers / businesses should a reduction in carriageway space be required

3.7 Key Risks

3.7.1 The risk and uncertainty inherent in the implementation of the options has been considered and is shown in Table 3:9.

3.7.2 Note that the uncertainty surrounding the COVID-19 pandemic has not been individually noted for each option. However, there is the potential for the structural impacts of the COVID-19 pandemic to materially alter societal behaviour with respect to work and travel. The aftermath of the pandemic has the potential to impact on the way we work, live and travel. Given the national need for working from home, employers and employees have had to adapt accordingly, implementing working strategies and technological solutions to enable this. The outcome may be a new working reality where staff choose to work more often from home. There are also significant short to medium term restrictions on public transport capacities due to the requirements of social distancing. This evolving working and travel environment may have implications, especially for the public transport and also active travel schemes at the planning stages, as these may need to be revisited to explore whether they are still appropriate, or whether different types of schemes may now be considered more relevant. However, given the nature of the activities at ASH and proposed ETZ, there is perhaps less scope for home working associated with these sites. This should be considered further as the options progress.

3.7.3 For all the options, given the cost estimates provide only a broad and relative indication of construction costs for the proposed works. The costs do not include allowances for various elements, as listed in Section 3.4, a number of which could be substantial. There is therefore a key risk across all options that the costs may be higher than those estimated, with this risk being further mitigated during the early stages of detailed design, which includes land and utility searches and further engagement with Network Rail.

3.7.4 A complete Risk Register is presented in Appendix B. with the top economic risks identified as:

- Funding Delayed (REF: 2_Peo)
- Covid-19 Pandemic resulting in Increased Costs (REF: 6_Env)
- Network Rail Agreement (REF: 17_Peo)

Table 3:9: Risk and Uncertainty

Option	Option Description	Risk		Comments	Potential Mitigation
A2a/b	New road connection from Greenwell Road / Greenbank Road via St Fitticks Community Park to Coast Road with a new underbridge under the railway line	Delivery	Design	Route design may constrain land availability within the proposed ETZ site at St. Fitticks due to space required for new road and associated earthworks / flood treatment. This may reduce the opportunities and activities the land at the proposed ETZ site can offer, impacting on the overall success of the site.	On-going dialogue with Opportunity North East as the masterplanning work for the proposed ETZ site develops.
			Design	A new underpass under the railway line is likely to be complex and require extensive consultation and approvals from Network Rail. The railway crossings also introduce the need for disruptive possessions of the railway, which need advance planning and consultation with Network Rail to plan and deliver.	Early discussions with Network Rail to ensure any design show-stoppers are understood as early as possible. On-going dialogue with Network Rail as the route design progresses.
			Design	The route under the railway line is constrained in both vertical and horizontal geometry. This may prevent certain abnormal loads from utilising the route. Such loads would still be required to route through the residential area of Torry. This may deter potential businesses from using ASH.	Continued dialogue with Aberdeen Harbour Board and Opportunity North East to establish the exact nature of anticipated abnormal loads to ensure the route can be designed, as far as possible, to maximise potential use by abnormal loads. Where this will constrain use of the route by certain vehicles, this should be clarified to all stakeholders at the earliest opportunity.
			Planning	Both option variants would have some impact either direct or indirect on property within East Tullos industrial estate. This may create both benefits to businesses through improved connectivity but may also create disbenefits through increased traffic past business frontages as well as creating difficulties in exiting onto Wellington Road if congested.	On-going dialogue with businesses in East Tullos industrial estate to explain the outcomes of the appraisal. Further detailed traffic modelling as work progresses to update the model once the likely proposed ETZ activities are more defined.
			Planning	The option runs through East Tullos industrial estate and would involve the introduction of additional traffic regulation to improve the transport corridor and reduce the likelihood of parked vehicles delaying traffic. Whilst much of the road extents in the industrial estate are already regulated, the removal of parking would be controversial and potentially	On-going dialogue with businesses in East Tullos industrial estate to explain the likely parking restrictions to come into force.

Option	Option Description	Risk		Comments	Potential Mitigation
				be met with some resistance from businesses based in the industrial estates.	
			Planning	Construction of the route would impact on St Fitticks Community Park and potentially the northern tip of Tullos Hill Conservation Site. This is likely to be met with resistance from the local community.	On-going engagement with the local community to explain the proposals and present the benefits of the scheme to the local community.
			Construction	Construction of the route requires cutting into the landfill site to the south of the railway line. This is likely to be a costly exercise, with the need to remove material and hazardous substances. While preliminary investigations into the waste at the site can provide an indication of the likely cost, once construction commences, further unanticipated waste materials may be uncovered which require significant additional cost to safety remove and dispose of.	Ensure any preliminary investigations into the waste at the site are sufficient to minimise future risk of finding unexpected waste material during construction.
		Operational	Demand	The 'value for money' assessment of the options has been undertaken assuming a level of traffic generated by the new ASH and proposed ETZ sites. If the traffic estimates were much higher than those which transpire, the schemes would provide a lower overall value for money with overall scheme costs higher than the achieved benefits. The BCR for Option A2a and A2b already show a value, in most scenarios, of less than 1 (and in some scenarios negative) so any reduction could generate negative ratios in a greater number of scenarios. This means implementing the scheme creates overall disbenefits.	Revisit the traffic modelling as work progresses to update the traffic generation estimates, traffic model, and economic evaluation once the likely proposed ETZ activities are more defined.

Option	Option Description	Risk		Comments	Potential Mitigation
A3a/b	New road connection from Greenwell Road / Greenbank Road via the former Ness Landfill site and a new bridge over the railway	Delivery	Design	A new bridge over the railway line is likely to be complex and require extensive consultation and approvals from Network Rail. The railway crossings also introduce the need for disruptive possessions of the railway, which need advance planning and consultation with Network Rail to plan and deliver.	Early discussions with Network Rail to ensure any design show-stoppers are understood as early as possible. On-going dialogue with Network Rail as the route design progresses.
			Design	The options both require a gradient in excess of current design standards to facilitate a connection across the railway to the Coast Road. This would constrain the route for freight traffic.	Ensure both Aberdeen Harbour Board and Opportunity North East are aware of this constraint.
			Planning	Both option variants would have some impact either direct or indirect on property within East Tullos industrial estate. This may create both benefits to businesses through improved connectivity but may also create disbenefits through increased traffic past business frontages as well as creating difficulties in existing onto Wellington Road if congested.	On-going dialogue with businesses in East Tullos industrial estate to explain the outcomes of the appraisal. Further detailed traffic modelling as work progresses to update the model once the likely proposed ETZ activities are more defined.
			Planning	The option runs through East Tullos industrial estate and would involve the introduction of additional traffic regulation to improve the transport corridor and reduce the likelihood of parked vehicles delaying traffic. Whilst much of the road extents in the industrial estate are already regulated, the removal of parking would be controversial and potentially be met with some resistance from businesses based in the industrial estates.	On-going dialogue with businesses in East Tullos industrial estate to explain the likely parking restrictions to come into force.
			Construction	Construction of the route would require very substantial cutting into the landfill site to the south of the railway line. This is likely to be a costly exercise, with the need to dispose of material and hazardous substances. While preliminary investigations into the waste at the site can provide an indication of the likely cost, once construction commences, further unanticipated waste materials may	Ensure any preliminary investigations into the waste at the site are sufficient to minimise future risk of finding unexpected waste material during construction.

Option	Option Description	Risk		Comments	Potential Mitigation
				be uncovered which require significant additional cost to safety remove and dispose of.	
		Operational	Demand	The 'value for money' assessment of the options has been undertaken assuming a level of traffic generated by the ASH and proposed ETZ sites. If the traffic estimates were much higher than those which transpire, the schemes would provide a lower overall value for money with potentially overall scheme costs higher than the achieved benefits. The BCR for both Option A3a and A3b already show a value, in all scenarios, of less than 1 (and in some scenarios zero) so any reduction could generate negative ratios in some traffic demand scenarios. This means implementing the scheme creates overall disbenefits.	Revisit the traffic modelling as work progresses to update the traffic generation estimates, traffic model, and economic evaluation once the likely proposed ETZ activities are more defined.
A4	Improve the existing route via Hareness Road through the provision of a new bridge over the railway on Coast Road	Delivery	Planning	The option includes the upgrading of Coast Road to provide a wider road carriageway for larger vehicles, which would use the road when the ASH and proposed ETZ sites are operational. This upgrade may require third party land from adjacent landholdings to facilitate the creation of a wider road with standard 2m wide verges.	Investigate whether third party land can potentially be avoided if a narrow verge is considered permissible by the Roads Authority.
			Planning	The option would involve the introduction of additional traffic regulation to improve the transport corridor and reduce the likelihood of parked vehicles delaying traffic. Whilst much of the road extents in the industrial estate are already regulated, the removal of parking would be controversial and potentially be met with some resistance from businesses based in the industrial estates.	On-going dialogue with businesses in Altens industrial estate to explain the likely parking restrictions to come into force.

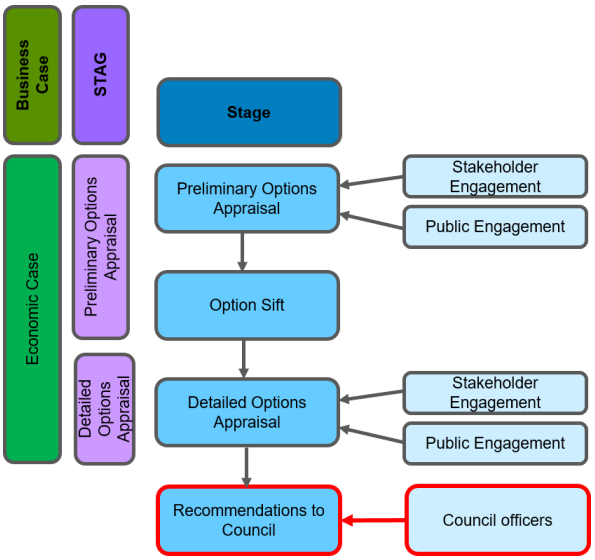
Option	Option Description	Risk		Comments	Potential Mitigation
			Construction	Construction of the route may require cutting into the former Taylor landfill site to the east of the railway line. If required, this is likely to be a costly exercise, with the need to dispose of material and hazardous substances. While preliminary investigations into the waste at the site can provide an indication of the likely cost, once construction commences, further unanticipated waste materials may be uncovered which require significant additional cost to safety remove and dispose of.	Ensure any preliminary investigations into the waste at the site are sufficient to minimise future risk of finding unexpected waste material during construction. Detailed alignments considered to minimise this risk.
		Operational	Demand	The 'value for money' assessment of the option has been undertaken assuming a level of traffic generated by the ASH and proposed ETZ sites. If the traffic estimates were much higher than those which transpire, the scheme would provide a lower overall value for money. However, as the BCR has been estimated at around 1.5 to 2, it is unlikely that demand would be sufficiently less to generate a ratio less than 1.	Revisit the traffic modelling as work progresses to update the traffic generation estimates, traffic model, and economic evaluation once the likely proposed ETZ activities are more defined.
A5	New road connection between Coast Road and Souter Head Road and a new bridge over the railway on Coast Road.	Delivery	Planning	The option route passes close to the residential area of Burnbanks Village. This is likely to create noise and vibration impacts, and severance impacts, to residents in the village and is likely to be meet with opposition from the local community.	Early, and on-going engagement with Burnbank Village residents. Noise and vibration impacts could be partly mitigated against through use of a low noise road surface.
			Planning	The option requires part-demolition of a business premise at the end of Souter Head Road to enable the new link between Altens industrial estate and the Coast Road. The business in question has a long-term lease of the site and recently have invested significantly in its capabilities at the site. On-going business investment decisions are being made in relation to the site and the outcomes of this study could significantly impact on these.	Early, and on-going engagement with the business (and potentially others on Souter Head Road) likely to be impacted to discuss potential relocation packages and to provide them with suitable information to allow for informed business investment and operational decisions to be made. Discussions would cover the potential for future acquisition of *some* of the site, due to the way that the potential road option would interact with the facility i.e. it might not be necessary for the whole business to be acquired and relocated.

Option	Option Description	Risk		Comments	Potential Mitigation
			Planning	The option would have some impact either direct or indirect on property within Altens industrial estate. This may create both benefits to businesses through improved connectivity but may also create disbenefits through increased traffic past business frontages as well as creating increased queuing on exiting the estate at Souter Head roundabout.	On-going dialogue with businesses in Altens industrial estate to explain the outcomes of the appraisal. Further traffic modelling as work progresses to update the model once the likely proposed ETZ activities are more defined.
			Planning	The option would generate a higher volume of traffic through Altens industrial estate and involve the introduction of additional traffic regulation to improve Souter Head Road and reduce the likelihood of parked vehicles delaying traffic. Any removal of parking would be controversial and potentially be met with some resistance from businesses based in the industrial estates.	On-going dialogue with businesses in Altens industrial estate to explain the likely parking restrictions to come into force.
			Planning	The option includes the upgrading of Coast Road to provide a wider road carriageway for larger vehicles, which would use the road when the ASH and proposed ETZ sites are operational. This upgrade may require third party land from adjacent landholdings to facilitate the creation of a wider road with standard 2m wide verges.	Investigate whether third party land can potentially be avoided if a narrow verge is considered permissible by the Roads Authority.
			Construction	Construction of the route may require cutting into the Taylor landfill site to the east of the railway line. This is likely to be a costly exercise, with the need to dispose of material and hazardous substances. While preliminary investigations into the waste at the site can provide an indication of the likely cost, once construction commences, further unanticipated waste materials may be uncovered which require significant additional cost to safety remove and dispose of.	Ensure any preliminary investigations into the waste at the site are sufficient to minimise future risk of finding unexpected waste material during construction.
		Operational	Demand	The 'value for money' assessment of the option has been undertaken assuming a level of traffic generated by the new harbour and proposed ETZ sites. If the traffic estimates were much higher than those which transpire, the scheme would provide a lower overall value for money. However, as the Benefit to Cost ratio has been	Revisit the traffic modelling as work progresses to update the traffic generation estimates, traffic model, and economic evaluation once the likely proposed ETZ activities are more defined.

Option	Option Description	Risk		Comments	Potential Mitigation
				estimated at around 1.5 – 2.3, it is unlikely that demand would be sufficiently less to generate a ratio less than 1 (which could then not be considered to offer value for money).	
C1 / C4	C1: Formalise and enhance provision through St. Fitticks Park - linking the Coast Road with Torry / Wellington Road C4: Dedicated cycle route provision on Hareness Road (linking with existing provision on the Coast Road and planned improvements on Wellington Road)	Delivery	Planning	For Option C1, there is a risk due to association with the ETZ master-planning exercise, and associated ongoing planning considerations. For Option C4, if significant works were undertaken to provide a tiered cycleway alongside a segregated footway on Hareness Road, there may be concerns raised from drivers / businesses within Altens industrial estate should a reduction in carriageway space be required.	Mitigate by not progressing Active Travel Option C1 until there is a clearer outcome from the ETZ master-planning work and delivery mechanisms with the ETZ. On-going dialogue with local business as proposals develop.
		Operational	Demand	If use of the routes is not sufficient, the routes will not generate value for money.	Detailed Cost-Benefit analysis of the active travel routes as more detail is known about the activities and likely employees at the proposed ETZ sites. On-going promotion of use of active travel and the availability of the route in both accessing the harbour and proposed ETZ sites, as well as by other users wishing to access the Coast Road area.
		Operational	Maintenance	Maintenance will be required to ensure the route is safe and secure. A lack of appropriate maintenance may reduce use of the route and encourage people back into their cars.	Ensure the maintenance needs of the route are understood and included in the Council's ongoing active travel commitments.

3.8 Summary and Recommendations

3.8.1 In summary, the appraisal process highlighted that road Options A4 and A5 provide the greatest monetised economic benefits over the 60-year assessment period (benefit to cost ratio). Both options provide consistently reduced journey times to ASH / proposed ETZ area across all time periods and there would be no additional traffic on Wellington Road north of Hareness Road. Both options also significantly reduce the current constraint caused by the existing road bridge over the railway on the Coast Road. Option A4 provides the lowest cost estimate and has the least risk attached to it. In the public consultation Option A4 is the only option where the overall feeling was agreement with the option as opposed to disagreement.



3.8.2 The technical feasibility for Option A4 from an environmental, topographical, ground and transport perspective would make construction of this option significantly less problematic when compared with other options. The appraisal suggests that if Option A4 is preferred, then in the longer term the extension to include a link through Souter Head Road within Option A5 would provide additional benefits. However, the significant additional cost and risk means that its provision is not supported in the shorter term.

3.8.3 At the Aberdeen City Council City Growth and Resources Committee on 3rd February 2021, it was therefore recommended, agreed and instructed that Option A4, with active travel Options C1 and C4, be progressed. Active travel Option C4 follows the Option A4 route along Hareness Road (and linking to the existing Coast Road route) and therefore complements Option A4 in that it provides an active travel route from Aberdeen (South) to both the Aberdeen South Harbour area and, with the inclusion of Option C1, a route through to the city centre. During the design process, consideration of improving Crawpeel Road as an additional / alternative signed road connection linking the harbour area to Wellington Road (at Souter Head) and the strategic road network should also be undertaken.

3.8.4 At this stage, the constraints of the railway line, site topography, and the location and status of the Ness Landfill Site preclude any recommendation for an option that provides an improved direct link to East Tullos Industrial Estate from the Coast Road. Such a link would not provide a meaningful connection between the strategic road network and the new harbour and given the 'double-back' nature of such a route, it would be expected that external traffic would continue to route via Hareness / Coast Road to access Charleston junction. However, East Tullos industrial estate represents a large area of land close to the harbour / proposed ETZ sites that has been specified for redevelopment as the building stock is ageing and it is therefore recognised that a link directly connecting East Tullos to ASH / proposed ETZ sites has the potential to support the regeneration of East Tullos, support ASH / proposed ETZ related activities and unlock inward investment in the area. The feasibility of delivering this option would be highly dependent on further detailed work to investigate the landfill and the associated scheme costings.

3.8.5 Given the above, the focus of the financial, commercial and management cases presented in the remaining sections of this report therefore focus on the delivery of Option A4 (and the complementary active travel options C1 and C4), as shown in Figure 3:1.

3.8.6 A feasibility design drawing for Option A4 is presented in Appendix A.

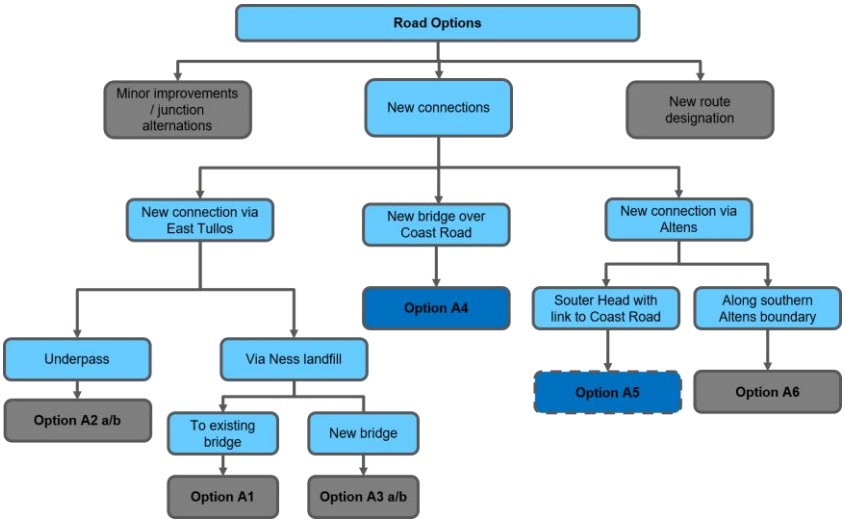


Figure 3:1: Recommendation to Council (road options)

4 Financial Case

4.1 Introduction

4.1.1 The purpose of this Financial Case is to demonstrate that the costs of the preferred Option A4 is realistic and affordable.

4.1.2 Preliminary cost estimates have been prepared for construction costs only. The costs do not take account of land or property acquisition, any required statutory approvals or consents, adjustments to existing public utility apparatus, surveys and investigations, design works and supervision fees or VAT. This elements could be significant, and will be continue to be investigated during the early stages of the detailed design process.

4.1.3 The project's funding was approved as part of the Aberdeen City Region Deal by Aberdeen City Council and Aberdeenshire Council on 17th August 2016 and by the UK and Scottish Governments on 21st November 2016. Within the Aberdeen City Region Deal, £25m has been allocated from the UK Government (£12.5m) and Scottish Government (£12.5m) for the transport infrastructure to support the harbour expansion. The budget for this project will come from this funding stream.

4.1.4 The estimated cost for Option A4, C1 and C4 DMRB Stages 2 & 3 design is **£1,200,000** plus **£150,000** for surveys. The cost is based on a construction value of £6.5m (including active travel).

4.2 Capital Costs

4.2.1 No formal assessment of risk has been undertaken in preparing the cost estimates due to the limited information available at present. As per HM Treasury Green Book Guidance (2020), Optimism Bias is not included in the Financial Case. The cost estimates also do not include allowances for:

- Costs associated with land / property acquisition;
- Statutory approvals / consents;
- Adjustments to existing public utility apparatus;
- Surveys and investigations;
- Design and works supervision fees; or
- Value Added Tax (VAT) and Inflation, as the date of construction is yet to be established.

4.2.2 The total capital cost estimate of Option A4 is £4.6m. This represents the highest costs estimates presented in the Economic Case. A breakdown of the estimated capital cost estimates is shown in the table below. At this stage in the project, it is important to note the costs presented in the table are estimated at a high level and are subject to substantial uncertainty and risk. A more detailed assessment of the budgetary implications of the project will be undertaken during the next stages of the business case process and at this stage there is therefore a need to retain the £25m allocated funding for the scheme.

Table 4:1: Estimated Capital Costs (Excludes Land, Consents, Utilities, Surveys, VAT and Optimism Bias)

Route Corridor - Option A4	Cost (£)
Carriageway resurfacing (Hareness Road)	£780,000
Carriageway widening (Coast Road)	£186,225
New single carriageway all-purpose road	£720,000
Landfill material excavation and disposal	£164,700
New landfill site access	£214,500
Railway Overbridge	£2,100,000
Railway Overbridge - Network Rail Costs	£500,000
TOTAL	**£4,665,425**

4.2.3 A breakdown of the estimated capital costs for Active Travel Option C1 (assuming a 5m wide segregated path) are shown in the table below.

Table 4:2: Active Travel Option C1 (Excludes Land, Consents, Utilities, Surveys, VAT and Optimism Bias)

Active Travel Option C1	Cost (£)
Footway Construction (Bit-mac plus edgings)	£679,770
Lighting (4m columns and connections)	£14,571
Cable, trench, ducting, pvc tape	£76,285
Earthworks (Net fill)	£209,167
Footbridge (Reinforced insitu concrete, 5m span)	£157,500
Toucan Crossing (Crossings at both connections on Coast Road)	132,000
TOTAL	**£1,269,293**

4.2.4 A breakdown of the estimated capital costs for Active Travel Option C4 (assumed a tiered cycleway along Hareness Road) are shown in the table below.

Table 4:3: Active Travel Option C4 (Excludes Land, Consents, Utilities, Surveys, VAT and Optimism Bias

Active Travel Option C4	Cost (£)
Cold milling of surface course	£76,304
30mm HRA Surface Coarse with Limestone Chips	£56,050.
Kerb removal and disposal	£1,900
Breakout footway	£15,371
Cold milling of surface course	£38,152
50mm Dense Ashphalt Concrete Binder Course	£59,774

Active Travel Option C4	Cost (£)
30mm HRA Surface Course with Red Chippings	£56,050
Precast concrete kerb	£69,616
Precast Gully (40m spacing)	£51,224
Dispose of existing gully grating and frame	£469
Carrier Pipe to existing gully pot	£24,168
Gully connection to existing gully pot	£9,249
Sub-Total	£458,327
Utilities (30%)	£137,498
TOTAL	**£595,826**

4.2.5 The total overall capital cost is presented in the table below.

Table 4:4: Total Estimated Capital Costs (Excludes Land, Consents, Utilities, Surveys, VAT and Optimism Bias

	Cost (£)
Route Corridor - Option A4	£4,665,425
Active Travel Option C1 (5m wide segregated path)	£1,269,293
Active Travel Option C4 (tiered cycle way on Hareness Road)	£595,826
TOTAL	**£6,530,545**

Cost Estimates

4.2.6 As the proposed road interventions are at the feasibility design stage, only high-level construction cost estimates can be provided. The cost estimate has been prepared using approximate estimating rates extracted from '*SPON's Civil Engineering and Highway Works Price Book 2019*'.

4.2.7 Costs could increase or decrease once more information becomes available and the design process advances. Consequently, the estimates provided should only be used as a broad indication of construction costs for the proposed works and, as noted above, there is therefore a need to retain the £25m City Regional Deal allocated funding for the scheme.

Design Cost Estimate

4.2.8 The cost for DMRB Stages 2 & 3 design of Option A4, C1 and C4 has been estimated at **£1,200,000** inclusive of surveys and project management costs, based on the currently understood scope of works, initial capital cost estimates developed above, and allowances for the noted exclusions.

Expenditure on Assets Not Council Owned

4.2.9 Current Scottish Government Guidance allows the Council to invest capital resources in assets that are not owned by the Council.

4.2.10 Widening the Coast Road may require the acquisition of land from third parties and there would be costs associated with doing so.

4.2.11 Option A4 requires a new bridge over the railway to the south of Aberdeen South Harbour. The new bridge over the railway line and specific alignment would require agreement with Network Rail who may wish to take ownership of the design process.

4.2.12 Network Rail has indicated that should a new bridge be constructed, Aberdeen City Council would need to take ownership of the bridge.

Cost Overruns

4.2.13 As Aberdeen City Council is the project owner it will have responsibility for cost over-runs.

VAT

4.2.14 The Council is VAT registered and pays and recovers VAT according to HMRC guidelines.

4.3 Affordability Assessment

Ongoing Revenue Considerations

4.3.1 The preferred route option, Option A4, improves an existing route via Hareness Road through the provision of a new bridge over the railway on Coast Road. The road infrastructure is therefore already part of the public road network and there will be committed revenue expenditure for ongoing maintenance from the local authority. The road infrastructure constructed as part of the project will be adopted by ACC. Note this is reaffirmed in the Commercial Case.

4.3.2 As the current Coast Road bridge is in the ownership of Network Rail, there will consequently be an ongoing requirement for its maintenance, the costs of which will be met as part of the local authority's continuous cycle of revenue expenditure.

4.3.3 The ongoing maintenance costs for a road are challenging to estimate as they can be affected by a number of different factors such as weather conditions, frequency of extreme events, accident rates, inflation and the location of the road (urban or rural). However, statistics gathered across Scotland for the *Local Government Benchmarking Framework* (LGBF)[8] provide a means of estimating the cost of roads per kilometre per annum based on Local Authority experience across Scotland.

4.3.4 The 2019-2020 benchmarking report from the LGBF indicates that approximately £550million was spent on roads in 2019-2020 and approximately 45% of that was revenue expenditure on tasks such as:

- roads construction.
- structural maintenance.

[8] LGBF Benchmarking Overview Report 2019-20 (improvementservice.org.uk)

- environmental maintenance.
- winter maintenance.
- lighting.
- safety maintenance.
- emergency patching and
- routine repairs.

4.3.5 Based on current budgets and spends, the average cost of roads across Scotland has been calculated to be £9,619 per kilometre and is based on the capital and revenue expenditure on roads by Local Authorities across Scotland. The reporting indicates that approximately 45% of this expenditure in 2019-2020 was on revenue related maintenance activities, which translates to an average cost of £4,330 per kilometre for roads maintenance. However, the cost of roads across Scotland varies, and this is largely related to rurality, with the evidence from Local Authorities indicating significantly higher capital and revenue costs for roads in urban areas compared to rural areas. On average the capital and revenue cost for a kilometre of urban road versus a rural road was £17,190 compared to £5,850.

4.3.6 The new link road to Aberdeen South Harbour will be primarily in an urban environment and based on experience across Scotland, the average cost of maintaining this road will be higher than the average for roads across Scotland. From the LGBF Benchmarking Report, the average cost for an urban road in 2019-2020 was £17,190. However, this figure was made up of capital and revenue expenditure. Based on the overall capital and revenue split for 2019-2020, 45% of this figure could be attributed to revenue costs relating to maintenance activities to estimate the split in costs. This would provide a figure of £7,735 per kilometre for an urban road maintenance cost. This is just over £3,400 higher than the average cost per kilometre in Scotland based on the 2019-2020 figures.

4.3.7 The proposed route from the Hareness Roundabout on the A956 to the new harbour will be approximately 4km in length. Based on a cost per kilometre of £7,735 for maintenance of an urban road this would equate to an average annual maintenance cost of £30,940 for this road. This would need to funded in perpetuity by Aberdeen City Council. However, it should be noted that the actual costs per year are likely to vary with reduced costs in the first five years post construction and costs increasing after this point as elements of the road infrastructure reach the end of their working life and need replaced.

4.3.8 Based on the available data on current levels of spend on roads maintenance across Scotland, over a 25-year period it is estimated that the net investment in roads maintenance will cost approximately **£800,000**. However, it should be noted that this estimate is based on an assumption that levels of investment in roads maintenance will remain at similar levels to those in 2019-2020. It should also be noted that the estimate is based on present day costs and no allowance has been made for cost inflation over the period.

4.3.9 Monitoring and evaluation (M&E) costs have been incorporated at £50,000 over the lifetime of the project analysis period (25-years, covering the gateway periods). This equates to £2,000 per annum.

4.4 Financial Risks

4.4.1 Key risks and uncertainties associated with the delivery and operation of Option A4 have been identified (Table 3:8) and have been used to factor risk into more detailed cost estimates.

4.4.2 From the Risk Register presented in Appendix B, the top financial risks are identified as follows:

- Funding Delivery (REF 1_Fin)
- Additional Cost from Unanticipated Waste Materials (REF 10_Fin)

5 Commercial Case

5.1 Introduction

5.1.1 This chapter sets out the commercial case for delivery of the project. It documents the involvement of other parties and identifies key challenges and risks. The project will be procured by Aberdeen City Council who will be responsible for the operation and maintenance of the road and associated transport infrastructure.

5.2 Delivery Specification

5.2.1 The Council commissioned Stantec (formerly Peter Brett Associates LLP) in October 2017 to undertake an appraisal of transport connections for the new ASH. The aim of the study was to examine transport connectivity for the site and identify appropriate transport infrastructure and connectivity upgrades to be taken forward for detailed appraisal in the context of the Aberdeen City Region Deal. The Economic Case of this SBC has subsequently confirmed that preferred route forward. ACC is responsible for delivering the infrastructure detailed in the project description:

- New bridge over the railway on Coast Road and Coast Road capacity improvements. Designated route to ASH/ ETZ area would remain via Hareness Road
- New active travel route along Hareness Road linking the ASH/ETZ area to Wellington Road at the Hareness Road / Welington Road junction
- New formalised active travel provision through St. Fitticks Park linking the ASH/ETZ area to Tullos and onwards to Wellington Road, subject to coordination with the ETZ masterplanning exercise

Stakeholder Considerations

5.2.2 Close consultation and programme coordination with key public and private sector stakeholders will be carried out to ensure the project is delivered to limit conflict with other operations.

5.2.3 Key stakeholders (Network Rail, SEPA, utilities providers and affected frontages) with an interest in the infrastructure design will be consulted in relation to their requirements.

5.2.4 Transport Scotland, SEPA, NatureScotland other stakeholders will continue to influence the development of the project and the environmental mitigation measures associated with the infrastructure. Key beneficiaries of the route including Aberdeen Harbour Board and ETZ Ltd will also be key stakeholders.

5.2.5 Within the Council, the delivery specification is being determined in accordance with the requirements of the various departments involved in the project, including:

- Roads / Infrastructure / Flood Risk
- Planning & Economic Development
- Environment
- Land Ownership / Site Acquisition

- Legal
- Procurement

5.3 Procurement strategy

5.3.1 All procurement will be carried out in accordance with national procurement guidelines which set out key considerations in relation to a range of issues such as sustainability, community benefits and advertising through public contracting frameworks.

5.3.2 The three stages of DMRB design work and associated services will be procured through an extant approved framework such as Scotland Excel. The Scotland Excel contract is based on the established NEC Professional Service Contract and is familiar to both Council and consultants.

5.3.3 The procurement strategy for the development will also align with the Aberdeen City Council, Aberdeenshire Council and the Highland Council Joint Procurement Strategy (2017 – 2022) Version 2.0. The Joint Procurement Strategy sets out the procurement objectives and actions for 2017 – 2022 and reflects on both national and local policies and priorities. Should project delivery be post-2022 it is anticipated an updated Procurement Strategy will be in place to adhere to.

5.3.4 Currently the approach is envisaged as follows:

- the best procurement route to the market for the main construction contract for the project will be identified and agreed within the contract strategy but will include as a minimum consideration around Client design (utilising external specialist designers) and potentially a separate 'Construct Only' Works construction contract or contracts;
- the construction contract(s) are likely to be over the OJEU threshold in terms of the Public Contracts (Scotland) Regulations and will required to be advertised in line with relevant rules and regulations.
- industry standard terms and conditions will be explored and agreed within the contract strategy, with suitable Client amendments to reflect appropriate risk positions,
- contracts will be evaluated based on the Most Economical Advantageous Tender;
- the award criteria are set out in the contract strategy;
- the minimum weighting attributed to community benefits and fair working practices will follow the City Region Procurement Strategy and the City Region Community Benefits Strategy; and
- the Project will be delivered and managed by Aberdeen City Council. All contract opportunities will be advertised via the Public Contracts Scotland website.

5.3.5 The approach to procurement will be consistent with the requirements of the main funding parties, and hence, in line with capturing community benefits for local people and businesses as per the local and national strategic priorities where possible. The Joint Procurement Strategy recognises the valuable role of in supporting local businesses and third sector providers and aims to remove the barriers often faced by smaller organisations with limited resources for bidding for work tendered by the Councils.

Key Procurement Milestones

5.3.6 Key procurement milestones will be agreed as the project programme continues to evolve. The current intent is to follow a traditional procurement route i.e. employer's led design with subsequent procurement of construction services.

5.3.7 Key procurement dates and a more detailed project Gantt Chart can be found at Appendix C.

5.4 Commercial Risks

5.4.1 The project will be delivered by relevant departments within ACC, managed by the City Region Deal Transportation Workstream Group.

5.4.2 Form the Risk Register presented in Appendix B, the top commercial risks are identified as follows:

- Necessary statutory approvals for development cannot be gained or are delayed (REF: 22_Reg)
- Programme slippage incurs additional project costs (REF: 5_Peo, 7_Sch, 12_Sch, 13_Con, 15_Con, 16_Pol)
- Third Party Land Acquisition (REF: 8_Obj)

5.5 Wider considerations

Community Benefits

5.5.1 The scale of work involved in developing the infrastructure will generate a range of opportunities for training, work experience, apprenticeship and full-time work opportunities as well as potential for progression between them.

5.5.2 Clarity at an early stage and consideration of recruitment mechanisms to engage the long-term or young unemployed to take up the opportunities will be critical in attracting recruits to the project. Offering clear guidance to contractors as to what their contract bid may contain, as well as any support they may expect in delivery e.g. co-ordination of recruitment under the community benefit programme, pre-employability programmes ahead of site work to meet contract schedules, etc. will be provided. This will encourage delivery to targets set in the Benefits Realisation Plan and, in showing that the practical concerns of contractors have been considered in advance, encourage high quality contractors to the opportunity. Opportunities will be taken to secure community benefits in both the design contract, and the subsequent construction contract.

5.5.3 Community benefits tracking will be monitored as part of the CRD benefits realisation plan, and the transport aspects input via the Transport Working Group.

5.5.4 Monitoring of community benefit outcomes will be undertaken as part of specific contract management processes and reported to the PMO as part of the contract reporting obligations.

5.5.5 Community benefits can include a wide range of social, environmental and economic initiatives which are secured as part of a public-sector procurement exercise. Often the most tangible benefits are those secured through targeted employment and support for small and medium enterprises through the construction contracting process.

5.5.6 Community Benefit outcomes for the project will be linked to ACC's strategic objectives and include:

- Improving economic growth and employability;
- Improving environmentally sustainable infrastructure.

5.5.7 A sourcing strategy will be provided as part of the next Business Case. This will guide procurers and bidders through the procurement process for the project. It will communicate and reinforce Aberdeen City Council's procurement priorities which include carrying out activities in a responsible and sustainable manner, considering how the economic, social and environmental wellbeing of the area can be improved, being a responsible and ethical buyer and embedding the key principles of sustainability into procurement activity for the benefit of society, the economy and the environment.

5.5.8 Community benefits will form part of the sourcing strategy. These are requirements and commitments imposed in relation to contracts and frameworks and bidders will be required to provide some form of social, economic por environmental benefit in addition to the core purpose of the contract. They are a key component in meeting obligations under the sustainable procurement duty. Community benefits could include:

- Training or recruitment, or
- The availability of sub-contracting opportunities, or
- Activity which is otherwise intended to improve the economic, social or environmental wellbeing of the Aberdeen City area in a way additional to the main purpose of the contract in which the requirement is included.

6 Management Case

6.1 Introduction

6.1.1 This chapter sets out the project governance and management structure for the Project.

6.2 Project Roles

Management Procedures

6.2.1 The project will be coordinated along with other City Region Deal transport activities by the City Region Deal Transportation Workstream Group, comprising members of Nestrans, Aberdeen City Council, Aberdeenshire Council, Transport Scotland, and the City Region Deal Programme Manager.

6.2.2 The Workstream Group will act as the de facto Project Board, reporting to Aberdeen City Region Deal Programme Board on an operational basis with the Aberdeen City Region Deal Joint Committee providing approvals of key project stages

6.2.3 The Workstream Group meets six-weekly or they may convene as required to review progress and address problems. It discusses strategic issues relative the City Deal Transport programme, key matters arising across the City Deal Transport programme and emerging from the Programme Management Office and City Deal Support Groups. It also monitors the City Deal Programme Risk Register.

6.2.4 The project delivery team has been selected to ensure that it has all the necessary skills and expertise required to deliver the project.

Project Governance Structure

6.2.5 To ensure the effective delivery of City Deal, a governance model has been agreed.

6.2.6 Clear governance provides assurance to the UK Government, Scottish Government, Aberdeen City Council, Aberdeenshire Council and the wider Aberdeen regional partners that there is open and transparent decision making and project delivery.

6.2.7 Central to the governance arrangements is the Aberdeen City Region Deal Joint Committee, established under the Local Government (Scotland) Act 1973, to oversee the implementation and monitoring of the Aberdeen City Region Deal. It will work with both Governments to ensure efficient and effective delivery of the Aberdeen City Region Deal.

6.2.8 There are nine seats on the Joint Committee, made up of three representatives from each of the administrations of Aberdeen City Council and Aberdeenshire Council, and the Board of Opportunity North East.

6.2.9 A Programme Management Office (PMO) is based in Aberdeen. Julie Richards-Wood is the Programme Manager and responsible for the coordination of project activity and programme delivery.

6.2.10 The creation of the Joint Committee represents the joint commitment of the Constituent Authorities and Opportunity North East (“ONE”) to support and oversee the implementation of the Aberdeen City Region Deal.

6.2.11 In particular it shall have the power to:

- Approve Business Cases for City Region Deal projects and any other related documentation with the exception of those where approval is reserved to either or both of the Constituent Authorities.
- Make recommendations to the Constituent Authorities and ONE in respect of projects within the City Region Deal Strategic and Policy plans.
- Monitor the effectiveness of the implementation and the delivery of the City Region Deal and to report to the Constituent Authorities on progress.
- Receive updates from the United Kingdom and Scottish Governments in connection with any aspect of the City Region Deal, projects relating to the Memorandum of Understanding signed by the United Kingdom and Scottish Governments and the Constituent Authorities or additional United Kingdom and Scottish Government investment and any related projects.
- Approve (i) the overall programme funding for the City Region Deal; and (ii) the detailed breakdown and use of the Constituent Authorities' financial contributions to the City Region Deal in relation to such overall programme funding for the City Region Deal where this relates to programme funding already committed and approved by the relevant Constituent Authority.
- Approve operational expenditure within agreed Aberdeen City Region Deal Joint Committee budgets allocated by the Constituent Authorities and/or ONE in order to further the aims of the City Region Deal.
- Provide feedback to the United Kingdom Government and Scottish Government on the implementation of the City Region Deal and any strategic, economic or infrastructure activities associated with the City Region Deal.
- Appoint three representatives and three named substitutes of ONE to the membership of the Joint Committee.

6.2.12 These terms of reference will be kept under review by the Constituent Authorities, ONE and the Joint Committee throughout the implementation of the City Region Deal to ensure sufficient accountability of public funds provided through City Region Deal funding.

6.2.13 The project governance structure within the Council is shown in Figure 8.2. This highlights clear lines of responsibility and accountability for delivery of the various elements of the project.

6.3 Aberdeen City Council Project Management

Project Responsibility

6.3.1 The Capital Investment Programme, Chief Officer (Capital) will co-ordinate the delivery of the project.

6.3.2 The project is a key element of the Capital Portfolio - Transportation Programme. As a Roads Authority project it is sponsored by the Chief Officer (Capital) and governed initially by the Transportation Programme Board and ultimately the Capital Board. Monthly monitoring of progress and delivery will be undertaken by the Transportation Programme Board reporting to the Capital Programme Board.

6.3.3 The wider project delivery team which will oversee the design process is outlined in the table**Error! Reference source not found.** below.

Table 6:1: Wider Project Team

Role	Name
Project Sponsor	John Wilson
Project Manager	To be appointed
Senior User	Doug Ritchie
Senior User	Reference Group
Senior Supplier	Alan McKay

6.4 Change or Risk Management Strategy

6.4.1 If the construction/study programme of individual projects falls into significant delay, the Programme Manager will update the PMO with the remedial measures and associated timescales for redressing the delay. Where a change is required, the PM is to provide an initial cost to establish the viability based on the information available to the SRO. If the change is approved in principle, the design will be developed, and the PM will provide a final cost and details of any implications to the programme.

6.4.2 A standard ACC change request form will be completed by the PM. The PM will not act upon any change request associated with funding until the SRO and PMO has issued instruction. The PM will maintain a change log, detailing all requests for change and their status. This log will be issued to the client as part of the monthly report pack. At the project outset, the PM will agree with SRO and the Councils s.151 Officer a change value limit which they are authorised to sign off. Where the cost of a change exceeds this limit, their authorisation will be required.

Risk Management

6.4.3 The risk management strategy is a process for identifying adequate assessment and response to risk. Regular, active review allows for early decision making to mitigate risks. The PM will be responsible for risk management and will review the effectiveness of the risk management strategy during the programme.

6.4.4 A live risk register (Appendix A) will record potential risks which could impact on the successful delivery of individual projects on time and on budget. The risk register will be regularly reviewed, updated and re-issued through the agreed channels of communication. All risks have been allocated a risk owner. All project team members should be aware of all the scheduled risks and should notify the PM as soon as possible if anything (not already identified) is likely to affect either the project cost or programme. All parties (key stakeholder and departments) have a shared responsibility to help mitigate risks, by means of good planning, co-ordination, communication and co-operation. When a risk is identified it will be assessed so as to understand and quantify the chance of the risk occurring and its potential impact on project delivery. The risk will be reviewed against its likelihood and the resultant impact.

6.4.5 To ensure clarity on risk status, high risks will be assigned a red status with low risks being assigned a green status. Amber status will be assigned to those risks in between. All risks will be regularly monitored and scored on their impact and probability. The revised priority of risks can then be acted on appropriately. ACC will retain risks which are not transferred or avoided, although these may have been reduced or shared with project partners (e.g., Network Rail). ACC will manage the risks which it owns, as is expected of risks managed by the project partners.

6.5 Other Legal Matters for Consideration

Subsidy Control

6.5.1 There are no issues anticipated in relation to the recent Subsidy Control Bill – June 2021[9].

6.5.2 The Subsidy Control Bill provides the framework for a new, UK-wide subsidy control regime. This regime will enable public authorities, including devolved administrations and local authorities, to deliver subsidies that are tailored and bespoke for local needs to deliver government priorities such as levelling up and achieving net zero carbon, as well as supporting the economy's recovery from COVID-19.

6.5.3 The project will deliver the construction of new accesses and supporting infrastructure improving accessibility to the core and strategic road network and providing a direct link to ASH.

6.5.4 At the present time it is understood that the project is considered to have limited risk given that the road will be open to all and free of charge and when built will not favour any particular non-Council proprietor over any other party. The Council has confirmed that any third-party land required for the project will be acquired at market value. On this basis, the funding of the project is unlikely to be regarded as "selective" (i.e. it does not favour only certain undertakings) and on that basis, would not fall within the Subsidy Control rules. There is sufficient evidence held by the Council that the roads and infrastructure will provide a wider benefit to the public at large in terms of providing a connection between publicly accessible areas and enhanced green networks. This will continue to be reviewed during project progression.

6.5.5 The project is therefore strategic enabling infrastructure which unlocks development and does not benefit a single developer or landowner.

Land Ownership and Compulsory Purchase Orders

6.5.6 The majority of land in the immediate vicinity of the scheme is known to be in the control of Aberdeen City Council, albeit some may be associated with lease and tenancy agreements. Other parcels of land could be required that are in the control of third parties, and the next stages of detailed design work will determine this.

6.5.7 As such, it has been identified that there may be a requirement to apply Compulsory Purchase Order powers to acquire the necessary land to facilitate access to the proposals, if agreement cannot be reach voluntarily. The exact extent and requirement to apply these powers will not be known until the land-take and associated site-access proposals have been developed in more detail and the associated land ownership has been confirmed.

6.5.8 Should it be necessary to secure the land required to construct the project from parties unwilling to reach voluntary agreement, the Council is confident that it possesses sufficient powers and justification for their use and appropriate authority would be sought to promote a Compulsory Purchase Order pursuant to the Council's powers under the Roads (Scotland) Act 1984 or equivalent legislation.

6.5.9 Initial contact with possibly affected landowners is yet to commence.

[9] Available at: https://www.gov.uk/government/collections/subsidy-control-bill

Third Party Arrangements

6.5.10 A Basic Asset Protection Agreement (BAPA) will be signed by the Council with Network Rail to cover the project's design phase. This will be updated to cover the construction period and will be confirmed in the Full Business Case.

6.5.11 As the design is developed, if requirements for diversion of utilities apparatus are identified, these would need to be discussed and agreed with the relevant utilities' providers in accordance with the requirements of the New Road and Streetworks Act.

6.5.12 No other service agreements are anticipated

Local Authority Powers

6.5.13 Aberdeen City Council, as Local Roads Authority, possesses all the necessary powers to deliver this project. In some instances, the cooperation of other agencies will be required to apply their powers in the delivery of the project. This is most likely to be the case for the construction of the railway bridge where Network Rail's authority will be required.

6.5.14 The Council will use its powers, including under the Local Government (Scotland) Act 1973 or the Roads (Scotland) Act 1984, as appropriate to deliver the project. This will be supplemented as appropriate by application for planning approval. Planning in Principle is yet to be sought.

Equality Impacts

6.5.15 An Equality Impact Assessment will be undertaken by the Council for the Outline Business Case.

Environmental Impacts

6.5.16 The environmental impacts of the project are being assessed as part of the project development and planning processes. The Council will observe all obligations under relevant environmental legislation and all appropriate measures including the requisite legal agreements, licenses and mitigation plans will be undertaken to ensure compliance with all relevant environmental legislation and planning requirements.

6.6 Project Schedule

6.6.1 The current project Work Programme is shown in Appendix C.

6.6.2 A summary of the programme with key milestones from DMRB Stages 2 and 3 is outlined below.

Table 6:2: Programme Milestones

Action	Programme Completion Date
Develop Preferred Route	15/04/2022
Stakeholders Consultations	17/06/2022
Preferred Route Approval	11/11/2022
DMRB Stage 3 Completion	20/12/2024

6.6.3 During the DMRB design Stages 2 and 3, the preferred option will further be refined considering likely environmental, economic, traffic and engineering aspects. A high-level design programme for both stages is shown in Appendix C.

6.6.4 The main focus of Stage 2 will be confirming engineering solution and location for the new railway bridge, active travel routes as well as consultations with statutory undertakers. An initial assessment of anticipated departures from standards will also be completed. The stakeholders' consultations are a key part of this stage and will commence after the preferred route development. The consultation will entail confirming abnormal load requirements with Aberdeen Harbour Board, interface with proposed Energy Transition Zone, understanding cyclist group requirements, any impact on Ness landfill and agreeing success factors. Concurrently with consultations, land take estimate, traffic and economic assessment along with a preliminary cost assessment will be carried out. The stage findings will be summarised in Stage 2 Report which will be submitted for acceptance to Aberdeen City Council.

6.6.5 At Stage 3, the engineering team will gather additional information through site surveys to inform the proposed design. The proposed survey durations include procurement, site work and data analysis. Parallel to site investigations, the design team will engage key statutory undertakers to confirm location of their assets and understand their diversion requirements. If required, a comprehensive Environmental Statement, covering arboriculture, archaeology, soil handling, materials, water and waste management, will be prepared during this stage. The aim of the Environmental Statement is to outline measures envisaged to alleviate adverse project impact and confirm with the Planning Authority and Environmental Agencies if further assessment is required as part of planning application. In order to reduce Stage 3 duration, it is proposed to commence key design activates prior to completion of site investigations. Structural design and approval of the new railway bridge are critical to timely stage completion and therefore Network Rail's team will be engaged shortly after design commencement and will be kept inform through frequent progress meetings. As part of this design phase, temporary traffic arrangements would have to be reviewed and diversion routes developed. It is envisaged that departures from standards acceptance and other necessary approvals will be obtained within allowed durations. Stage 3 would be complete within 2024.

6.6.6 At this stage it is appropriate to allow up to 36 months for remaining elements up to end of construction phase, inclusive of Stage 4 (Final Design and Tender documents), Stage 5 (Construction procurement) and Stage 6 (Construction). Any Public Local Inquiry associated with land acquisition not gained by voluntary agreement would require to be incorporated into this programme and would be additional.

6.6.7 Assessment of potential land take requirements will be undertaken at an early stage in the design process to support, if required, any voluntary acquisition discussions. As the design progresses, traffic and economic and land take assessments will take place. Cost estimate precedes planning application preparation and will form a significant part of this suite of documents.

6.7 Benefits, Monitoring and Evaluation

6.7.1 The CRD maintains and implements an overall Benefits Realisation Strategy, managed by the CRD PMO. Aberdeen City Council's project team will have responsibility for supporting this Strategy, ensuring the delivery of the project outcomes for economic development and regeneration.

6.7.2 During the design phase, an annual evaluation of the development and construction process, including an assessment of forecast versus outturn project costs, together with reasons for any variance, will be produced for monitoring and evaluation purposes. Following this, a staged monitoring and evaluation plan will take place at each of the following monitoring points (budgetary provision should be made for this by Aberdeen City Council):

- Monitoring Point 1 (2022) – An initial evaluation, approximately one year into the programme will provide an early indication that the project is operating as planned.

- Monitoring Point 2 (2024) – A detailed evaluation, approximately three to four years into the delivery of the entire programme. At this stage, we will carry out a revalidation of the original option assumptions as forecast in the option appraisal.

- Monitoring Point 3 (2028) – This crucial stage will consider impacts in the context of data gathered over a longer period post implementation and provides a more detailed measurement as to what extent the longer-term objectives have been achieved (i.e. land value uplift). This longer timeframe also allows consideration of the impacts of wider initiatives, including the local resident and business sentiment. Budgetary provision could be made for this

6.7.3 Measuring benefits realised against Monitoring Point target outputs will assess the governance, timely delivery and value for money which further grant funding is conditional upon.

Appendix A Feasibility Design of Option A4

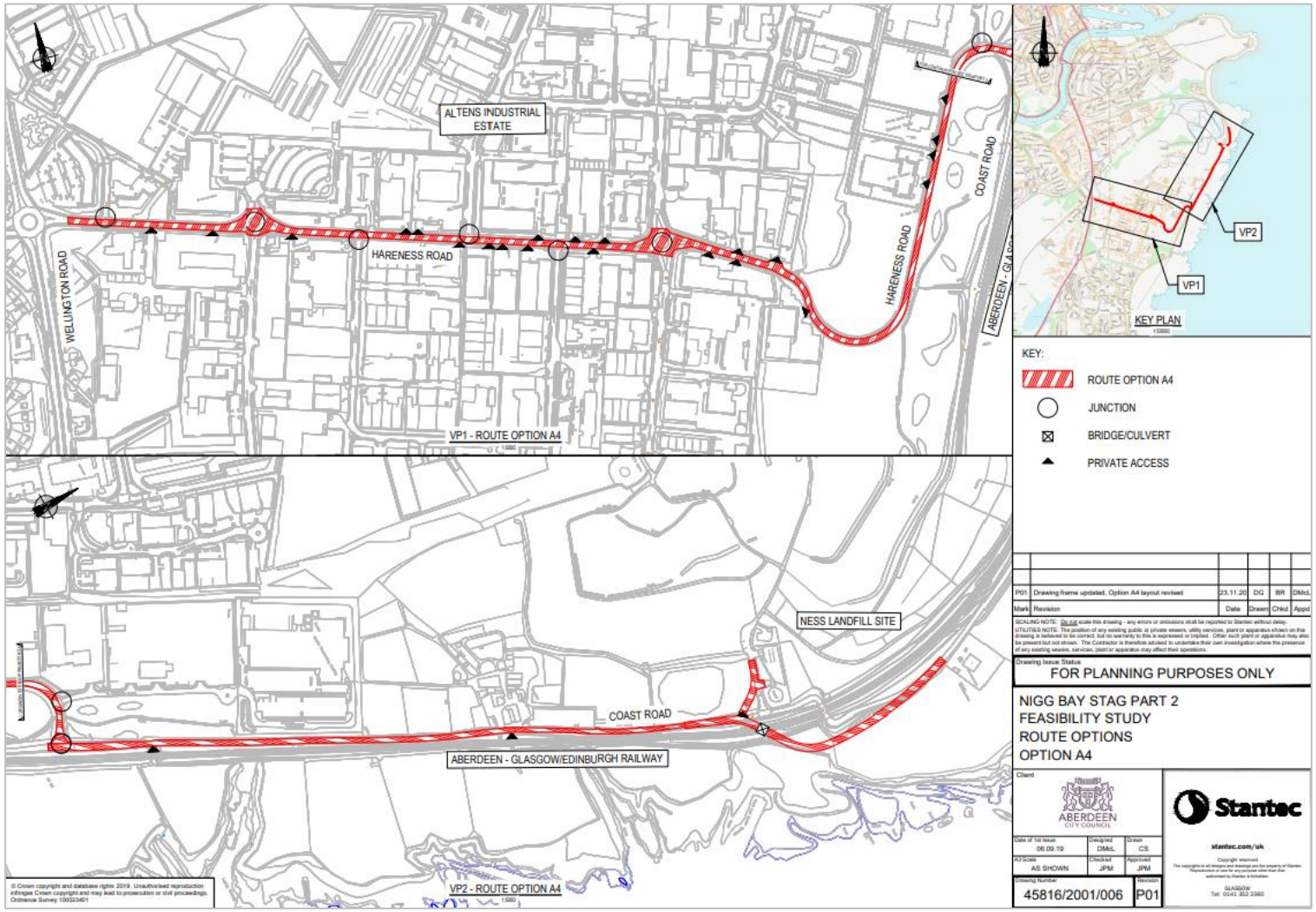


Figure A:1: Option A4

Appendix B Risk Register

No.	Risk Ref	Risk Type	Status	Internal/ External	Risk Description	Inherent Impact	Inherent Probability	Inherent Risk Score	Rank	Owner	Control Actions	Residual Impact	Residual Probability	Residual Risk Score	Rank	Date Checked
1	1_Fin	Financial	Live	Internal/ External	Funding not delivered. Project delayed or cannot go ahead.	5	3	15	4	Aberdeen City Council	Funding committed from UK and Scottish Governments, competent ACC PMO responsible for securing funding.	2	1	2	14	Jul-21
2	2_Peo	People / Societal	Live	Internal/ External	Funding delayed. Failure to meet draw down deadlines with potential changes to contracts.	4	3	12	11	Aberdeen City Council	Close working relationship between ACC PMO and UK and Scottish Governments.	3	2	6	3	Jul-21
3	3_Con	Contractu al	Live	Internal/ External	Complexity of funding contracts. Delay to project start with impact on draw down deadlines with potential changes to contracts. Could lead to decommitment which would impact on delivery of the project.	5	3	15	4	Aberdeen City Council	Close working relationship between ACC PMO and project delivery team. Expenditure forecast developed by experienced road engineer familiar with delivery of such projects.	4	1	4	5	Jul-21
4	4_Phy	Physical / Assets	Live	Internal/ External	Delays due to ground conditions. Project extension with impact on draw down deadlines with potential changes to contracts	3	2	6	18	Aberdeen City Council	Adequate site investiagtions carried out. Contract structure and selection of contractors. Site	2	1	2	14	Jul-21

No.	Risk Ref	Risk Type	Status	Internal/ External	Risk Description	Inherent Impact	Inherent Probability	Inherent Risk Score	Rank	Owner	Control Actions	Residual Impact	Residual Probability	Residual Risk Score	Rank	Date Checked
											visits and programme team meetings.					
5	5_Peo	People / Societal	Live	Internal/ External	Availability of resources (labour, materials etc). Project extension will impact on draw down deadlines with potential changes to contracts.	4	2	8	12	Aberdeen City Council	Contract structure and selection of cotractors. Site visits and programme team meetings. Experienced project manager familiar with working on road construction projects.	3	1	3	11	Jul-21
6	6_Env	Environment	Live	Internal/ External	The full impact of the currnet COVID-19 pandemic is currently unknown. This could impact on a wide range of factors including build costs and availability of labour. Could be far reaching including increased construction costs and delays.	5	1	5	19	Aberdeen City Council	ACC will continue to monitor guidance and the market with partners and contractors.	4	1	4	5	Jul-21
7	7_Sch	Schedule / Timescales	Live	Internal/ External	Build delivery impacted due to weather. Subsequent delay of construction and potential harm to funding/cash flow	4	2	8	12	Aberdeen City Council	Ensuring sufficient planning and preparation for delivery of road in all eventualities	2	1	2	14	Jul-21

No.	Risk Ref	Risk Type	Status	Internal/ External	Risk Description	Inherent Impact	Inherent Probability	Inherent Risk Score	Rank	Owner	Control Actions	Residual Impact	Residual Probability	Residual Risk Score	Rank	Date Checked
8	8_Obj	Objectives & Projects	Live	Internal/ External	Unable to acquire third party land required for carriage widening. Impact on project delivery and cost.	5	3	15	4	Aberdeen City Council	Investigate if a narrow verge is permissible by the Roads Authority to avoid need for acquiring third party land. If land acquistion required, early engagement and discussion with relevant landowners to take place. Compulsory purchase would be served if negotiations fail.	4	1	4	5	Jul-21
9	9_Fin	Financial	Live	Internal/ External	Project programme extends beyond the agreed funding window of the City Region Deal (2206).	5	3	15	4	Aberdeen City Council	On-going monitoring of the project programme and early dialogue with City Region Deal funders if programme likely to go beyond City Region Deal window (2026)	4	1	8	5	Aug-21

No.	Risk Ref	Risk Type	Status	Internal/ External	Risk Description	Inherent Impact	Inherent Probability	Inherent Risk Score	Rank	Owner	Control Actions	Residual Impact	Residual Probability	Residual Risk Score	Rank	Date Checked
10	10_Fin	Financial	Live	Internal/ External	Disposal of material and hazardous substances from lanfill site that may need to be cut into. Significant additional cost of unanticipated waste materials and uncovered and require disposal.	4	2	8	12	Aberdeen City Council	Preliminary investigations into the waste at the site to be sufficient to minimise future risk of finding unexpected materials during construction.	2	1	2	14	Jul-21
11	11_Fin	Financial	Live	Internal/ External	Level of traffic generated is lower than estimated and the project does not deliver value for money.	4	2	8	12	Aberdeen City Council	Traffic modelling to be revisited as scheme progresses to update traffic generation estimates, traffic model and economic evaluation.	2	1	2	14	Jul-21
12	12_Sch	Schedule / Timescales	Live	Internal/ External	Changes in the council's team resources. Project delivery disrupted affecting programme and budget.	3	1	3	22	Aberdeen City Council	Utilise internal and external support. Provide handover period if key officers change.	2	1	2	14	Jul-21
13	13_Con	Contractual	Live	Internal/ External	Breakdown in communication with contractors leading to delays or errors, project schedule not managed effectively, delays to project.	5	3	15	4	Aberdeen City Council	Planning in place to ensure project team can devote time to the project, as part of wider time management and programme/ operational planning for site.	4	1	4	5	Jul-21

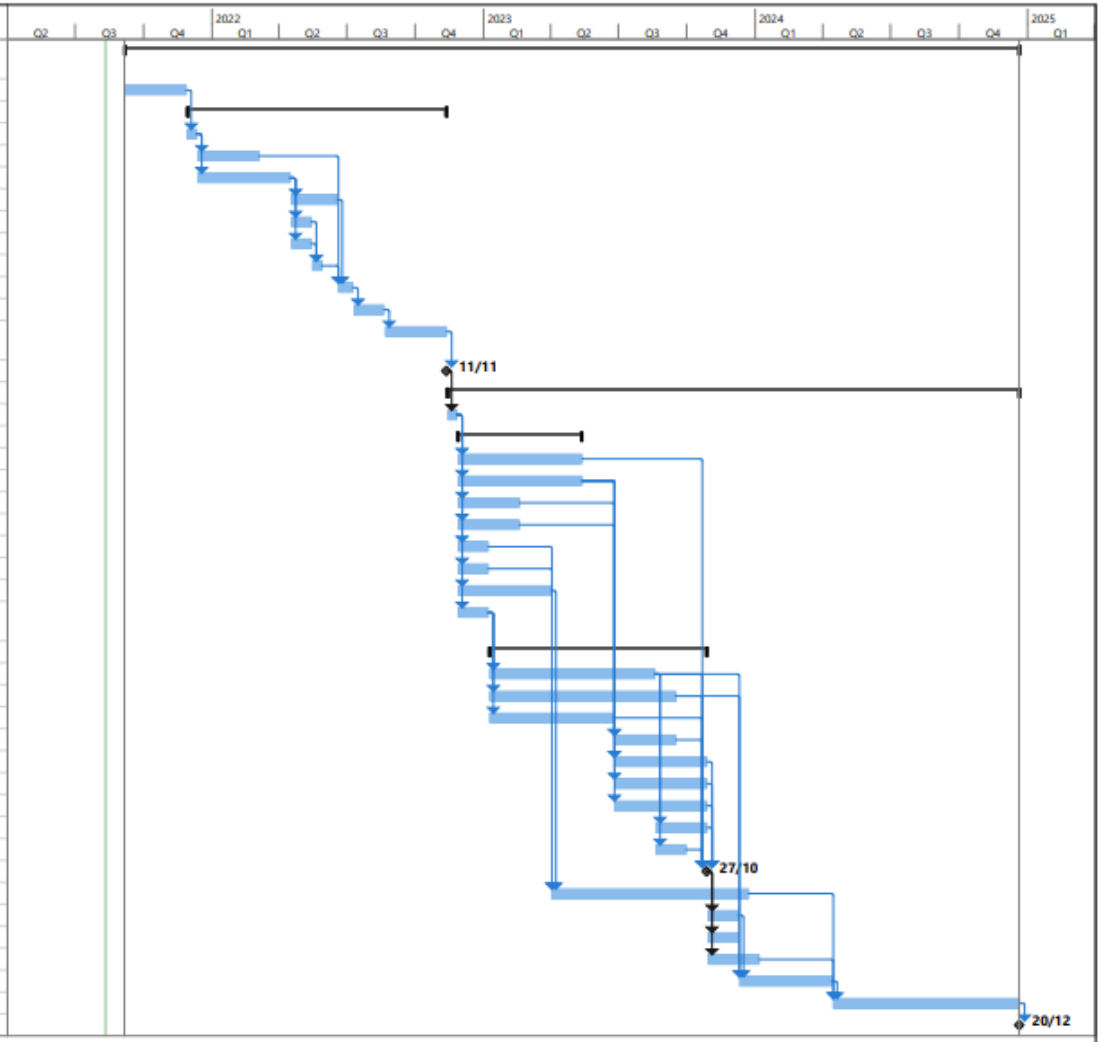
No.	Risk Ref	Risk Type	Status	Internal/ External	Risk Description	Inherent Impact	Inherent Probability	Inherent Risk Score	Rank	Owner	Control Actions	Residual Impact	Residual Probability	Residual Risk Score	Rank	Date Checked
14	14_Peo	People / Societal	Live	Internal/ External	Adverse reactions from public and businesses due to changes in traffic management and impacts of construction works on traffic flow in and around Altens.	4	2	8	12	Aberdeen City Council	Need careful communications and stakeholder engagement to ensure support for the scheme. Public consultation on all proposed route options has taken place with selected route being preffered option.	2	1	2	14	Jul-21
15	15_Con	Contractual	Live	Internal/ External	Programme outputs not acheived.	5	4	20	1	Aberdeen City Council	Programme delivery team meetings, claims monitoring, site visits, annual delivery plans.	3	1	3	11	Jul-21
16	16_Pol	Political	Live	Internal	Political support not acheived resulting in significant delays.	5	1	5	19	Aberdeen City Council	Preferred route option already agreed by Elected Members on the City Resources and Growth Committee. Further stakeholder engagement and regular briefings of project delivery team, senior management team, Elected Members and Cabinet.	4	1	4	5	Jul-21

No.	Risk Ref	Risk Type	Status	Internal/ External	Risk Description	Inherent Impact	Inherent Probability	Inherent Risk Score	Rank	Owner	Control Actions	Residual Impact	Residual Probability	Residual Risk Score	Rank	Date Checked
17	17_Peo	People / Societal	Live	Internal/ External	Reaching agreement with Network Rail on construction of new railway bridge. Network Rail seeking to control design process. Could result in project delays and cost over runs.	5	4	20	1	Aberdeen City Council	Network Rail consulted throughout process to date. Regular dialogue and consultation maintained through design phases.	4	2	8	1	Jul-21
18	18_Phy	Physical / Assets	Live	Internal/ External	Active travel routes requiring a reduction in carriageway space within Altens industrial estate may be met with resistance from businesses and users of the estate.	4	1	4	21	Aberdeen City Council	On-going dialogue with local businesses as proposals develop.	2	1	2	14	Jul-21
19	19_Fin	Financial	Live	Internal/ External	Active travel routes not being utilised as predicted resulting in the routes not generating value for money.	4	2	8	12	Aberdeen City Council	On-going promotion of use of active travel and and the availability of routes in accessing both the harbour and future energy transition zone sites and other users wishing to access Altens and the Coast Road area.	2	1	2	14	Jul-21

No.	Risk Ref	Risk Type	Status	Internal/ External	Risk Description	Inherent Impact	Inherent Probability	Inherent Risk Score	Rank	Owner	Control Actions	Residual Impact	Residual Probability	Residual Risk Score	Rank	Date Checked
20	20_Env	Environment	Live	Internal/ External	Wellington Road is an Air Quality Management Area. Vehicles using Option A4 to access ASH will use Wellington Road and it is therefore likely that there will be an increase in traffic and a resultant worsening of air quality.	5	4	20	1	Aberdeen City Council	Early engagement with ACC Environmental Health department to discuss impacts and mitigation.	3	2	6	3	Jul-21
21	21_Obj	Objectives & Projects	Live	Internal/ External	The development of the new route cannot begin until ASH has opened. Delay to the development of ASH could result in project delays and failure to meet funding draw down deadlines	5	3	15	4	Aberdeen City Council	Early and continual engagement with Aberdeen Harbour Board to understand project deadlines and work to those for the road development.	3	1	3	11	Jul-21
22	22_Reg	Regulatory / Legal	Live	Internal/ External	Necessary statutory approvals for development cannot be gained or are delayed resulting in overall project delays and cost increases	5	3	15	4	Aberdeen City Council	Early and continual engagement with ACC planning department, roads department and external statutory consultees NatureScot, SEPA, HES	4	2	8	1	Jul-21

Appendix C Project Programme

ID	Task Name	Duration	Start	Finish
1	**Aberdeen South Harbour Design Programme**	**860 days**	**Mon 06/09/21**	**Fri 20/12/24**
2	Procurement of design consultant	60 days	Mon 06/09/21	Fri 26/11/21
3	**Stage 2 - Preferred Route Confirmati**	**250 days**	**Mon 29/11/21**	**Fri 11/11/22**
4	Mobilisation	10 days	Mon 29/11/21	Fri 10/12/21
5	Environmental assessment	60 days	Mon 13/12/21	Fri 04/03/22
6	Preferred route development	90 days	Mon 13/12/21	Fri 15/04/22
7	Stakeholders consultations	45 days	Mon 18/04/22	Fri 17/06/22
8	Traffic & economic assessment	20 days	Mon 18/04/22	Fri 13/05/22
9	Land take assessment	20 days	Mon 18/04/22	Fri 13/05/22
10	Preliminary cost estimate	10 days	Mon 16/05/22	Fri 27/05/22
11	Stage 2 report preparation	15 days	Mon 20/06/22	Fri 08/07/22
12	Stage 2 report approval	30 days	Mon 11/07/22	Fri 19/08/22
13	Aberdeen City Council governance (preferred option approval)	60 days	Mon 22/08/22	Fri 11/11/22
14	Stage 2 complete	0 days	Fri 11/11/22	Fri 11/11/22
15	**Stage 3 - Preliminary Design**	**550 days**	**Mon 14/11/22**	**Fri 20/12/24**
16	Mobilisation	10 days	Mon 14/11/22	Fri 25/11/22
17	**Surveys**	**120 days**	**Mon 28/11/22**	**Fri 12/05/23**
18	Geotechnical	120 days	Mon 28/11/22	Fri 12/05/23
19	Topographic	120 days	Mon 28/11/22	Fri 12/05/23
20	Pavement	60 days	Mon 28/11/22	Fri 17/02/23
21	Drainage	60 days	Mon 28/11/22	Fri 17/02/23
22	Air quality	30 days	Mon 28/11/22	Fri 06/01/23
23	Noise	30 days	Mon 28/11/22	Fri 06/01/23
24	Ecology (bats, badger, etc)	90 days	Mon 28/11/22	Fri 31/03/23
25	Statutory undertakers consultation & obtaining	30 days	Mon 28/11/22	Fri 06/01/23
26	**Engineering design & drawings**	**210 days**	**Mon 09/01/23**	**Fri 27/10/23**
27	Road	160 days	Mon 09/01/23	Fri 18/08/23
28	Structures	180 days	Mon 09/01/23	Fri 15/09/23
29	Geotech	120 days	Mon 09/01/23	Fri 23/06/23
30	Pavement	60 days	Mon 26/06/23	Fri 15/09/23
31	Drainage	90 days	Mon 26/06/23	Fri 27/10/23
32	Landscape	90 days	Mon 26/06/23	Fri 27/10/23
33	Technology	90 days	Mon 26/06/23	Fri 27/10/23
34	Street lighting	50 days	Mon 21/08/23	Fri 27/10/23
35	Temporary traffic management	30 days	Mon 21/08/23	Fri 29/09/23
36	Design complete	0 days	Fri 27/10/23	Fri 27/10/23
37	Environmental statement	190 days	Mon 03/04/23	Fri 22/12/23
38	Traffic & economic assessment	30 days	Mon 30/10/23	Fri 08/12/23
39	Land take assessment	30 days	Mon 30/10/23	Fri 08/12/23
40	Cost estimate	50 days	Mon 30/10/23	Fri 05/01/24
41	Planning application preparation	90 days	Mon 11/12/23	Fri 12/04/24
42	Planning application review & appr	180 days	Mon 15/04/24	Fri 20/12/24
43	Stage 3 complete	0 days	Fri 20/12/24	Fri 20/12/24



Project: ASH PROGRAMME
Date: Wed 11/08/21

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