now part of

Thornhill and Surrounding Area Sustainable Transport Options STAG Appraisal

STAG Report

On behalf of **SWestrans**

Project Ref: 41971 | Rev: 1 | Date: August 2019

Registered Office: Buckingham Court Kingsmead Business Park, London Road, High Wycombe, Buckinghamshire, HP11 1JU
Office Address: 3rd Floor, Randolph House, 4 Charlotte Street, Edinburgh EH2 4QZ
T: +44 (0)131 297 7010 E: edinburgh@peterbrett.com

now part of

Stantec

On behalf of **SWestrans**

Project Ref: 41971 | Rev: 1 | Date: August 2019

Registered Office: Buckingham Court Kingsmead Business Park, London Road, High Wycombe, Buckinghamshire, HP11 1JU
Office Address: 3rd Floor, Randolph House, 4 Charlotte Street, Edinburgh EH2 4QZ
T: +44 (0)131 297 7010 E: edinburgh@peterbrett.com

now part of

Stantec

On behalf of **SWestrans**

Project Ref: 41971 | Rev: 1 | Date: August 2019

Registered Office: Buckingham Court Kingsmead Business Park, London Road, High Wycombe, Buckinghamshire, HP11 1JU
Office Address: 3rd Floor, Randolph House, 4 Charlotte Street, Edinburgh EH2 4QZ
T: +44 (0)131 297 7010 E: edinburgh@peterbrett.com

Document Control Sheet

Project Name: Thornhill Sustainable Transport Options STAG Appraisal

Project Ref: 41971

Report Title: STAG Report

Date: 08/08/2019

	Name	Position	Signature	Date
Prepared by:	Emily Seaman Rachel Thomas Emma Schneider	Associate Transport Planner Principal Transport Planner Senior Transport Planner	ES RT ES	08/08/19
Reviewed by:	Scott Leitham	Director	SL	08/08/19
Approved by:	Scott Leitham	Director	SL	08/08/19
For and on behalf of Peter Brett Associates LLP				

Revision	Date	Description	Prepared	Reviewed	Approved
1	01/04/2019	Draft Report –STAG Report	Emily Seaman	Scott Leitham	Scott Leitham
2	07/0620/19	Final STAG Report	Emily Seaman / Rachel Thomas	Scott Leitham	Scott Leitham
3	10/06/2019	Final STAG Report – post comments	Emily Seaman / Rachel Thomas	Scott Leitham	Scott Leitham
4	08/082019	Final STAG Report – post comments (second revision)	Emily Seaman	Scott Leitham	Scott Leitham

Contents

Figures

Tables

Appendices

1 Introduction

1.1 Overview

1.1.1 SWestrans (the South-West of Scotland Transport Partnership) commissioned Peter Brett Associates LLP (PBA) in January 2016 to undertake a Scottish Transport Appraisal Guidance (STAG) Pre-Appraisal of sustainable transport options for the town of Thornhill and the surrounding area in Dumfries and Galloway.

1.1.2 The work was presented to the SWestrans Board in July 2016. PBA was subsequently commissioned to undertake the STAG Part 1 Appraisal for the study in December 2016 and the STAG Part 2 Appraisal for the study in October 2017.

1.1.3 A map showing the approximate study area is provided in Figure 1.1. The area encompasses Thornhill and a number of other villages including Moniaive, Penpont and Tynron, with a total population of just over 5,000[1].

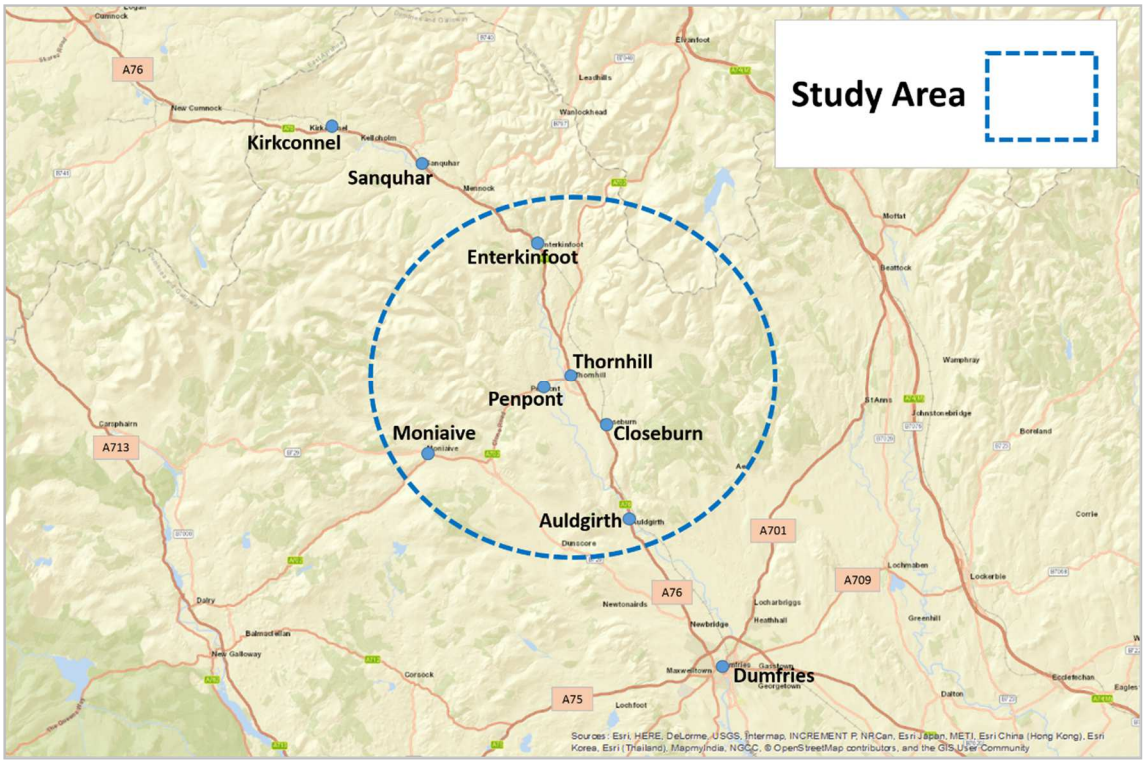

Figure 1.1: Thornhill, Dumfries and Galloway

1.1.4 Thornhill is located on the A76 in the Mid Nithsdale area of Dumfries and Galloway. The town lies approximately 19km south-east of Sanquhar and approximately 26km north-west of Dumfries.

1.1.5 The potential re-opening of stations in Dumfries and Galloway is identified in the Dumfries and Galloway Regional Transport Strategy Delivery Plan (updated 2010). Four railway stations are considered worthy of consideration including those at Thornhill, Eastriggs, Dunragit/Glenluce and Beattock. Of these, the re-opening of Thornhill Railway Station is given joint highest priority

[1] Population figure is based upon 2011 Census Output Area Level data broadly corresponding to the study area as defined in Figure 1.1.

(with Eastriggs). The re-opening of Thornhill Station is also noted in the Local Transport Strategy (where it is defined as a strategic aspiration).

1.1.6 Thornhill station, which lies on the Glasgow South West Mainline (GSWL) closed to passenger traffic in 1965, with the nearest stations now being at Sanquhar, to the north, and Dumfries, to the south.

1.1.7 However, while the potential for a station is noted in regional and local transport strategies, there has never been either a robust audit of the transport problems and opportunities in the town and the surrounding local area, or the provision of an evidence-based case setting out why a new railway station is the most appropriate means of tackling the transport problems and opportunities.

1.1.8 In recognition of the above issues, this STAG appraisal seeks to identify and evidence the transport problems & opportunities within Thornhill and the surrounding area and the most appropriate opportunities for addressing them. Whilst STAG is multi-modal in nature, the policy context driving this study means that it considers potential improvements in relation to all **sustainable modes of travel** only.

1.1.9 It should be noted that this study began in early 2016, with the final STAG 2 Report published in Summer 2019. Over the lifespan of the project, bus and rail timetables and services have altered. While base data has been revisited and updated, the analysis undertaken during the earlier stages of the project is reflective of the public transport network and services at the time it was undertaken.

1.2 Scottish Transport Appraisal Guidance

1.2.1 The study is being undertaken in line with the Scottish Transport Appraisal Guidance (STAG) and covers all stages of STAG. STAG is an objective-led framework and is based on an understanding of the transport problems, issues, opportunities and constraints; public consultation; and evidence-based objective setting. This ensures that the ultimate option or options progressed address the transport needs of the communities in question.

1.2.2 This STAG appraisal is multi-modal and seeks to identify and evidence the transport problems and opportunities within the Thornhill study area, and the most appropriate opportunities for addressing them through the consideration of **all sustainable transport modes**.

2 Analysis of Problems and Opportunities

2.1 Overview

2.1.1 The purpose of the initial stage of a STAG study is to identify the problems, issues, opportunities and constraints within the **current and future** transport system.

2.1.2 These terms are defined within STAG as follows:

- **Problems:** Existing and future problems within the transport system, e.g. unreliable journey times
- **Opportunities:** Chances to improve the current situation by making changes to the transport system, e.g. improve journey times
- **Issues:** Uncertainties that the study may not be in a position to resolve, but must work in the context of, e.g. impact of the Local Development Plan (LDP)
- **Constraints:** The bounds within which the study is being undertaken, e.g. available funding

2.2 Methodology for Identifying Problems and Opportunities

2.2.1 Three key workstreams were undertaken as part of the study to support the identification and evidencing of problems and opportunities for the study: consultation; transport data analysis; and socio-economic data analysis.

2.2.2 **Consultation** was undertaken at various stages during the project lifetime, and has provided the backbone to understanding the problems and opportunities, and ultimately the 'Case for Change' for investment in the transport network in the Thornhill area.

2.2.3 The key evidence to support the Case for Change is presented in this chapter of the report, with a full summary of the consultation activities undertaken provided in:

- Appendix A – for consultation undertaken during the initial stages of the study; and
- Appendix N – for consultation undertaken during later stages of the study.

2.2.4 Information established through the **consultation and engagement activities** has identified a range of problems, and data and information relating to the **local transport network, travel-to-work patterns, existing public transport connectivity** has been used to provide the evidence of the problems.

2.2.5 **Socio-economic data**, has been used to provide context for the study as well as providing an understanding of the impacts of the transport problems from a social and economic perspective.

2.2.6 The process is highlighted in Figure 2.1.

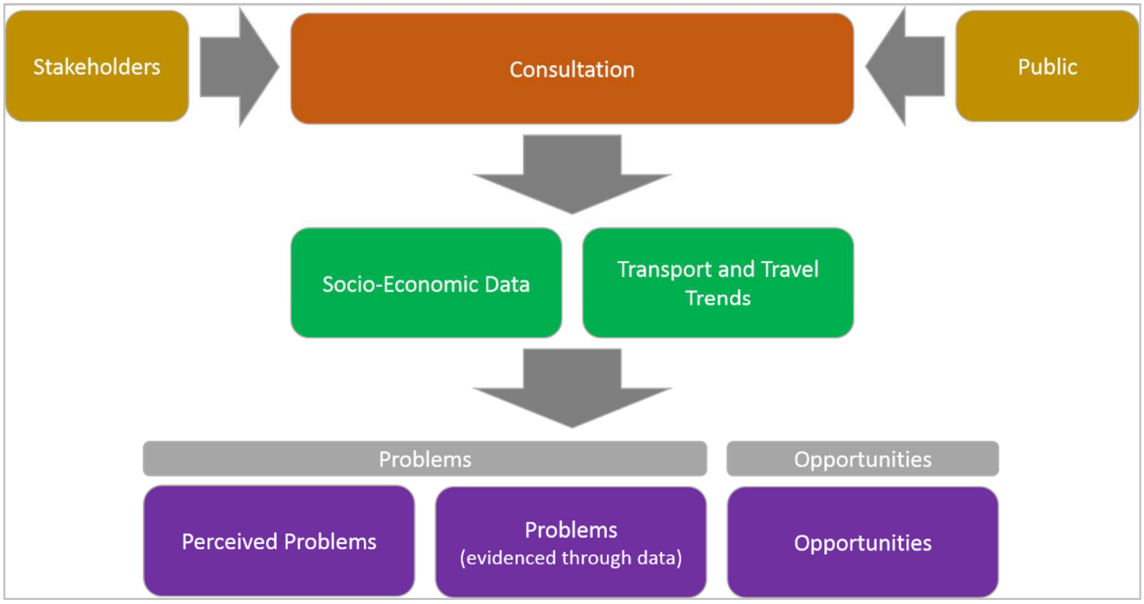

Figure 2.1: Identification of Problems and Opportunities - Process

2.2.7 The key data used in evidencing the problems and the impacts of the problems is presented in this chapter. Full details of all the data analysed is presented in:

- Appendix B and Appendix C in relation to the existing local transport network, travel-to-work patterns and existing public transport connectivity and accessibility mapping.
- Appendix D in relation to Socio-Economic data.

2.3 Engagement

2.3.1 An engagement exercise was undertaken at the outset of the study, in order to identify an initial set of problems and opportunities, and the economic and social impacts of these problems (Appendix A contains full summaries of the discussions). This included:

- An online public survey;
- Face-to-Face consultation with SWestrans and Dumfries and Galloway Council;
- Face-to-face consultation with Stagecoach (West Scotland), the largest commercial bus operator in the area;
- Telephone consultation with a number of smaller bus operators in the area;
- Telephone consultation with Thornhill and District Community Transport – a local Community Transport provider;
- Face-to-face consultation with Transport Scotland; and
- Face-to-face consultation with the rail operators including:
  - Network Rail; and
  - ScotRail.

2.3.2 Further engagement at the Part 1 and Part 2 stages of the study provided more detailed insight into the transport problems and impacts (Appendix N contains full summaries of the discussions). This included:

- A public event with an associated online survey. While the event also presented the Part 1 and Part 2 appraisal findings, it also provided extensive further insight into transport problems and their impacts;
- Face-to-Face consultation with SWestrans and Dumfries and Galloway Council;
- Face-to-face consultation with Stagecoach (West Scotland – also speaking on behalf of Stagecoach Cumbria) and local bus operator Houstons;
- Face-to-face discussion with Thornhill Station Action Group;
- Discussion with Wallace Hall Academy Pupils;
- Email correspondence with:
  - Network Rail;
  - ScotRail;
  - Strathclyde Partnership for Transport; and
  - East Ayrshire Council.

2.4 Key Problems and Opportunities Identified

2.4.1 From the engagement exercise, the key problems and opportunities for the study area, as perceived by the public and the key stakeholders were reviewed and assessed before being collated into a succinct list of problems and opportunities, for which data has then been analysed.

2.4.2 The key transport problems identified were as follows:

- PR1: Poor strategic public transport frequency
- PR2: Long strategic public transport journey times
- PR3: Lack of direct public transport services
- PR4: Limited bus operating hours
- PR5: Poor integration between bus and rail
- PR6: Large gaps in the rail timetable
- PR7: Lack of direct and safe cycling routes on A76

2.4.3 Each of these is presented below, alongside the key evidence of the problems.

PR1: Poor Strategic Public Transport Frequency

PR2: Long Strategic Public Transport Journey Times

PR3: Lack of Direct Public Transport Services

2.4.4 Public transport connections directly serving Thornhill are limited to the bus as there is no rail station in the town.

2.4.5 It was noted in the initial public consultation exercise (see Figure A.5) that Dumfries, Carlisle, Glasgow and Edinburgh were the key locations people travelled to on a regular basis and there are very limited or no direct bus connections to Edinburgh, Glasgow, Ayr and Carlisle. Where connections do exist the journey time is long, and the frequency of the connections is very limited.

2.4.6 The initial public consultation exercise highlighted (see A.1.14):

- Local residents were not using the bus due to:
  - Low bus frequency (50% of non-bus users);
  - No direct routes to where I need to go (45% of non-bus users);
  - Prefer the car (32% of non-bus users); and
  - Long journey times (31% of non-bus users).

2.4.7 In addition, of those using the bus:

- Poor service frequency was cited as the most significant issue faced when travelling by bus, noted by 75% of respondents (see A.1.15); and
- Lack of direct routes was the next most significant issue, noted by 37% of respondents.

2.4.8 Analysis of the results of the Public Event online survey (see Appendix N) also highlighted the following as problems:

- Long journey times by bus to Edinburgh and Glasgow, with 60% of respondents noting they felt this was a major problem to them; and
- A lack of direct bus services with 56% of respondents noting they felt this was a major problem to them.

2.4.9 Quick and easy travel access across the country was noted by many in the online survey as a key way in which the community of Thornhill could be improved. In addition to the cities noted above, Manchester and London were among more distant strategic locations noted.

2.4.10 It was also noted by a number of bus operators during consultation that congestion in Dumfries town centre was a cause of additional journey time on bus routes into the town, and that reducing this delay would have significant impacts in reducing bus journey times on services starting or ending in Dumfries.

Key Evidence

2.4.11 In terms of existing strategic public transport connections:

- Bus service 102 connects Thornhill to **Edinburgh** directly (with details provided in B.1.1). However, there is only one bus service a day, with a journey time of around 2 hours 30 minutes (the comparison by car is around 1 hour 45 minutes - 2 hours). The bus timings do however allow for 7 hours in Edinburgh (12:00 to 19:00) but require a total travel time of around 5 hours for the return trip.

- There are currently no direct connections to **Glasgow**, with interchange required to rail in Dumfries or Sanquhar to connect to trains on the Glasgow South West Line (GSWL) or in Lockerbie to connect to the faster trains on the West Coast Main Line (WCML). The overall journey time is between 2 – 3 hours depending on time of travel (the comparison by car is approximately 1 hour 20 minutes).

- There are currently no direct connections to **Ayr,** with interchange required in Cumnock. The journey time is around 2 hours 30 minutes – 3 hours depending on time of travel (the comparison by car is approximately 1 hour 10 minutes).

- There are currently no direct connections to **Carlisle,** with interchange required in Dumfries to either an onward bus or to rail. The journey time is around 1 hour 30 minutes – 2 hours depending on time of travel (the comparison by car is approximately 1 hour 15 minutes).

2.4.12 A comparison has been made between Thornhill and other nearby towns / villages (including Sanquhar, Lockerbie and Castle Douglas) considering:

- The number of direct public transport connections on a typical weekday to key strategic locations;

- The quickest possible morning (08:00 – 12:00) journey times from the towns to the key strategic locations; and

- The quickest possible evening (16:00 – 20:00) journey times from the key strategic locations back to the towns.

2.4.13 The full data is shown in Appendix B.3, with the comparisons with the most local town of Sanquhar shown in Table 2.1 and Table 2.2.

Table 2.1: Strategic public transport connections from Thornhill and Sanquhar

	Strategic Location	Number of direct daily public transport connections	
		Thornhill	Sanquhar
To…	Glasgow	0	10
	Edinburgh	1	0
	Ayr	0	0
	Carlisle	0	10

Table 2.2: Strategic public transport journey times from Thornhill and Sanquhar

Time Period	From / To	Strategic Location	Fastest public transport journey time (minutes)		
			Thornhill	Sanquhar	Difference (Thornhill – Sanquhar)
AM (08:00 – 12:00)	Outbound to…	Glasgow	123	87	36
		Edinburgh	150	164	-14
		Ayr	152	108	44
		Carlisle	101	74	27
PM (16:00 – 20:00)	Back from…	Glasgow	138	88	50
		Edinburgh	155	167	-12
		Ayr	139	99	50
		Carlisle	87	72	15

2.4.14 The tables show:

- That there is a much greater offering of direct strategic connections from Sanquhar compared to Thornhill;
- That travel times from Sanquhar to Glasgow and Ayr are significantly quicker than from Thornhill; and
- That the journey time from Sanquhar to Carlisle is significantly quicker (nearly 30 minutes quicker in the morning and 15 minutes quicker in the evening) than the journey time from Thornhill, despite Thornhill being geographically closer.

Key Economic and Social Impacts

2.4.15 From both the initial public engagement, and the Public Event and associated feedback from the online survey, the existing level of transport connectivity was felt to be causing a number of economic and social problems in the local communities, particularly in terms of:

- **Community isolation.** Many people feeling remote and unable to access social activities further afield, particularly in Carlisle and Glasgow. This was felt to be a key driver in the area's inability to retain young people and the associated ageing population demographic, as younger people need to move elsewhere to easily access higher education opportunities and employment.
- **Reduced access to employment**. It was noted that the long journey times by public transport reduced the ability to access higher paid jobs in the Central Belt. If these opportunities were taken up at present, it meant a very an early start / late return home with the subsequent impact of reduced family time.

- **Reduced accessibility to higher education opportunities.** It was noted that for families on lower incomes, affording accommodation for children to go to university can place a significant financial burden on the family or mean that educational opportunities cannot be taken up. Many university courses now run as full time courses compressed into three full days. If access by public transport to higher education and university locations (in particular to the universities and colleges in Glasgow and Carlisle as well as to Ayrshire College (with campuses in Ayr and Kilmarnock)) was improved, it may be possible for students to remain at home during their studies, or take up opportunities which would otherwise not be possible.

- **Limited opportunities to participate in social activities further afield.** Platform surveys undertaken at Sanquhar station (see Appendix Q) show that of those boarding at the stations, 50% of people at Sanquhar indicated that they would not have made the journey if the station were not present. Therefore, the lack of direct strategic connectivity from Thornhill is likely to be impacting on local people's ability to take up social and other opportunities further afield.

  It was clear from discussions with pupils attending Thornhill's Wallace Hall Academy (see Appendix N) that, as opposed to Glasgow, they see Carlisle, and also Gretna (given the retail outlet) as the more desirable destinations. This reflects the closer proximity of Carlisle to Thornhill and therefore the ability to spend more time in the city on a visit. Carlisle offers young people access to social activities such as cinemas, shopping, bowling and trampoline parks. At present however, given the lack of any direct link, access to Carlisle requires a bus to Dumfries with interchange to either rail or bus onwards to Carlisle.

  At present, pupils' ability to access Glasgow, especially for concerts which finish late at night, was highly dependent on parents being able to collect them from Sanquhar as the buses did not provide sufficient connectivity later on in the evening. This places a burden on parents, reduces the ability for greater independence by young people and may limit opportunities for pupils in households without access to a car.

- **Difficulties accessing healthcare.** The ability to access healthcare is a key concern, both in terms of accessing major healthcare facilities and specialist consultants (in Ayr, Glasgow and Edinburgh) and in particular, the ability of the community to attract skilled healthcare professionals to the local area. The economic data analysis (as presented in Appendix D) shows a larger proportion of retirees in the Thornhill study area, particularly when compared to the Scottish average. The lack of direct access, meaning interchange is required, can be particularly difficult for the elderly and those less able.

- **Those without a car and reliant on public transport are at a disadvantage**. The data highlights the significantly quicker journey times that are possible from Thornhill by car compared to public transport. The longer journey times by public transport constrain the employment and education opportunities accessible from the town. This is particularly the case in relation to Carlisle, where the journey time from Thornhill, if it were more similar to that from Sanquhar (approximately 1 hour 10 minutes) may be considered within commutable distance.

- **Limiting visitors to the area.** The lack of direct public transport links was felt to be a constraint on tourism in the area. It was noted that there are many small businesses in the area which would benefit from increased footfall in the village. There are a number of festivals across the region including: the Spring Fling Arts and Crafts festival which happens across the entire region; Electric Fields (attracting 5,000 people and growing); events at Drumlanrig Castle; and Moniaive as a 'festival village'. All these events were felt could benefit from improved strategic connectivity to the area.

- **Burden on local business operations**. It was noted that the lack of strategic transport links can place a burden on local businesses. The HALO Trust was noted as an example of a local business which operates internationally, regularly welcoming visitors from London

and the south as well as from international locations (often via Prestwick Airport). Travel into the area was difficult though and often the Trust had to transport visitors to and from rail stations in to order to provide onward locations on the strategic network, with a subsequent drain on staff time.

PR4: Limited Bus Operating Hours

2.4.16 Bus services:

- Do not operate across the entire day, often with the last service running in the early evening; and
- Do not operate across the week, with limited (or no) Saturday and Sunday service.

2.4.17 Analysis of the results of the Public Event online survey (see Appendix N) also highlighted that limited bus operating hours were an issue, with 59% of respondents noting it as a major problem to them.

2.4.18 It was noted in the Initial Public engagement exercise, by just under 50% of respondents, that '*services which run earlier in the morning or later in the evening'* would improve the bus network. This was the second highest rated of the improvement measures.

Key Evidence

2.4.19 A number of bus services connect Thornhill and the surrounding villages (Moniaive, Tynron, Keir Mill, Gatelawbridge, Leadhills, Wanlockhead, Kirkton and Auldgirth) to Dumfries.

2.4.20 Table 2.3 shows all bus services which serve Thornhill setting out:

- The first bus departure to Dumfries / Sanquhar;
- The last bus departure back from Dumfries / Sanquhar; and
- The number of connections of the service a day.

2.4.21 Firstly, Figure 2.2 shows the buses serving Thornhill.

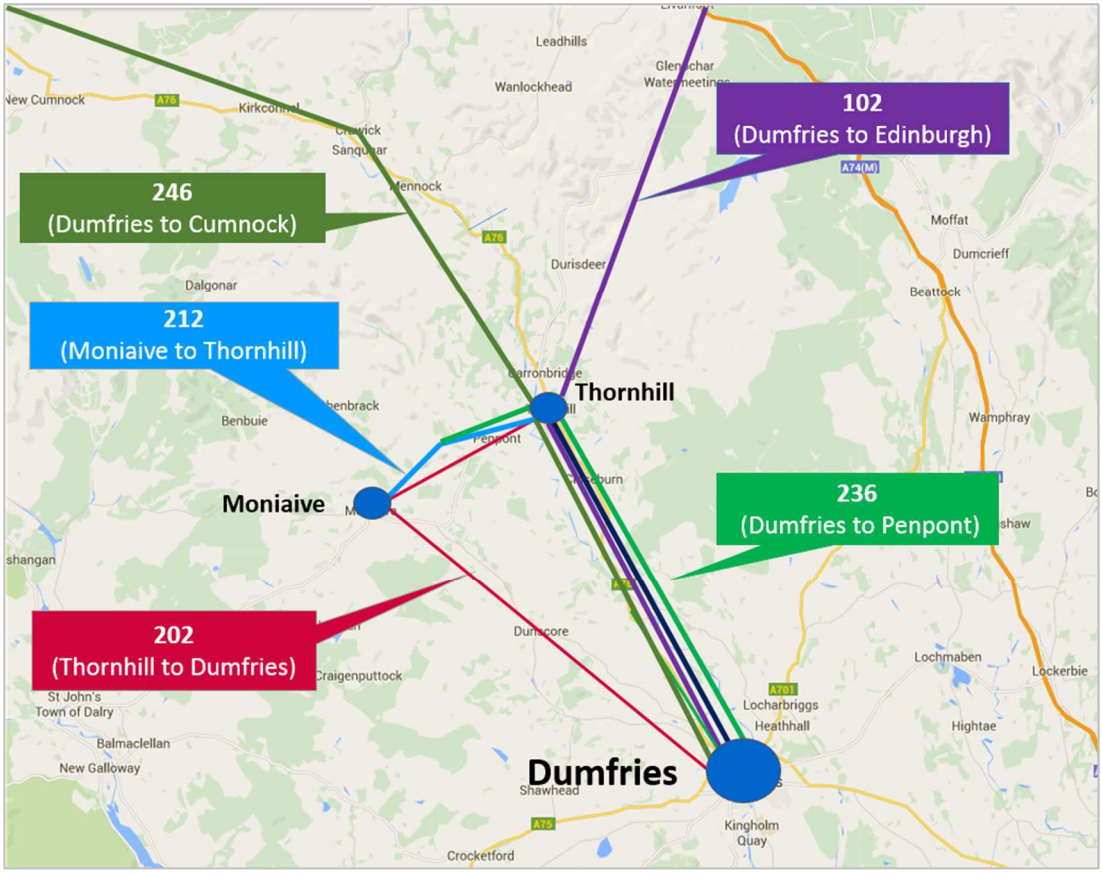

Figure 2.2: Bus routes serving Thornhill

Table 2.3: Bus Operating Hours from and to Thornhill

Thornhill ... To / From	Service	Serving	Weekday			Saturday			Sunday		
			First connection to	Last connection back	No. services (each direction	First connection to	Last connection back	No. services (each direction)	First connection to	Last connection back	No. services (each direction)
Dumfries	101 / 102 / 200	Dumfries, Thornhill, Edinburgh	20:00	13:20	1	20:00	13:20	1	16:25	17:04	1
	202	Dumfries - Dunscore - Moniaive – Thornhill	07:15	17:45	5	07:15	17:45	5	-	-	-
	212	Moniaive - Tynron - Keir Mill – Thornhill	09:00	16:15	3 - 5	09:00	16:15	2 - 4	-	-	-
	213	Thornhill - Gatelawbridge - Park – Dumfries	09:00	14:10	6 - 7	-	-	-	-	-	-
	236	Dumfries - Kirkton - Auldgirth – Thornhill	07:45	17:45	10	07:45	17:45	10	14:15	17:20	1 - 2
	246	Dumfries - Thornhill – Cumnock	07:02	20:30	13	07:02	20:30	11	10:22	20:30	4
Sanquhar	246	Thornhill – Sanquhar - Cumnock	06:25	20:40	9	06:25	20:40	9	11:00	21:25	4

2.4.22 Table 2.3 shows:

- The time of the latest bus back from Dumfries to Thornhill at 20:30 on a weekday and at weekends;
- The limited bus services and much reduced operating hours on a Sunday, with the earliest bus to Dumfries from Thornhill not until close to 10:30; and
- At the end of the working day, there is a long gap between buses returning from Dumfries to Thornhill between 17:45 and 20:30.

Key Economic and Social Impacts

2.4.23 From both the initial public engagement and the Public Event and associated feedback from the online survey, the existing bus operating hours were felt to be causing a number of economic and social problems in the local communities, particularly in terms of:

- **Reduced social opportunities**. As noted in the previous problem, at present, young people's ability to access Glasgow, especially for concerts which finish late at night, was highly dependent on parents being able to collect them from Sanquhar as the buses did not provide sufficient connectivity later on in the evening (the last bus being just after 20:30 from Sanquhar). This places a burden on parents, reduces the ability for greater independence by young people and may limit opportunities for pupils in households without access to a car.

  In addition, the last bus back from Dumfries to the area is at 20:30. This does not provide any opportunity to use public transport for a return journey back from an evening in Dumfries. This either requires people to use their cars, or leaves people without access to a car unable to participate. This issue also pertains to school children for whom participation in later finishing extra-curriculum school activities in Dumfries is impossible without support.

  It should be noted that there is a burden on partners / friends / parents in enabling others to access locations further afield who require lifts to then connect to public transport. For instance, it was noted that for travel to Edinburgh, given the very limited public transport connectivity (and the long associated journey time by bus) people often drive to drop people at Lockerbie Station – a return trip of over 1 hour 30 minutes.

  The issue of lacking late night travel connectivity to Glasgow was also noted during the public event (see Appendix N), where it was noted that those wanting to enjoy a drink on a night out could not drive to Sanquhar and leave their car to pick up on the return journey. Instead, either someone had to drive to collect them from Sanquhar station or they needed to pay for a taxi back to Thornhill (around £30 - £40). This is a considerable cost and may not be affordable to all, thus limiting social opportunities from the area.

- **Reduced employment opportunities.** The lack of late evening bus connectivity and the much reduced Sunday services means it is difficult for those without a car or unable to drive to take up employment opportunities which require shift work or weekend working.

PR5: Poor Integration between Bus and Rail

2.4.24 In terms of integration between bus and rail, there are problems relating to:

- Poor integration between bus and rail timetables; and
- A lack of physical integration between bus stops and rail stations with the rail network not easily accessible, especially for those with limited mobility.

2.4.25 Analysis of the results of the Public Event online survey (see Appendix N) also highlighted poor integration between bus and rail as a problem, with 63% of respondents noting they felt this was a major problem to them.

Key Evidence

2.4.26 The closest stations to Thornhill are located at:

- Sanquhar (19km north) and Dumfries (26km south) on Glasgow South West Line; and
- Lockerbie (48km south-east) on West Coast Main Line.

2.4.27 Figure 2.3 shows these stations and the daily services departing from these stations.

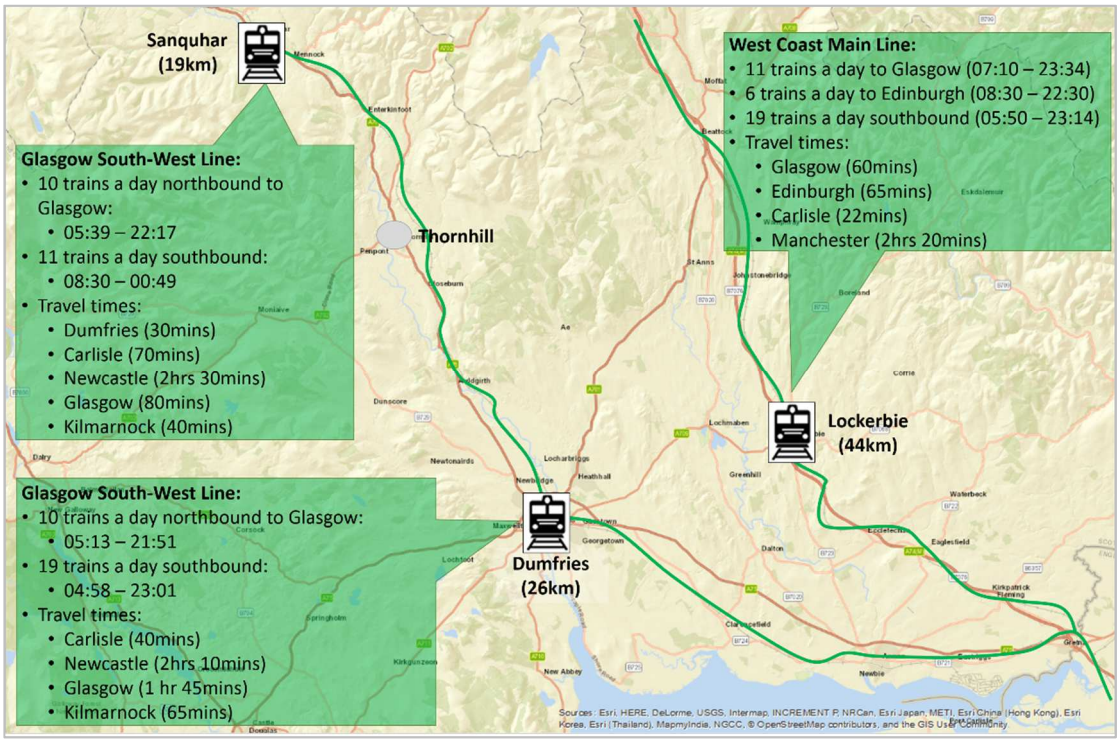

Figure 2.3: Closest railway stations

Rail network not easily accessible

2.4.28 Most buses from Thornhill to Dumfries terminate at Whitesands to the west of the town's main shopping area. The railway station is located to the north of the town centre, around a 10-15-minute walk from Whitesands. For those with limited mobility, this can present a difficult interchange between bus and rail.

2.4.29 There are some (very) limited **direct** bus services to Dumfries railway station with Service 202 / Service 212 providing the only direct connection from Thornhill and Moniaive to the station in Dumfries.

2.4.30 From Thornhill, Service 246 northwards connects to Sanquhar, stopping on the High Street, around a 6-minute walk to the train station, located to the north of the village.

2.4.31 There are no direct bus services to Lockerbie Station, with interchange between buses required in Dumfries. However, the 81 / 381 connecting bus from Dumfries to Lockerbie does stop close to Lockerbie Station.

Poor integration between bus and rail timetables

2.4.32 Analysis of integration between bus and rail timetables has been undertaken (reflecting winter 2016/17 timetables) for both north and southbound services at Dumfries and Lockerbie, considering the available bus services connecting Thornhill (either direct, or indirect with interchange between buses) to departing and arriving train services. The analysis is shown in Appendix L.1.

2.4.33 The analysis considers 'access time' i.e. the total travel time from Thornhill to a departing train (i.e. an outbound trip), or from an arriving train back to Thornhill (an inbound trip) and considers bus travel time, any walk time required between bus stop and railway station and any wait time (either at the station for outbound trips) or at the appropriate bus stop (for inbound trips).

2.4.34 Appendix L.1 shows how existing bus services to and from Thornhill tie in with rail departure times from Dumfries and Lockerbie Railway Stations. For each rail departure the figures indicate time spent on the bus, walk time between the bus stop and station, and additionally time spent waiting at the station. For arrivals by rail (when the trip being considered is from the railway station back to Thornhill), the figures include the walk time from the station to the required bus stop, wait time at the bus stop, and the journey time by bus back to Thornhill.

2.4.35 The analysis highlights that at present, in the **outbound** direction:

- Bus services from Thornhill do not allow access to the first two southbound rail departures from Dumfries or the first three from Lockerbie;
- Overall, interchange time makes up circa 50% of total 'access' journey time for outbound trips via Dumfries Railway Station and 30% via Lockerbie Railway Station;
- Total 'access' journey times from Thornhill to boarding a train at Dumfries, range from 41 minutes to nearly 2 hours across the day; and
- Total 'access' journey times from Thornhill to boarding the train at Lockerbie, range from 1 hour 10 minutes to nearly 2 hours 20 minutes across the day.

2.4.36 The analysis highlights that at present, in the **inbound** direction:

- There is no available bus service to Thornhill if alighting from the last two northbound train arrivals at Dumfries or the last four into Lockerbie;
- Wait times at the bus stop in Dumfries range from six minutes to nearly 1 hour 45 minutes;
- Overall interchange time makes up circa 55% of total 'access' journey time for inbound trips via Dumfries Railway Station and 35% via Lockerbie Railway Station;
- Total 'access' journey times from Dumfries Railway Station range from around 50 minutes to nearly 2 hours 30 minutes; and
- Overall 'access' journey times, from Lockerbie Railway Station range from around 1 hour 10 minutes to nearly 2 hours 30 minutes.

2.4.37 Integration between bus services to/from Thornhill and rail services from Dumfries and Lockerbie is therefore considered to be presently poor.

Key Economic and Social Impacts

2.4.38 From both the initial public engagement and the Public Event and associated feedback from the online survey, the existing level of public transport integration was felt to be causing a number of social problems in the local communities, particularly in terms of:

- **Impact on those with mobility issues**. The lack of integration between bus and railway stations and services creates long wait times for services and a need to interchange between services, often with a walk across town. This is particularly difficult for the elderly and those less able.
- **Reduced employment opportunities**. The lack of bus and rail integration, particularly with a lack of connecting bus services to later evening trains, limits the potential to utilise the combined public transport network for accessing employment opportunities.
- **Reduced social opportunities**. As above with employment opportunities, the lack of bus and rail integration, particularly with a lack of connecting bus services to later evening trains, limits the potential to utilise the combined public transport network for accessing social opportunities.

PR6: Large Gaps in Rail Timetables

2.4.39 Analysis of the results of the Public Event online survey (see Appendix N) also highlighted large gaps in the rail timetable causing problems, with 57% of respondents noting they felt this was a major problem to them.

Key Evidence

2.4.40 There are currently large gaps in the rail timetable meaning travel by rail is not possible (as highlighted in Figure 2.4 and Figure 2.5):

- Between approximately 09:00 and 12:00, and 16:00 and 19:00 northbound
- Before 08:30 and between 14.30 and 17.30 southbound

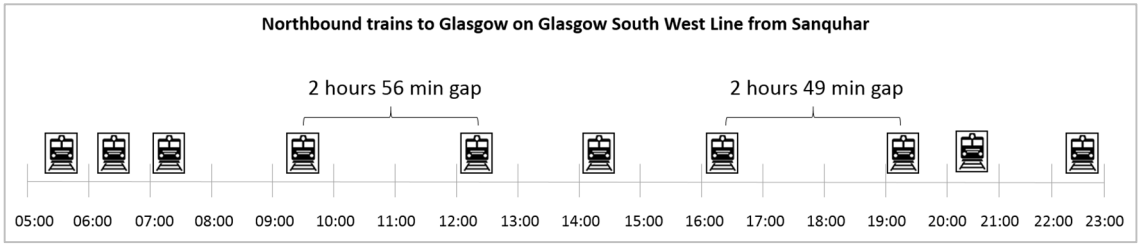

Figure 2.4: Northbound trains from Sanquhar

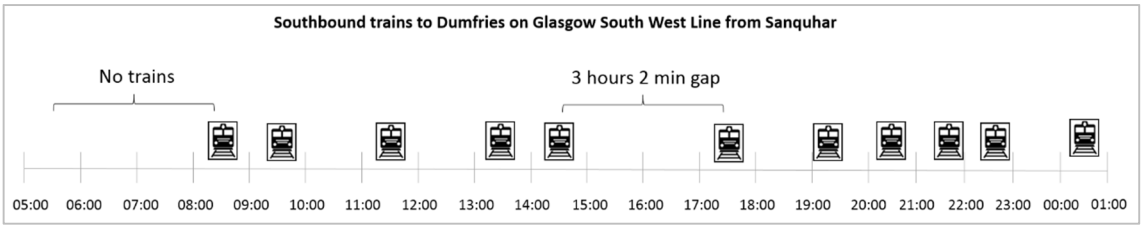

Figure 2.5: Southbound trains from Sanquhar

Key Economic and Social Impacts

2.4.41 The large gaps in the rail timetable specifically limit the ability of people in Thornhill to utilise the rail network (through access at the nearest station at Sanquhar) for travel both north and southbound.

2.4.42 It was noted by the community that the current timetable offers no service to Carlisle between around 14:30 and 17:30, and there are no trains north to Glasgow between around 16:00 and 19:00, with these very large gaps in the afternoon where travel by rail is not possible – and this limits the use of rail for education, retail and social activities. Again, for those reliant on public transport, this severely limits access to places further afield.

PR7: Lack of Direct and Safe Cycling Routes on A76

2.4.43 Consultation highlighted that:

- It was felt there were a lack of safe cycling routes serving the local area;
- There were places local people would like to be able to reach by bike but couldn't. These included:
  - Dumfries
  - Castle Douglas

2.4.44 Analysis of the results of the Public Event online survey (see Appendix N) also highlighted a lack of direct and safe cycling routes as a problem, with 36% of respondents noting they felt this was a major problem to them.

Key Evidence

2.4.45 Currently, the Kirkpatrick Macmillan Cycle Trail offers a very quiet route from just west of Thornhill to the A75, just over 4km north of Dumfries town centre (shown in Figure 2.6) but:

- The route is not direct at 32km
- The direct route via A76 is 26km (but not considered safe)
- The route does not link north to Sanquhar (it stops at Drumlanrig Castle)

2.4.46 The direct route between Thornhill and Dumfries is along the A76. However:

- The route is single carriageway at national speed limit throughout much of its length; and
- There is no street lighting along the majority of its length.

2.4.47 The speed of traffic and lack of lighting make the route very unsuitable as a cycle route from a safety perspective.

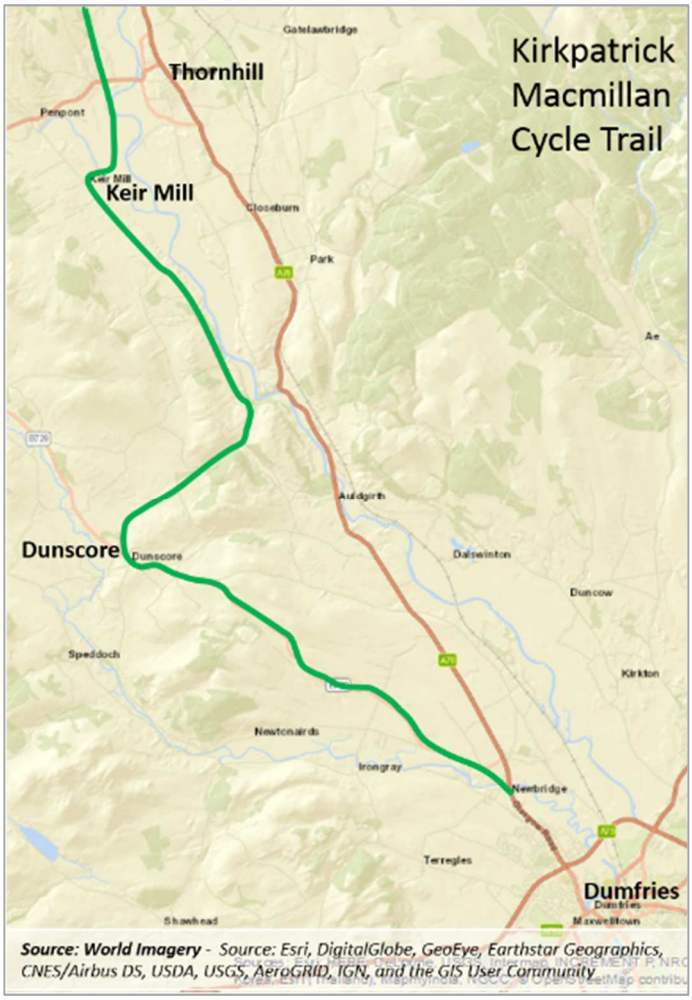

Figure 2.6: Cycle link between Thornhill and Dumfries

Key Economic and Social Impacts

2.4.48 The lack of direct and safe cycling routes on the A76 was felt to be contributing to the following economic and social problems:

- **Constraining the tourism market**. The lack of strategic cycle access to and from Thornhill was felt to be reducing the community's ability to support the Scottish Government's Sustainable Tourism agenda. There were felt to be opportunities to promote the area through the newly formed South of Scotland Enterprise Partnership and Visit Scotland's 'See South Scotland' initiative (with half a million pounds of funding announced to launch a new campaign dedicated to attracting visitors to the South of Scotland), as well as the potential for a Dumfries and Galloway National Park – with the potential to attract cycle visitors; and

- **Limiting access to Sanquhar Railway Station.** The lack of active travel links to the station is likely to contribute to higher levels of car use, with consequent impacts on the local environment and the health of the local community.

2.5 Issues and Constraints

2.5.1 In the context of considering options, it is important to note the situation with respect to the bus industry across Dumfries and Galloway as a whole in what is a rural context.

2.5.2 A key major issue facing transport in the area is the ongoing viability of the bus network. In total, over half of the bus network in Dumfries and Galloway operate with partial or full subsidy from SWestrans, and this subsidy is reducing in the light of funding pressures (see Table 2.4 below). There is therefore uncertainty regarding how much funding will be available in the future for supporting bus services.

2.5.3 Figure 2.7 shows the operating commercial and subsidised buses in the area.

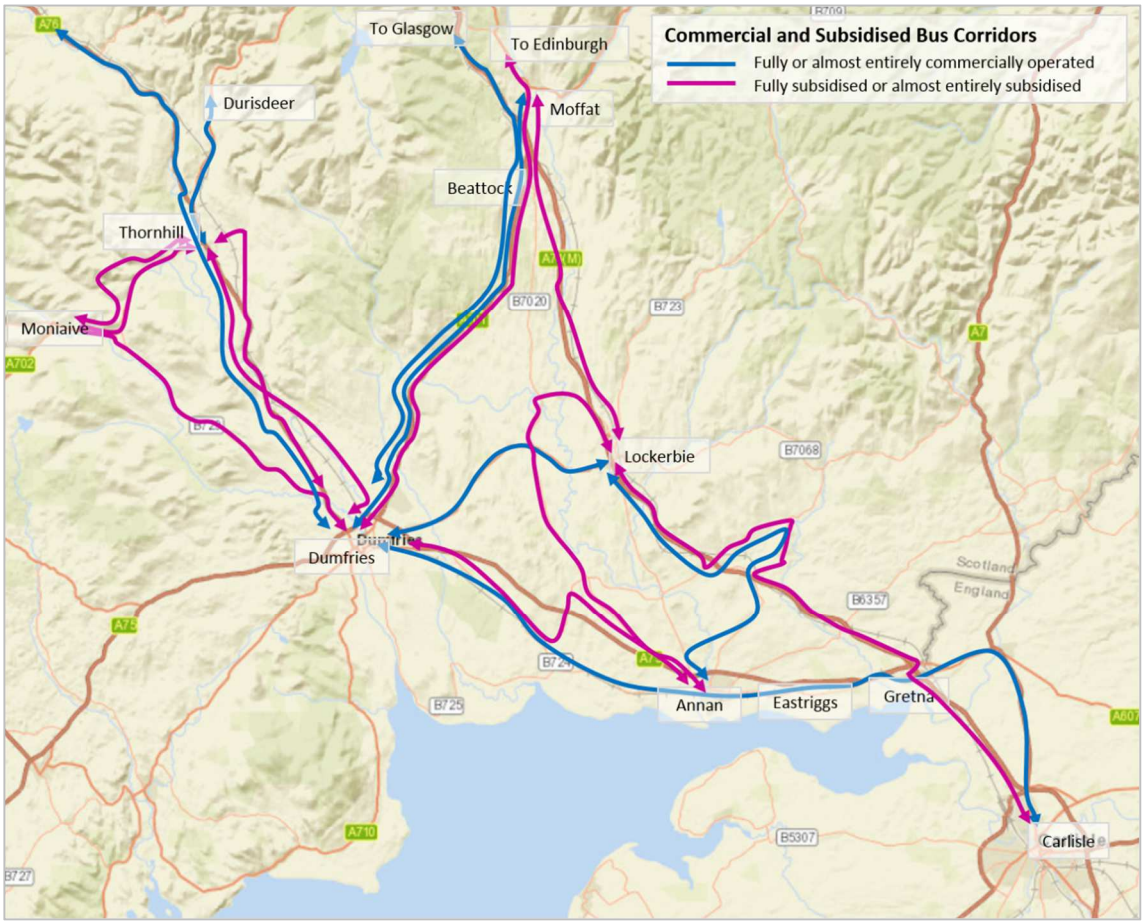

Figure 2.7: Commercial and subsidised bus services in the area (as at December 2017)

2.5.4 Table 2.4 shows SWestrans bus subsidy budget since 2015/16.

Table 2.4: Available SWestrans subsidy

Year	Available Subsidy (£)	Change in subsidy available compared to previous year
2015 / 16	£3,735,600	-
2016 / 17	£3,473,040	-7.0%
2017 / 18	£3,400,798	-2.1%
2018 / 19	£3,395,741	-0.1%
Overall subsidy reduction 2015 / 16 to 2018 / 19		-9.1%

2.5.5 The available resources (vehicles and drivers) which operate bus services across the region are heavily utilised throughout the day over a variety of routes. For commercially run services, the overall viability of services is, in many cases, only achievable due to the high use of services in the morning by school children / school contracts. As such, the overall bus network and operation across the region is fragile and even minor changes to routes or services (or indeed any new competition with rail), which have the potential to tie up resources or affect patronage, could have major consequences. This is an important point when considering any changes to the existing bus network. In addition, for those without access to a car, there is often no alternative other than the bus, and bus services are therefore 'lifeline' in nature.

2.5.6 In addition, clear cognisance must be taken in consideration of instating any new bus services operating with subsidy which could have an impact on commercially operated services. The relevant legislation is contained in Section 63 of the Transport Act 1985 (as amended) which states:

> *(2)(a) "It shall be the duty of a council in Scotland ... to secure the provision of such public passenger transport services as the council consider it appropriate to secure to meet any public transport requirements within their area which would not in their view be met apart from any action taken by them for that purpose"*
>
> *(5) "For the purpose of securing the provision of any service under subsection (2)(a) any council shall have power to enter into an agreement providing for service subsidies; but their power to do so shall be exercisable only where the service in question would not be provided without subsidy"*

2.5.7 It should be noted that while the above Act refers to the council, this responsibility was transferred from Dumfries and Galloway Council to SWestrans via a transfer of functions order in 2006. Under the Act therefore SWestrans has a duty to secure services it thinks are required where they are not provided by the market, but it cannot secure a service already provided by the market.

2.5.8 The key issue is the interpretation of "service": there are many examples of subsidised services that partially parallel commercial services. In developing options, a clear understanding of the purpose of any new subsidised services is required in order to show that the proposals are legal.

2.6 Opportunities

Economic

2.6.1 Economic benefits include:

- The ability of improved connectivity to the area in helping sustain the community through the retention of young people, through offering improved access to education, employment, and social opportunities;

- Increased opportunities for local businesses to take advantage of improved connectivity for their business needs as well as an increased skilled labour force. It has been noted that there are a high number of 'one-man band' businesses in the area, who are highly reliant on local transport links for their business needs. Attracting staff to local businesses was an issue as current transport connectivity was reducing the available labour catchment area; and

- The greater ability of key services (healthcare, education) to recruit staff if transport connectivity were improved.

Tourism

2.6.2 Tourism is felt to be a key opportunity with much untapped potential including the large range of walking, cycling, fishing and shooting opportunities in the area. There is potential to be a community where this offering can be accessed by sustainable means, supporting the Scottish Government's Sustainable Tourism agenda. As noted above, opportunities exist to promote the area through the newly formed South of Scotland Enterprise Partnership and Visit Scotland's 'See South Scotland' initiative (with £500k of funding announced to launch a new campaign dedicated to attracting visitors to the South of Scotland), as well as the potential for a Dumfries and Galloway National Park – with the potential to attract visitors who may otherwise have favoured e.g. the Lake District. Improved transport links are seen as key to enabling these opportunities to be realised.

2.6.3 A discussed above, there are a large number of festivals across the region including: the renowned Spring Fling Arts and Crafts festival which happened across the entire region; the events at Drumlanrig Castle; and Moniaive as a 'festival village'. Good transport links are important for such events and their continued growth. For example, the Electric Fields Festival which attracted 5,000 people recently withdrew from the area, in part due to transport and logistic issues. There is also an opportunity for improved access to the Galloway and South Ayrshire Biosphere and Southern Upland Way to support Thornhill being seen as a 'Gateway' to the region.

Social

2.6.4 In terms of social opportunities, the general feeling of the community (as noted in the public engagement elements of the study) is that improved transport connectivity had real potential in terms of the long term sustainability of their community, encouraging younger people to remain or move into the area to rebalance its current ageing population profile and offering improved social accessibility for all. The highly regarded Wallace Hall Academy in Thornhill regularly has requests for placements from out with the local area and improved transport connectivity was seen as allowing a greater number of students to easily access the academy as well as offering opportunity for greater higher education access. Improved transport connections were also seen as providing the necessary catalyst for unlocking development in the area, especially land allocated for housing in Thornhill in the Dumfries and Galloway Local Development Plan.

Environmental

2.6.5 Thornhill has the potential to capitalise on sustainable tourist opportunities, as well as opportunities to reduce the current high reliance on the private car for travel. Reduced emissions and noise levels (including those caused by heavy goods vehicles - including timber lorries) on the trunk road through the town, could be key benefits of the implementation of greater sustainable travel access and use in the area.

3 Objective Setting

3.1.1 This section sets out the Transport Planning Objectives (TPOs) for the study. The TPOs express the outcomes sought for the study and describe how the identified key problems can be alleviated (without indicating any potential solution). The objectives will form the basis for appraisal of the options at STAG Part 1 Appraisal (and subsequently, with refinement, during the more detailed STAG Part 2 Appraisal).

3.1.2 The development of the TPOs has been informed by:

- Consideration of the key problems and opportunities identified;
- The wider established transport, land use planning and economic policy context as discussed below;
- Discussions during the stakeholder engagement programme; and
- Discussion with the client group.

3.1.3 The objectives have been developed with SMART principles in mind as specified below:

- **Specific:**
  It will say in precise terms what is sought
- **Measurable:**
  There will exist means to establish to stakeholders' satisfaction whether or not the objective has been achieved
- **Attainable:**
  There is a general agreement that the objectives set can be reached
- **Relevant:**
  The objective is a sensible indicator or proxy for the change which is sought
- **Timed:**
  The objective will be associated with an agreed future point by which it will have been met.

3.2 Objective Setting Policy Hierarchy

3.2.1 The TPOs set for the study, while reflecting the identified problems, also support the range of established national, regional and local policy directives, plans and strategies.

3.2.2 Figure 3.1 shows the key transport, planning and economic policy, strategy and plan hierarchy under which the study is positioned, and to which the study objectives are aligned.

3.2.3 Details of the key aims and objectives for each of the noted policy directives, plans and strategies shown in Figure 3.1 are discussed in Appendix E .

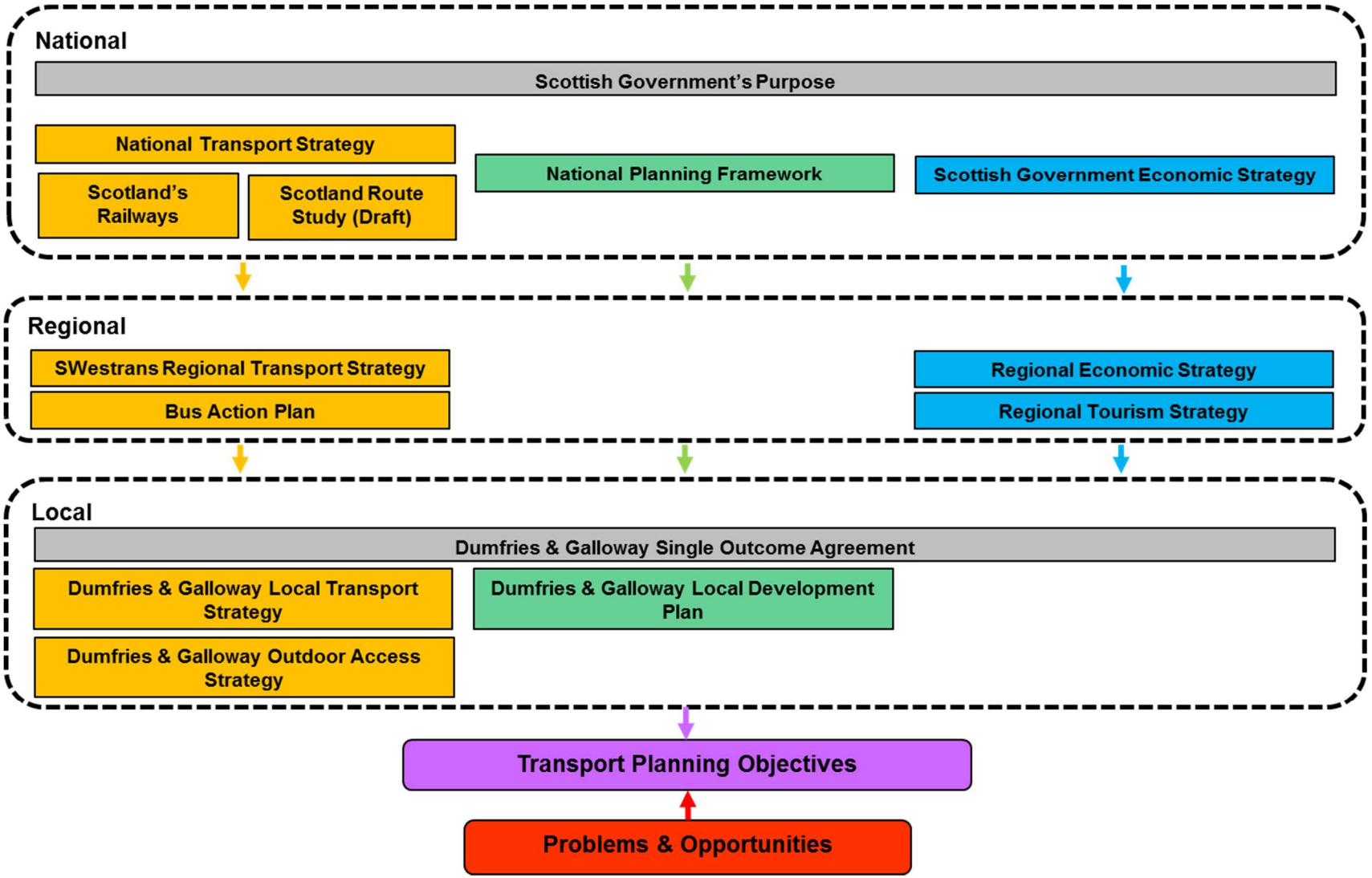

Figure 3.1: Objective Setting Policy Hierarchy

3.3 Transport Planning Objectives

3.3.1 The setting of TPOs is a key step in the STAG process, as they define what the policymaker is seeking to achieve through the transport intervention. The objectives that have been developed for this appraisal are designed to reflect and address the problems and opportunities outlined in 2.4 to 2.6 above, whilst also focussing on the delivery of the wider policy context.

3.3.2 The resulting TPOs are set out below. In line with the problems and opportunities identified, they are focussed on addressing the provision of sustainable travel options that facilitate access to employment, retail and key services.

- **TPO 1:** Enable an effective day trip by public transport to key education, retail and social opportunities in Glasgow, Ayr, Edinburgh and Carlisle
- **TPO 2:** Provide public transport connectivity which enables travel to and from the area across the day and across the week
- **TPO 3**: Increase the inbound public transport catchment to support education, tourism and local businesses

3.3.3 Figure 3.2 shows how the problems set out in Chapter 2 have fed into the objectives. The dotted lines linking the problem PR7 to the objectives reflects that the problem partially links to the objectives. This reflects the part that active travel can play in enabling connections to the strategic transport network but recognises that it is unlikely that active travel modes would be used for an entire strategic trip, given the distances involved.

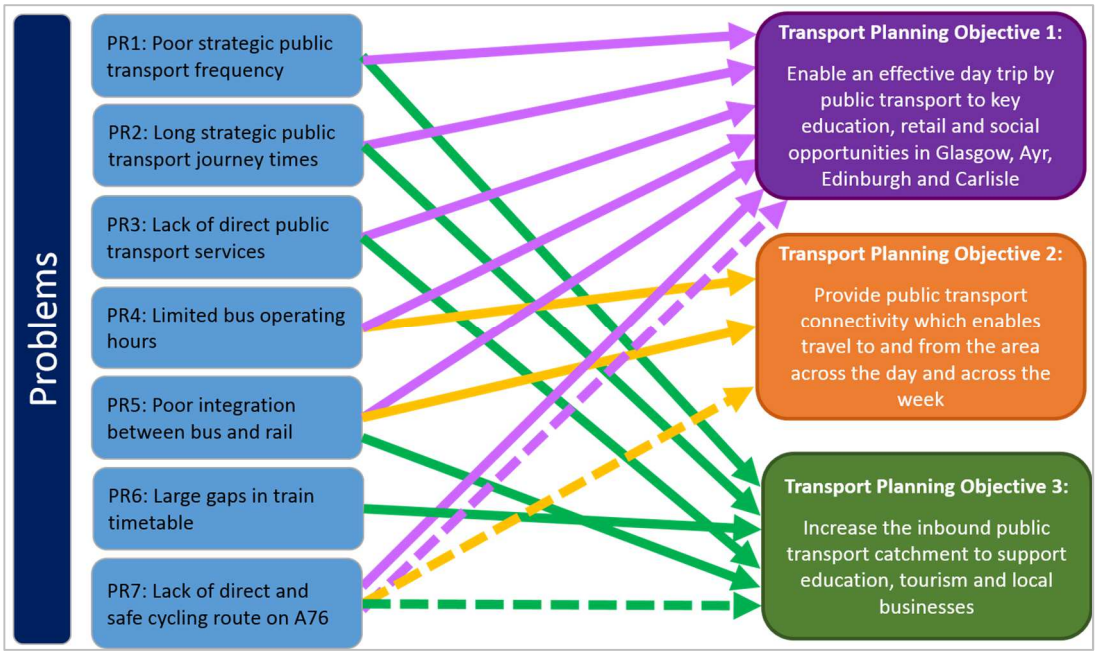

Figure 3.2: Problems mapped to Objectives

4 Option Generation, Development & Sifting

4.1 Overview

4.1.1 Drawing on the problems and opportunities identified and considering the developed objectives, an initial list of options which could potentially resolve them was developed. In line with STAG, the potential options were derived through:

- ideas / outputs from the consultation process;
- ideas / proposals that have previously been developed and remain viable options; and
- ideas / outputs from structured decision making processes, followed by our team undertaking the 'optioneering' exercise.

4.2 Option Generation

4.2.1 This section sets out the potential options which have been identified for addressing the transport problems and opportunities in Thornhill.

Do Minimum & Reference Case

4.2.2 STAG requires the establishment of a 'Do Minimum' and 'Reference Case':

- The 'Do Minimum' is the current position plus any committed investments which have policy and funding approval. The Do Minimum is the basis against which all other options should be measured.
- The 'Reference Case' includes other non-controversial but as yet uncommitted transport schemes and / or development profiles, which can also be used as a baseline for option comparison.

4.2.3 With no committed transport improvements in the Thornhill area, the 'Do Minimum' and 'Reference Case' for this study represent one and the same – i.e. the continuation of the current situation.

Options Generated

4.2.4 The generated options are shown in Table 4.1 alongside a high-level appraisal against the Transport Planning Objectives.

Table 4.1: Generated Options

Option No.	Option Description	High-level Appraisal against Objectives		
		TPO1: Effective day trip	TPO2: Connectivity across the day and week	TPO3: Increase inbound transport catchment
1	RailBus to Dumfries and Lockerbie: dedicated bus from Thornhill which integrates with train arrival and departure times at Dumfries and Lockerbie Railway Stations.	✓	✓	✓
2	Bus priority measures in Dumfries Town Centre (focused on improving bus journey times and reliability in Dumfries town centre by providing bus priority measures)	✓		
3	Earlier & later (and Sunday) services between Thornhill, Moniaive & Dumfries	✓	✓	✓
4	Direct bus connections to Glasgow	✓		✓
5	Increased promotion and further development and support for local community transport		✓	
6	Re-open Thornhill Railway Station	✓		✓
7	Re-open Closeburn Railway Station	✓		✓
8	Improved off-road cycling Infrastructure between Thornhill and Dumfries	✓	✓	✓

4.3 Option Development

4.3.1 A number of the options were further developed in order to clarify the details of each to allow for informed appraisal – this is set out in Table 4.2 below.

Table 4.2: Option Development

Option	Description	Further development
1	Railbus linking the study area with Dumfries Railway Station and / or Lockerbie Railway Station	The option is focussed on improving integration between bus and rail by providing bus services (potentially a dedicated Railbus) which integrates with train arrival and departure times at Dumfries and / or Lockerbie, improving transport integration between the bus and rail networks and increasing the accessibility of both the GSWL and the WCML. The option has been further developed and includes: ▪ **Option 1a:** Provision of a dedicated direct bus service operating between Thornhill, Dumfries Railway Station and Lockerbie Railway Station, integrated to reduce interchange times between bus and rail; ▪ **Option 1b:** Extension of the existing Service 246 to include a stop at Dumfries Railway Station – with adjustment of the bus timetable to reduce interchange time between bus and rail arrival/departure times; and ▪ **Option 1c:** Extension of the existing Service 81/381 (operating between Dumfries and Lockerbie) to Thornhill to provide a direct connection to Lockerbie Railway Station (similar to Option 1a) For Options 1a, 1b and 1c, there is the potential to establish a Statutory Quality Bus Contract (SQC) specifying the Railway Stations as stops, minimum service frequencies and maximum interchange wait times for rail services at the railway stations to ensure provision of service. It is recognised that commercially there may not be sufficient demand to encourage the current operator to increase the headway / alter the route of their services and there is very limited availability of the existing SWestrans budget to fund further subsidised services. A material change would therefore likely be required to the current bus subsidy available to enable this option to be delivered.
2	Bus priority measures in Dumfries town centre	The option seeks to benefit all bus services / users within the town and reduce journey times into Dumfries. This option assumes journey time benefits to bus services through: ▪ Selective vehicle detection (SVD) or selective vehicle priority (SVP) at traffic signals to provide priority / ‘green waves’ for buses; ▪ Bus lane and bus gate implementation where appropriate;

Option	Description	Further development
		▪ Increased implementation of signal optimisation platforms such as MOVA or SCOOT to better manage traffic flow, traffic fluctuations and congestion in the town centre. Further consideration has been given to this option with full details to the option's development provided in Appendix F which shows how data from the existing SCOOT system has been analysed to consider whether there is justification for an extension of bus lane operating hours on Glasgow Street (A76). In terms of specific bus priority that may benefit buses coming into Dumfries from Thornhill (i.e. on the A76), there is potential for: ▪ Extension of the operating hours of the existing southbound bus lane on Glasgow Street to full day operation, between 07:30 – 18:00 (from the current 07:00 – 09:30 and 16:00 – 18:30 operating hours); ▪ Extension of the southbound bus lane on Glasgow Street such that it extends to the Cuckoo Bridge retail park roundabout and potentially further north to the A76/A75 roundabout; ▪ Implementation of a northbound bus lane on Glasgow Street between the Cuckoo Bridge retail park roundabout and the A75/A76 roundabout; and ▪ Implementation of a bus lane on Buccleuch Street between Glasgow Street and Whitesands to provide joined up bus priority from Glasgow Road to the Whitesands bus station. The outcome of the analysis suggests there is potential for the extension of operating hours of the bus lane from peak to full day operation. However, the costs of implementing the bus lane extensions both north and southbound are unlikely to be justified based on local knowledge of current traffic congestion and the cost of implementation. Option 2 therefore includes: ▪ On-going investment in, and recalibration of the SCOOT system; ▪ Investment in a wireless detection system; ▪ Extension of the operating hours of the southbound bus lane on Glasgow Street to full day operation.

Option	Description	Further development
3	Earlier & later (and Sunday) services between Thornhill, Moniaive & Dumfries	The option assumes: ▪ Extension of the current Service 202 (Dumfries – Moniaive – Thornhill) timetable to operate later into the evening; ▪ Extension of the current Service 202 (Dumfries – Moniaive – Thornhill) timetable to operate on Sundays with 2 hourly frequency; and ▪ Increased frequency of Service 236 (Dumfries – Thornhill (via Kirkton and Auldgirth) on Sundays. It is recognised that commercially there is not sufficient demand to encourage the current operator to increase the headway of their services and there is very limited availability of the existing SWestrans budget to fund further subsidised services. A material change would therefore likely be required to current bus subsidy available to enable this option to be delivered.
4	Direct bus connection to Glasgow	The option assumes: ▪ Additional X74 Dumfries to Glasgow service running via Thornhill (in addition to existing route via the A701) to offer direct bus access to Glasgow
5	Increased promotion and further development and support for local community transport	Community Transport can play a critical role in meeting the transport needs of a wide range of groups where conventional transport fails to do so. Thornhill and District Community Transport offer a range of community transport services including group individual transport services for those who have difficulty using conventional bus routes. There is no specific funding through SWestrans etc. for Community Transport. However, the Community Planning Partnership have endorsed a strategic, coordinated and integrated approach to social/community transport service delivery across the partnership through the development of a Public Social Partnership (PSP). This approach involves the third sector earlier and more deeply in the redesign of Dumfries and Galloway's social and community transport services. The aim of the PSP in general terms is to improve the design of transport services delivered on behalf of the Commissioner(s) and to develop the capacity of the social and community transport sector. This is to be achieved by working in partnership to maximise the benefits to the community.

Option	Description	Further development
		The PSP is a multi-agency partnership between Dumfries and Galloway Council, the South West of Scotland Transport Partnership, NHS Dumfries and Galloway and the Community Transport operators/Third Sector Interface. The specific aims of this PSP are to develop a genuine and lasting partnership to support the remodelling of the Commissioner(s) services and to build the capacity of the sector to be able to delivery these services in the future by: ▪ Understanding the market; ▪ Increasing capability and capacity; and ▪ Responding to changing demand. Dumfries and Galloway PSP is currently seeking to engage with Third Sector organisations to work within the Public Social Partnership around three work streams: ▪ Transport Service Developments; ▪ Health and Social Care Transport Solutions; and ▪ Capability and capacity building. Initial scoping work has already begun with Third Sector and Public Sector partners through the co-produced "State of the Sector and Improvement Plan" report and the review of the non-emergency patient transport (NEPT) services. The work to redesign and pilot services will take place over a period of years. The existing community transport provider for the Thornhill area, Thornhill Community Transport, highlighted their desire to explore ways to improve access to healthcare, including: ▪ **The potential for a demand responsive, or similar, service in the evenings from Thornhill and, more particularly, surrounding villages, to and from the main hospital in Dumfries**, particularly to improve accessibility during the evening visiting hours. This was felt to be particularly important for more elderly residents for whom a trip bus involves interchange in central Dumfries which was considered to be potentially cold and frightening.

Option	Description	Further development
		▪ **Developing relationships and arrangements with local health centres** where, on a particular afternoon, the health centre would 'block out' appointments for those coming by community transport from surrounding villages, such that access could be provided by a single coordinated community transport vehicle.
6	Re-open Thornhill Railway Station	This option involves the delivery of a new railway station at Thornhill. It is assumed that the following will be provided: ▪ Proportionate car parking and bus access; ▪ DDA complaint footbridge or public road underbridge; ▪ Passenger facilities, including waiting shelters, Customer Information System (CIS), Public Address, CCTV system, and ticket machines; and ▪ Signalling as required.
7	Re-open Closeburn Railway Station	This option involves the delivery of a new railway station at Closeburn. It is assumed that the following will be provided: ▪ Proportionate car parking and bus access; ▪ DDA complaint footbridge or public road underbridge; ▪ Passenger facilities, including waiting shelters, Customer Information System (CIS), Public Address, CCTV system, and ticket machines; and ▪ Signalling as required
8	Improved off-road cycling Infrastructure between Thornhill and Dumfries	As discussed in PR7 in the Problems section, currently, the Kirkpatrick Macmillan Cycle Trail offers a very quiet route from just west of Thornhill to the A75, just over 4km north of Dumfries town centre. This route is shown in Figure 2.6. However: ▪ The route is not direct at 32km ▪ The direct route via A76 is 26km (but not considered safe)

Option	Description	Further development
		▪ The route does not link north to Sanquhar (it stops at Drumlanrig Castle) The direct route between Thornhill and Dumfries is along the A76. However: ▪ The route is single carriageway at national speed limit throughout much of its length; and ▪ There is no street lighting along the majority of its length. In order to improve walking and cycling, this option involves the delivery of improved off-road cycling infrastructure between Thornhill and Dumfries.

4.4 Option Sifting

4.4.1 Best practice in STAG is that all options should be retained until evidence is provided that the option will not deliver against the TPOs and STAG criteria (and hence will not address the problems and opportunities). At this stage, it is recommended that options which will clearly not deliver the intended outcomes should be eliminated from further consideration.

4.4.2 Many of the options developed above have the potential to contribute towards delivering against the TPOs and STAG criteria and thus could be considered in more detail at the STAG 1 appraisal stage. The options considered unlikely to meet these criteria are:

- Option 2 – Bus priority measures in Dumfries town centre
- Option 7 – Re-open Closeburn Railway Station
- Option 8 – Improved off-road cycling Infrastructure between Thornhill and Dumfries

4.4.3 Options 2, 7 and 8 are being rejected at this stage.

4.4.4 Option 2 is being rejected as:

- The option is not solely focused on benefitting only sustainable transport as it would likely benefit all those on the road network within Dumfries, providing improved journey times for cars also, and not encouraging greater use of the sustainable transport network; and
- Although, it is recognised that providing bus priority measures may lead to bus services being more punctual in general and therefore lead to improved connections overall, the option does not explicitly involve new connections from / to the study area and is therefore unlikely to strongly support the Transport Planning Objectives.

4.4.5 Option 7 is being rejected given:

- The distance of Closeburn Station from the village of Thornhill (and other surrounding communities) meaning interchange would likely be required to connect to rail services;
- Access by foot to the station is likely to be limited to a small number of people (only those residents in Closeburn village, which is much smaller than Thornhill);
- The likelihood that passengers may simply stay in their car/on the bus for their full journey given the need to use an alternative mode to reach the station (especially those eligible for free bus travel); and
- It is considered unlikely to be used by people in the study area who are heading north (who would likely travel to Sanquhar) thus reducing potential patronage.

4.4.6 Option 8 is being rejected given the distances involved. The route would be unlikely to be used for commuting purposes (given the distance to Dumfries, the main employment centre) and the likely low demand is highly unlikely to be able to justify the cost of a direct off-road route with the required lighting.

4.4.7 In addition, given the Public Social Partnership work currently being undertaken to explore healthcare and social transport solutions as discussed above, no further exploration of Option 5 has been undertaken within this study.

4.4.8 The options being taken forward to Part 1 Appraisal are therefore:

- **Option 1a**: RailBus to Dumfries and Lockerbie: dedicated bus from Thornhill which integrates with train arrival and departure times at Dumfries and Lockerbie Railway Stations.
- **Option 1b:** Extension of Service 246 to include a stop at Dumfries Railway Station – with adjustment of the timetable to reduce interchange time between bus and rail arrival/departure times
- **Option 1c:** An extension of the existing Service 81 operating between Dumfries and Lockerbie to extend to Thornhill
- **Option 3:** Earlier & later (and Sunday) bus services between Thornhill, Moniaive & Dumfries
- **Option 4:** Direct bus connection to Glasgow
- **Option 6:** Re-open Thornhill Railway Station

5 Part 1 Appraisal

5.1 Methodology

5.1.1 The STAG guidance sets out a range of criteria against which options should be appraised at Part 1. These include appraisal against:

- **Transport Planning Objectives**;
- **STAG criteria** (Environment, Economy, Safety, Integration and Accessibility and Social Inclusion);
- **Affordability** – which has focussed on:
  - For the bus options (Options 1a, 1b and 1c, 3 and 4), consideration of: costs of vehicle acquisition; ongoing annual operating and maintenance costs; and fare box revenue, and consideration of the level of subsidy which would be required to operate new services;
  - For the Thornhill Railway Station option (Option 6) in particular, a high-level costing exercise for the construction of a new station; and costing for mitigation measures;
- **Public Acceptability**; and
- **Feasibility**: which has specifically considered the Thornhill Railway Station option (Option 6) where understanding the following was key:
  - Initial analysis of existing and potential future capacity on the rail routes including consideration of the existing and potential future timetables;
  - The effects of providing a new station on the wider rail network;
  - In the longer term:
    - Development of an initial understanding of how a potential extension of High Speed Rail (HS2) into Scotland may impact on the West Coast Main Line (WCML). This seeks to understand how any changes may impact on the use of the GSWL;
    - Initially exploring the potential impact of the Scotland Route Study proposals on both the WCML and GSWL in relation to both passenger and freight services; and
    - As appropriate, exploration of the potential use of the station as rail freight hub (as well as passenger station).

5.1.2 The STAG scoring criteria has been used to assign scores to the criteria for each option using the STAG scoring scale as shown in Table 5.1.

Table 5.1: STAG Scoring

-3	-2	-1	0	1	2	3
Major Cost or Negative Impacts	Moderate Cost or Negative Impact	Minor Cost or Negative Impact	No Benefit or Impact	Minor Benefit	Moderate Benefit	Major Benefit

5.2 Do Minimum & Reference Case

5.2.1 As noted in Section 4.2, there are no committed transport improvements in the Thornhill area, and the 'Do Minimum' and 'Reference Case' for this study represent one and the same – i.e. the continuation of the current situation.

5.3 Appraisal Against the Transport Planning Objectives

5.3.1 A qualitative appraisal of the options against the study TPOs have been undertaken and is shown in Table 5.2.

5.3.2 The TPOs are predominantly concerned with increasing the accessibility to and from Thornhill. As such, analysis undertaken as part of the STAG Accessibility and Social Inclusion criteria appraisal has been used to support the appraisal against the TPOs. This is presented in Appendix K .

Table 5.2: Part 1 Appraisal Against the TPO – Key Points

Option	TPO		Key Points	Score
1a	1	Enable effective day trip by public transport to key education, retail and social opportunities in Glasgow, Ayr, Edinburgh and Carlisle	Providing a dedicated Railbus enabling a direct connection to Dumfries and Lockerbie Railway Stations provides reduced journey times to Edinburgh and Glasgow, the greatest improvement being a 45-minute reduction in the journey time back from Edinburgh in the evening period. The reduced journey time between Thornhill and Edinburgh and Glasgow is likely to enable more time in the strategic locations to undertake activities (social, retail and education), enabling a more effective day trip to these locations. This could have a positive benefit in helping the community feel less remote and better connected, with the same opportunities as other parts of Scotland. It was noted during the public consultation that the option would provide greater choice with regard to which Central belt city to access. The option provides a positive benefit against this TPO. Note that there is no improvement in access to Ayr.	2
	2	Provide public transport connectivity which enables travel to and from the area across the day and across the week	This option facilitates direct access to 8 rail services to/from Lockerbie that were previously difficult to access by public transport and will also reduce the journey from Thornhill to Lockerbie Railway Station by an average of circa 40 minutes. It will also permit onward travel to Thornhill from one further rail arrival into Dumfries Railway Station and reduce average journey times to/from Dumfries Railway Station by circa 20 minutes. The additional connectivity will enable trips to and from the area much earlier / later in the day, opening up opportunities for employment that requires shift / weekend working which were previously inaccessible by public transport.	2
	3	Increase the inbound public transport catchment to support education, tourism and local businesses	The option is likely to provide a significant increase in the number of people able to access Thornhill from further afield with improved connectivity and reduced access time from the West Coast Main Line rail network. The new service enables access 8 rail services to/from Lockerbie that were previously difficult to access by public transport, meaning Thornhill is more easily accessible. This may enable a much wider employment catchment area to enable people to access the area to support local key i.e. teachers, GPs etc. and also improve connectivity for tourists into the area to support local businesses.	2

Option	TPO		Key Points	Score
1b	1	Enable effective day trip by public transport to key education, retail and social opportunities in Glasgow, Ayr, Edinburgh and Carlisle	Analysis shows that extending Service 246 to include a stop at Dumfries Railway Station, will reduce journey times between Thornhill and Dumfries Station rail departures by approximately ten minutes across the board, as a result of the fact that Option 1b will place a bus stop directly outside of the station removing the need to walk to/from the bus stop to the station. The option has the potential to improve access, in particular, to Carlisle by removing the need to interchange between modes across Dumfries town centre. The improved integration with trains at the station, and the much reduced interchange time between bus and rail is likely to enable a more effective day trip to Carlisle, but will have limited impact on trips to Edinburgh, Glasgow or Ayr. The public engagement exercise undertaken with pupils at Wallace Hall Academy highlighted the importance of Carlisle to them as the closest major town offering social and retail opportunities. This option would therefore be beneficial in enabling more effective day trips for this section of the community.	1
	2	Provide public transport connectivity which enables travel to and from the area across the day and across the week	Option 1b involves the optimisation of an existing bus service timetable to better align with arrivals and departures at Dumfries Station. There is however limited improvement in accessing additional rail services.	0
	3	Increase the inbound public transport catchment to support education, tourism and local businesses	The option provides reductions in public transport travel time for trips between Thornhill and Carlisle in the morning period (20 minutes), afternoon period (15 minutes), and evening period (20 minutes), and between Thornhill and Edinburgh in the morning period (55 minutes), and evening period (20 minutes). This may enable a wider employment catchment area to enable people to access to village to support key services within the village i.e. teachers, GPs etc. and also improve connectivity for tourists into the area to support local businesses. Note that public transport travel times to the north (Kilmarnock / Glasgow etc.) and north-west (i.e. Ayr etc.) are unlikely to be improved in any period. This is to be expected given the options focus on connecting Thornhill to the railway network at Dumfries and not to Sanquhar to the north of Thornhill which is likely to be the most appropriate place to join the rail network if heading northbound to Glasgow.	1

Option	TPO		Key Points	Score
1c	1	Enable effective day trip by public transport to key education, retail and social opportunities in Glasgow, Ayr, Edinburgh and Carlisle	The option provides reductions in public transport travel time for trips between Thornhill and Edinburgh in the morning period (65 minutes). This option would therefore be beneficial in enabling more effective day trips for travel to Edinburgh but would have limited impact on trips to Carlisle, Glasgow or Ayr.	1
	2	Provide public transport connectivity which enables travel to and from the area across the day and across the week	At present there is not a direct bus connection from Thornhill to Lockerbie. Implementation of Option 1c would permit access to 6 additional rail services to/from Lockerbie and reduce journey times between Thornhill and Lockerbie rail services by an average of 25-30 minutes. The option would also permit access to/from two additional rail services from Dumfries Station, and reduces overall travel times. The additional access to rail across a wider time span is likely to provide access to opportunities for employment that requires shift / weekend working which were previously inaccessible by public transport. It may also enable people to access additional social, retail and educational opportunities in Edinburgh.	2
	3	Increase the inbound public transport catchment to support education, tourism and local businesses	The option is likely to provide an increase in the number of people able to access Thornhill. The option enables improved connectivity and reduced access time from the West Coast Main Line rail network for travel to / from further afield. The extended service enables access to additional rail services on the West Coast Main Line so is likely to make Thornhill more easily accessible. This may enable a wider employment catchment area to enable people to access the village to support key services within the village i.e. teachers, GPs etc. and also improve connectivity for tourists into the area to support local businesses.	1
3	1	Enable effective day trip by public transport to key education, retail and social opportunities in Glasgow, Ayr, Edinburgh and Carlisle	As the option provides greater accessibility to Dumfries in the evenings, it would provide an increased ability to undertake a day trip, spanning a longer time period. Analysis has shown that at present, it is not possible to travel between any of the four strategic locations and Thornhill after 20:00. In the evening period however, the option provides three new opportunities to travel back from Glasgow, Edinburgh and Carlisle as the additional bus services provide connections from arriving trains into Dumfries back to Thornhill. As such, the option provides the connectivity required to extend the current time spent in the strategic locations and enables a more effective day trip to these places to undertaken activities	2

Option	TPO		Key Points	Score
	2	Provide public transport connectivity which enables travel to and from the area across the day and across the week	Option 3 provides an extension of the operating day by 1 hour and 30 minutes on weekdays, providing greater connectivity to Thornhill from Dumfries in the evenings. While Option 3 only increases the operating day on a Sunday by around 20 minutes, there are an additional 8 connections offering far greater flexibility in time of travel.	2
	3	Increase the inbound public transport catchment to support education, tourism and local businesses	Given the focus of the option on evening and weekend service improvements, there will be no change in the morning period. In the evening period there is likely to be an increase in the number of people able to access Thornhill. This may be especially beneficial from a tourism perspective in supporting locally based social activities (concerts, festivals etc.) in the study area.	1
4	1	Enable effective day trip by public transport to key education, retail and social opportunities in Glasgow, Ayr, Edinburgh and Carlisle	The additional X74 service (from Dumfries to Glasgow via Thornhill) would reduce the travel time between Thornhill and Glasgow at 07:00 (by 70 minutes), 12:00 (by 20 minutes) and at 17:00 (by 35 minutes). For trips from Glasgow to Thornhill a reduction in public transport travel time of 15 minutes and an hour could be achieved for travel at 09:00 and 14:00 respectively. The service operating at 19:00 presents a new possibility to travel enabling Thornhill to be reached by bus from Glasgow in the evening period. Overall the additional services would provide increased accessibility to Glasgow, to retail, social and employment opportunities and creates more effective day trip potential. There is however no benefit to travel to Edinburgh, Carlisle or Ayr.	1
	2	Provide public transport connectivity which enables travel to and from the area across the day and across the week	The additional X74 services provide additional direct connectivity to Glasgow across the day and as noted in TPO1, the additional service operating at 19:00 presents a new possibility to travel enabling Thornhill to be reached by bus from Glasgow in the evening period, overall offering far greater flexibility in time of travel.	2
	3	Increase the inbound public transport catchment to support education, tourism and local businesses	The additional X74 services may increase the number of people able to access Thornhill, specifically from Moffat / Beattock / Motherwell and Glasgow. The greater ability for an increased number of people to access the town may be especially beneficial from a tourism perspective in supporting locally based social activities (concerts, festivals etc.) in the study area.	1

Option	TPO		Key Points	Score
6	1	Enable effective day trip by public transport to key education, retail and social opportunities in Glasgow, Ayr, Edinburgh and Carlisle	With the option in place, trips to Carlisle experience up to a 60% reduction in public transport travel time, with the largest reduction in time equating over 1 hour 10. Trips by public transport are quicker than the private car in 9 of the 16 hours considered when the trip by public transport can be up to around 15 minutes quicker. Trips to Glasgow experience up to around a 50% reduction in public transport travel time, with the largest reduction in time equating over 90 minutes in public transport travel time reduction. Trips by public transport are never quicker than the private car with the quickest travel time by public transport still 15 minutes slower than the private car. The option also provides a new opportunity to travel to Glasgow after 22:00. Journey times to Ayr also reduce by around 20 minutes in the morning period and around 15 minutes for return journeys in the evening period. These differences open up opportunities for more effective day trips to the strategic locations, especially Carlisle. This could have a positive benefit in helping the community feel less remote and better connected, with the same opportunities as other parts of Scotland. Travel times to Edinburgh are unaffected and as such the option does not provide any significant benefit in enabling an effective day trip to the capital. Given the location of the station, around 1.5km to the east of the town, the accessibility of the station itself would need to be considered if the option were progressed. Access times to the station (either by foot/cycle, bus or car) would increase the overall end-to-end travel time by rail and would be greater for those living in the rural hinterland around Thornhill. Suitable bus services which integrated with rail times would be required to ensure that overall travel times are kept to a minimum.	2
	2	Provide public transport connectivity which enables travel to and from the area across the day and across the week	With the option in place, there is: • An increase in weekday and Saturday northbound connections, with the rail services providing 10 additional connections; • An increase in operating hours for weekday, Saturday and Sunday travel with an additional 5 hours' coverage during the weekday and Saturday for access for northbound travel; and • An additional 1 hour 20 minutes and 3 hour 30 minute coverage for southbound travel on a weekday/Saturday and Sunday respectively. Specifically, of note is the ability to travel from Dumfries to Thornhill on a Sunday at around 23:45.	2

Option	TPO		Key Points	Score
			The additional connectivity will enable trips to and from the area much earlier / later in the day, opening up opportunities for employment that requires shift / weekend working which were previously inaccessible by public transport. In addition, there is a much greater ability to access social opportunities in Dumfries, Carlisle and Glasgow which have a later evening finish.	
	3	Increase the inbound public transport catchment to support education, tourism and local businesses	The option is likely to provide a very significant increase in the number of people able to access Thornhill, enabling a much wider employment catchment area to enable people to access the village to support key services within the village i.e. teachers, GPs etc. and also improve connectivity for tourists into the area to support local businesses.	3

5.4 STAG Criteria Appraisal

5.4.1 This section presents the appraisal against the STAG criteria:

- Environment;
- Safety;
- Economy;
- Integration; and
- Accessibility and Social Inclusion.

Environment

5.4.2 Table 5.3 shows the Part 1 appraisal against the Environment criteria.

Table 5.3: Part 1 Appraisal Against the STAG Environment Criteria – Key Points

Option	Key Points	Score
1a	The option is likely to encourage some minor modal shift from private car to bus and rail. As a result, there will some minor benefit to the environment through a reduction in vehicle emissions. The bus service would use the current road network and as such there will be little adverse impact on the environment. However, if the service were underutilised then the additional unnecessary bus miles undertaken would increase bus emissions with little benefit. A high level of car use was highlighted during the initial baselining exercise and improved bus and rail integration could encourage people to change their travel mode.	1
1b		1
1c		1
3	A high level of car use was highlighted during the initial baselining exercise and the option is likely to encourage some minor modal shift from private car to bus. As a result, there will be some minor benefit to the environment through a reduction in vehicle emissions and noise. The bus service will use the current road network and as such there will be little adverse impact on the environment.	1
4	The additional services proposed would use the existing road network. As such the environmental impact would be minimal. A high level of car use was highlighted during the initial baselining exercise and an improved service offering could encourage people to change their travel mode for access to Glasgow. Any modal shift that could be achieved would reduce car use and associated noise and emissions.	1
6	The option would involve the construction of the railway station at Thornhill. This may have adverse effects on the environment during construction and there may also be long-term noise impacts in the area close to the station due to train deceleration and acceleration. The option does not involve the running of additional trains (just an additional stop for existing trains) and therefore there will be little adverse impact on the environment in terms of emissions. High private car use for those in the study area was identified during the public engagement stages of the study and any modal shift to rail that could be achieved would reduce car use and associated noise and emissions. The public noted that currently, people drop family / friends at Sanquhar station. Each journey transferred to Thornhill Station, if it opened,	1

Option	Key Points	Score
	would save around 25 car miles and driver time (around 50 car miles if the return pick up trip is also considered). In addition, for those currently driving to Sanquhar station and leaving their car, transfer to Thornhill station would free up one of the (very few) parking spaces at Sanquhar, as well as reducing car miles by around 25 miles (for the outward and return trip to the station).	

Safety

5.4.3 Table 5.4 shows the appraisal against the Safety criteria.

Table 5.4: Part 1 Appraisal Against the STAG Safety Criteria – Key Points

Option	Key Points	Score
1a	Any modal shift to sustainable transport that may be achieved would reduce private vehicles on the road network which has the potential to reduce traffic accidents, although the reduction is anticipated to be minor.	1
1b	Option 1a and 1b would offer an increase in perceived personal security by removing the walk time from the existing bus stops to the stations and the often long wait time at the stations (for departures) or at the bus stop (for rail arrivals). This may be particularly beneficial to more vulnerable members of society such as the elderly, those less able and older unaccompanied children.	1
1c		1
3	Any modal shift to sustainable transport that may be achieved would reduce private vehicles on the road network which has the potential to reduce traffic accidents, although the reduction is anticipated to be minor.	1
4	Any modal shift to sustainable transport that may be achieved would reduce private vehicles on the road network which has the potential to reduce traffic accidents, although the reduction is anticipated to be minor. The option would offer an increase in perceived personal security by removing the need to interchange for travel to Glasgow. This may be particularly beneficial to more vulnerable members of society such as the elderly and those less able.	1
6	Any modal shift to rail that may be achieved would reduce private vehicles on the road network which has the potential to reduce traffic accidents, although the reduction is anticipated to be minor.	1

Economy

5.4.4 Table 5.5 shows the appraisal against the Economy criteria.

Table 5.5: Part 1 Appraisal Against the STAG Economy Criteria – Key Points

Option	Key Points	Score
1a	The option may provide some minor benefit to the economy by improving the accessibility of employment in Edinburgh. However, increasing the accessibility of Edinburgh may have a negative impact on the economy of Dumfries if people are more readily able to travel further afield to retail and social opportunities.	1
1b	The option may provide some minor benefit to the economy by improving the accessibility of employment and retail in Carlisle. However, increasing the accessibility of Carlisle may have a negative impact on the economy of Dumfries if people are more readily able to travel further afield to retail and social opportunities.	1
1c	The option may provide some minor benefit to the economy by improving the accessibility of employment and retail in Lockerbie and Edinburgh. However, increasing the accessibility of Edinburgh may have a negative impact on the economy of Dumfries if people are more readily able to travel further afield to retail opportunities.	1
3	The option is likely to have a minor benefit to the economy, with the provision of a later evening service and improved Sunday services enabling a greater number of people to access a greater range of leisure and (to a lesser extent) employment opportunities. The later running services may be especially beneficial from a tourism perspective in supporting locally based social activities (concerts, festivals etc.) in the study area.	1
4	The option is likely to have a minor benefit to the economy, with the provision of direct services to Glasgow enabling a greater number of people to access leisure, retail and (to a lesser extent) employment opportunities in the city. This may however have a negative impact on the economy of Dumfries.	1
6	The option has the potential to provide considerable benefit to the local economy by improving the accessibility of employment opportunities and retail in Dumfries, Carlisle and Glasgow. However, increasing the accessibility Carlisle and Glasgow may have a negative impact on the economy of Dumfries if people are more readily able to travel further afield to access opportunities. In addition, there would be increased opportunity for local businesses to take advantage of the improved connectivity for their business needs. There is potential for the option to have a significant impact on tourism, by enabling ease of access to the area, capitalising on the regions 'festival' offering.	2

Integration

5.4.5 Analysis has been undertaken, specifically focusing on transport integration (as opposed to land-use or policy integration) including:

- Potential transport integration benefits between bus and bus, rail and rail, and bus and rail modes; and
- The impact of reduced interchange time on journey times by sustainable transport.

5.4.6 Only Options 1a, 1b and 1c seek to directly provide integration benefits between bus and rail modes. As such, the integration analysis has focussed on these three options.

5.4.7 In order to understand the integration benefits that may be generated in terms of improved integration between bus and rail modes, both current and 'with option' bus and rail timetables have been examined to establish interchange times at both Dumfries and Lockerbie railway stations for both departing and arriving passengers on the railway network.

5.4.8 The analysis is presented in Appendix L .

5.4.9 Table 5.6 shows a summary of the analysis as well as appraisal of the options against the land-use and policy elements of Integration criteria.

Table 5.6: Part 1 Appraisal Against the STAG Integration Criteria – Key Points

Option	Key Points	Score
1a	Poor integration between bus and rail modes was highlighted as a key problem during the engagement stages of the study and Option 1a has a clear focus on improving this. Option 1a is a dedicated RailBus service designed to integrate with arrivals and departures at Dumfries and Lockerbie Railway Stations, and as such this option performs most highly in terms of public transport integration. Option 1a provides access to 8 additional rail services and is expected to yield average 'access' journey time savings. This option will reduce or maintain the same journey times as existing across 94% of services considered, and as this is a supplementary service, individuals can continue to use the existing 246 bus service where preferable. Improving the public transport network and transport integration supports the aims of the National Transport Strategy, SWestrans Regional Transport Strategy, the Bus Action Plan and the Local Transport Strategy. The option is therefore aligned with the broader policy goals included within key national, regional and local policy documents.	2
1b	Option 1b involves the optimisation of an existing commercial bus service to tie in with rail arrivals and departures at Dumfries Railway Station only. This option has limited potential to facilitate access to additional services, and like Option 1c generates more mixed results – shortening some journeys while lengthening others (14% of trips become longer). Option 1b also requires the amendment of a commercial bus service timetable which, although technically feasible, would have to be investigated in detail with the bus operator. Improving the public transport network and transport integration supports the aims of the National Transport Strategy, SWestrans Regional Transport Strategy, the Bus Action Plan and the Local Transport Strategy. The option is therefore aligned with the broader policy goals included within key national, regional and local policy documents.	2
1c	Option 1c is an extension to the existing 81/381 bus service, such that it connects Thornhill with both Dumfries and Lockerbie railway stations. The timing of departures from existing stops has not been altered, on the basis that this option would then closely resemble the pattern of bus provision tested under Option 1a. As noted above Option 1c yields varied results like Option 1b (with increased journey times for 19% of trips), and it will bring limited benefit to those travelling through Dumfries Railway Station. However, Option 1c will support access from Thornhill to 6 additional rail	1

Option	Key Points	Score
	services at Lockerbie and reduce travel times to/from Lockerbie Station by circa 20-25% overall. While the option only considers an extension of the existing Service 81/381 to Thornhill and not a re-timing of the service to better integrate with rail times, the option does not provide overall improvements in transport integration by better linking the bus and rail networks. Improving the public transport network and transport integration supports the aims of the National Transport Strategy, SWestrans Regional Transport Strategy, the Bus Action Plan and the Local Transport Strategy. The option is therefore aligned with the broader policy goals included within key national, regional and local policy documents.	
3	This option does not generate any specific transport integration benefits but improving the public transport network supports the aims of the National Transport Strategy, SWestrans Regional Transport Strategy, the Bus Action Plan and the Local Transport Strategy. The option is therefore aligned with the broader policy goals included within key national, regional and local policy documents.	1
4	The option would remove the need for interchange for journeys between buses or between bus and rail for public transport access to Glasgow. As above, improving the public transport network supports the aims of the National Transport Strategy, SWestrans Regional Transport Strategy, the Bus Action Plan and the Local Transport Strategy. The option is therefore aligned with the broader policy goals included within key national, regional and local policy documents.	1
6	The rail network is an integrated network and the provision of a station would open up access to this network across the UK which would provide integration benefits. In addition, the development of a station with suitable facilities for cycle parking, and with safe and secure walking access routes has the potential to integrate rail and active travel modes. It is also assumed that existing bus services may redirect to serve the station, and offer bus to rail integration benefits. This will be particularly important for Thornhill Railway Station given the stations location to the east of the village and the wide rural area it may serve i.e. it will be the closest railway station for those in Moniaive, Tynron, Penpont etc. for whom a walk to the railway station will not be possible by foot and in many instances by bike, given the distance. As above, improving the public transport network supports the aims of the National Transport Strategy, SWestrans Regional Transport Strategy, the Bus Action Plan and the Local Transport Strategy. The option is therefore aligned with the broader policy goals included within key national, regional and local policy documents.	2

Accessibility and Social Inclusion

5.4.10 Note that the TPOs set for the study relate to improving accessibility and the appraisal against this STAG criterion should be read in tandem with that presented for the TPOs.

5.4.11 The accessibility benefits arising from each option have been considered through consideration of the potential reductions in journey time, and therefore the increased accessibility, from Thornhill to key destinations relevant to each option. In addition, the increase in opportunity to travel, through increased service frequency or earlier/later running travel provision has also

been considered. All analysis for existing journey times assumes rail and bus timetables as at December 2016, when this analysis was undertaken.

Option 1a, 1b and 1c: Improved access to the rail network

5.4.12 A lack of direct public transport travel routes was identified as a key problem during the early stages of the study. Options 1a, 1b and 1c all consider improved direct access from Thornhill to the railway network, seeking to address the problem.

5.4.13 To appraise the options against this criteria existing journey times from Thornhill to key destinations on the railway network (Lockerbie, Carlisle, Edinburgh and Glasgow) have been considered alongside estimated journey times to these key destinations with the options in place. Appendix K shows the analysis for the options for:

- An AM trip (made at approximately 08:00);
- A PM trip (made at approximately 17:00); and
- An evening trip (made at approximately 20:00).

5.4.14 For the existing travel time, the travel time has been considered by car, bus only, and by a combination of bus and train.

5.4.15 Analysis of the change in the public transport to car travel time differential (i.e. the difference in journey time between a trip by public transport and the same trip by car, in both the existing and option situation) has also been undertaken i.e. how much more 'competitive' does the option make public transport. This analysis is also presented in Appendix K .

5.4.16 The TPOs set for the study all consider improved accessibility to the area. The key points made in the appraisal against the TPOs should be read in conjunction with the further comments in relation to the appraisal of the options against the accessibility and social inclusion criteria, as presented in Table 5.7.

Table 5.7: Part 1 Appraisal Against the STAG Accessibility and Social Inclusion Criteria – Key Points

Option	Key Points	Score
1a	A lack of direct travel routes was identified as a key problem during the early public engagement stage of the study. The provision of a public transport linking directly to Dumfries Railway Station (Option 1a, 1b and 1c) and Lockerbie Railway Station (Option 1a and Option 1c) would provide increased sustainable transport accessibility to Carlisle and Edinburgh. A moderate improvement in public transport access to employment and leisure and social opportunities in Carlisle (all Options 1a, 1b and 1c) and to some extent Edinburgh (Options 1a and 1c) would be provided. This would be particularly beneficial to those without access to a car or for whom driving is not possible.	2
1b	In addition, reduced journey times to Carlisle may widen the employment opportunities for those resident in the study area. However, while the public transport travel time to Edinburgh could be reduced (Option 1a and 1c), the travel time is still substantially longer than the private car and it is unlikely	1

Option	Key Points	Score
1c	that there would be any significant increase in access to employment opportunities in Edinburgh as a result. A key benefit of improved accessibility to and from the study area will be in reducing the feelings of remoteness of the community and enabling local people to feel connected and part of a wider Scotland. This is especially important in terms of the long term sustainability of the community and the retention of younger people in the area. The option provides better equality of access to all enabling fair access to the wider opportunities.	1
3	In terms of those on lower incomes and the less-abled, the increased accessibility to Dumfries may open up new job opportunities which require shift or weekend working as well as enabling better access to social and recreational activities in Dumfries which have a finish time later than 20:30 (the current time of the last bus back to Thornhill). Particularly for school children, the option would provide an increased ability to travel independently, providing access to a greater range of extra-curriculum and social activities in which to participate in Dumfries. The option may also help support local businesses, especially those connected to the tourism industry, by enabling people to visit the area in the evenings, attending local events.	1
4	The lack of a direct public transport route to Glasgow was identified during the study's early stages. This option would provide a moderate improvement in access to both employment, healthcare and social and leisure opportunities in Glasgow through the provision of a direct bus service. Rather than providing additional services, it could be that a number of the existing X74 services are re-routed via Thornhill. However, this would be at the expense of a reduced service offering in Beattock and Moffat with an associated reduction in accessibility for existing users of the service.	1
6	The option is particularly beneficially to those without a private car or unable to drive. This includes: • those on lower incomes for whom owning a car is not possible; • local businesses, especially those connected to the tourism industry, by enabling people to more easily visit the area and raising the profile of the town; • the elderly who have stopped driving for whom the improved access may enable improved accessibility to the major hospitals in Edinburgh and Glasgow; • those seeking Higher Education opportunities; • children under the age of 17 through providing an increased ability to travel independently, providing access to a greater range of extra-curriculum and social activities in which to participate in both Dumfries and Carlisle. It should be noted that the station is located 1.5km outside of the village, which presents an accessibility issue for those less abled and the elderly. In addition to the comments for the TPOs it is important to note that a key benefit of improved accessibility to and from the study area will be in reducing the feelings of remoteness of the community and enabling local	3

Option	Key Points	Score
	people to feel connected and part of a wider Scotland, especially true given the more permanent 'fixed' nature of a railway station. This is especially important in terms of the long term sustainability of the community and the retention of younger people in the area. The option provides better equality of access to all enabling fair access to the wider opportunities.	

5.5 Feasibility Appraisal

Bus Feasibility Consideration

5.5.1 A key issue for consideration in relation to the bus options, is whether they could be run commercially or need subsidy to operate. In general, as with many other rural areas, the bus network in Dumfries and Galloway operates with a large number of services requiring either part or full subsidy.

5.5.2 It is clear that the legalities surrounding the implementation of bus services which may need some level of subsidy to operate pose key deliverability issues. This was discussed in detail in Section 2.5.

Option 1a: Dedicated direct bus service operating between Thornhill, Dumfries and Lockerbie Railway Stations

What problem is the option setting out to address

5.5.3 Option 1a aims to provide direct access to the GSWL (at Dumfries Railway Station) for southbound travel and to the West Coast Main Line (at Lockerbie Railway Station) primarily for travel to Edinburgh (it is assumed that northbound rail travel would be primarily on the GSWL via Sanquhar). This bus service would be timed to provide good integration with as many departing and arriving rail services at both stations as possible reducing wait time at the stations for either departing trains or when alighting from arriving trains.

Current travel options to Dumfries

5.5.4 Currently, the journey time by car between Thornhill and Dumfries is around 25-30 minutes, with the equivalent journey time by bus around the same time as there are very few intermediate bus stops. Lack of parking in the vicinity of Dumfries station is not a constraint on its use for car / rail interchange.

5.5.5 For those without access to a car and reliant on public transport, the quickest ways to access **Dumfries** Railway Station are:

- A journey on Service 246 (operating every 30-minutes) to Whitesands in Dumfries followed by a 12-minute walk across Dumfries town centre to the Railway station;
- A journey on Service 246 (operating every 30-minutes) to Whitesands in Dumfries followed by interchange to a cross-town bus service to the railway station (approx. 6-minutes journey time); or
- A journey on the less-direct Service 202 to Dumfries Railways Station (operating just twice a day direct to the railway station).

5.5.6 It is therefore possible to access Dumfries station at present by public transport for southbound travel from Thornhill and the option would provide a very modest benefit in this respect if it were implemented.

Current travel options to Lockerbie

5.5.7 The journey time by car between Thornhill and Lockerbie is around 45 minutes. The equivalent trip by bus takes around 65 – 70 minutes.

5.5.8 While parking directly at Lockerbie Railway Station is constrained, there is free parking within a 5 - 10-minute walk of the station (on residential streets and public car parks at at McJerrow Park and the corner of Well Road) although this requires a potentially difficult interchange for those with mobility issues. The greater certainty of making a connection when accessing the station by car (rather than relying on both the bus and train to be on time) and the much quicker access time by private car (65-70 minutes by bus compared to 45 minutes by private car) means the potential market for a direct bus is likely to be those without access to a private vehicle (or potentially those with access to a car who prefer to travel free by bus using a National Entitlement Card). At the last census, only 15% of households in Thornhill did not have access to a car (against a Dumfries and Galloway average of 22%) making the potential market for this service very small.

5.5.9 For those without access to a car and reliant on public transport, the quickest way to access **Lockerbie** Railway Station is:

- A journey on Service 246 (operating every 30-minutes) to Whitesands in Dumfries followed by;
- A journey on Service 81/381 (operating every 20 to 30-minutes) from Whitesands in Dumfries to Lockerbie (with an approx. 3-minute walk to the station from the bus stop in Lockerbie).

5.5.10 It is therefore possible to access Lockerbie Station at present using public transport.

Legal Context

5.5.11 If the service did require subsidy to operate:

- The route between Thornhill and Dumfries would be in direct competition with the existing Service 246 run commercially (as shown in Figure 5.1).
- The route between Dumfries and Lockerbie would be in direct competition with the existing Service 81/381 service which is run commercially (as shown in Figure 5.1).

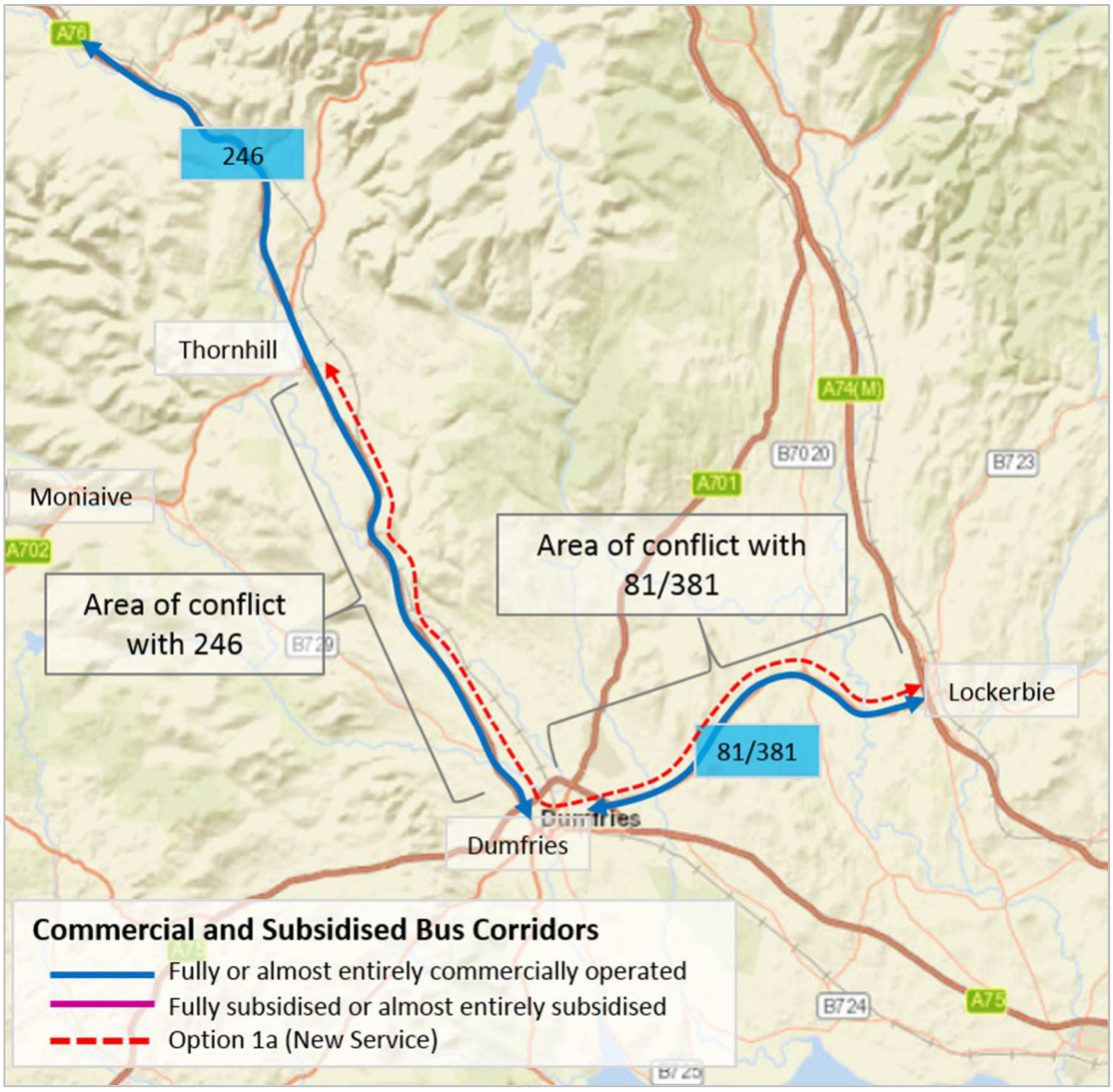

Figure 5.1: Commercial Vs. Subsidised Services – Option 1a

5.5.12 As noted in Section 2.5, under Section 63 of the Transport Act 1985, SWestrans has a duty to secure services it thinks are required where they are not provided by the market, but it cannot secure a service already provided by the market. The key issue is the interpretation of "service": there are many examples of subsidised services that partially parallel commercial services.

5.5.13 In this instance, in order to not run in parallel with existing services, the option would need to show a clearly different purpose to the existing services – and this may be difficult in the option's current form.

5.5.14 In addition, as intonated by bus stakeholders and SWestrans, the overall viability of services in the region is, in many cases, only achievable due to the resource intensive nature of overall bus operations. As such, the overall bus network and operation across the region is highly fragile and even minor changes to routes or services (or any new competition between services), which have the potential to tie up resources or affect patronage, can have major consequences. This is a very important factor when considering any changes to the network which may impact on existing services.

5.5.15 As noted previously, under Section 63 of the Transport Act 1985 SWestrans cannot secure a service already provided by the market. In this instance, it would be very difficult to show a

clearly different purpose to the existing service over the Thornhill to Dumfries section of the route. The option is therefore undeliverable in this regard.

5.5.16 In addition, if the legal issues could be overcome, the competition over the extended section of the route would raise the further issue of antagonising the existing Service 246 operator through impacting on the services patronage. As stated above, the fragile nature of the existing region wide bus operations means minor impacts can have major consequences and there may be the unintended consequence of reducing service provision elsewhere.

Option 1b: Extension of the existing Service 246 to include a stop at Dumfries Railway Station – with adjustment of the bus timetable to reduce interchange time between bus and rail arrival/departure times

What problem is the option setting out to address

5.5.17 Option 1b aims to provide direct access to the Glasgow South West Line (at Dumfries Railway Station) through re-routeing and re-timing of the existing Service 246 timed to provide good integration with as many departing and arriving rail services at the station as possible.

Operational and Commercial Issues

5.5.18 It was clear from the detailed engagement with the current operator of the wholly commercially operated Service 246 that they would not be keen to adjust their existing service for a number of reasons, namely:

- The service is currently timed to ensure suitable connections at the northern end of its route in Cumnock and the current operator does not wish to impact on that through re-timing to provide better connections at the southern end – with re-timing only potentially possible for off-peak or very early morning services;
- There was a lack of desire to improve connections to the rail network which may take away from their market share – they would rather ensure bus-to-bus connectivity; and
- Reiterating the region wide issue of the highly intensive nature of bus operations to ensure overall regional commercial viability, the operator made it clear that even making minor adjustment to the timing of the service or altering the routeing to serve the station (and in doing so extending the overall bus journey time) could have unintended consequences on other service/routes. In addition, the re-timing of the service could adversely impact on existing service users and negatively impact on patronage if journey times were extended or overall bus times were altered.

5.5.19 Given the above, it seems highly unlikely that the changes to the service would be deliverable. In addition, as noted in the discussion above in relation to Option 1a, it is possible to access Dumfries Railway Station at present by public transport for southbound travel from Thornhill and the option would provide a very modest benefit in this respect if it were implemented.

Option 1c: Extension of existing Service 81/381 to serve Thornhill

What problem is the option setting out to address

5.5.20 Option 1c aims to provide direct access to the West Coast Main Line (at Lockerbie Railway Station) primarily for travel to Edinburgh (it is assumed that northbound rail travel to Glasgow would be primarily on the GSWL via Sanquhar) through an extension of an existing bus service (rather than implementation of an entirely new service as per Option 1a).

5.5.21 Service 81/381 currently routes between Dumfries and Lockerbie and, if travelling by public transport between Thornhill and Lockerbie, forms the second part of the public transport link.

Extending the existing service north to Thornhill would remove the need to interchange in Dumfries and provide a direct link between Thornhill and Lockerbie.

Legal Context

5.5.22 If the service were to be implemented and required subsidy, similar legal issues to those noted in for Option 1a would require attention namely that:

- The extended route between Thornhill and Dumfries would be in direct competition with the existing Service 246 run commercially (see Figure 5.2).

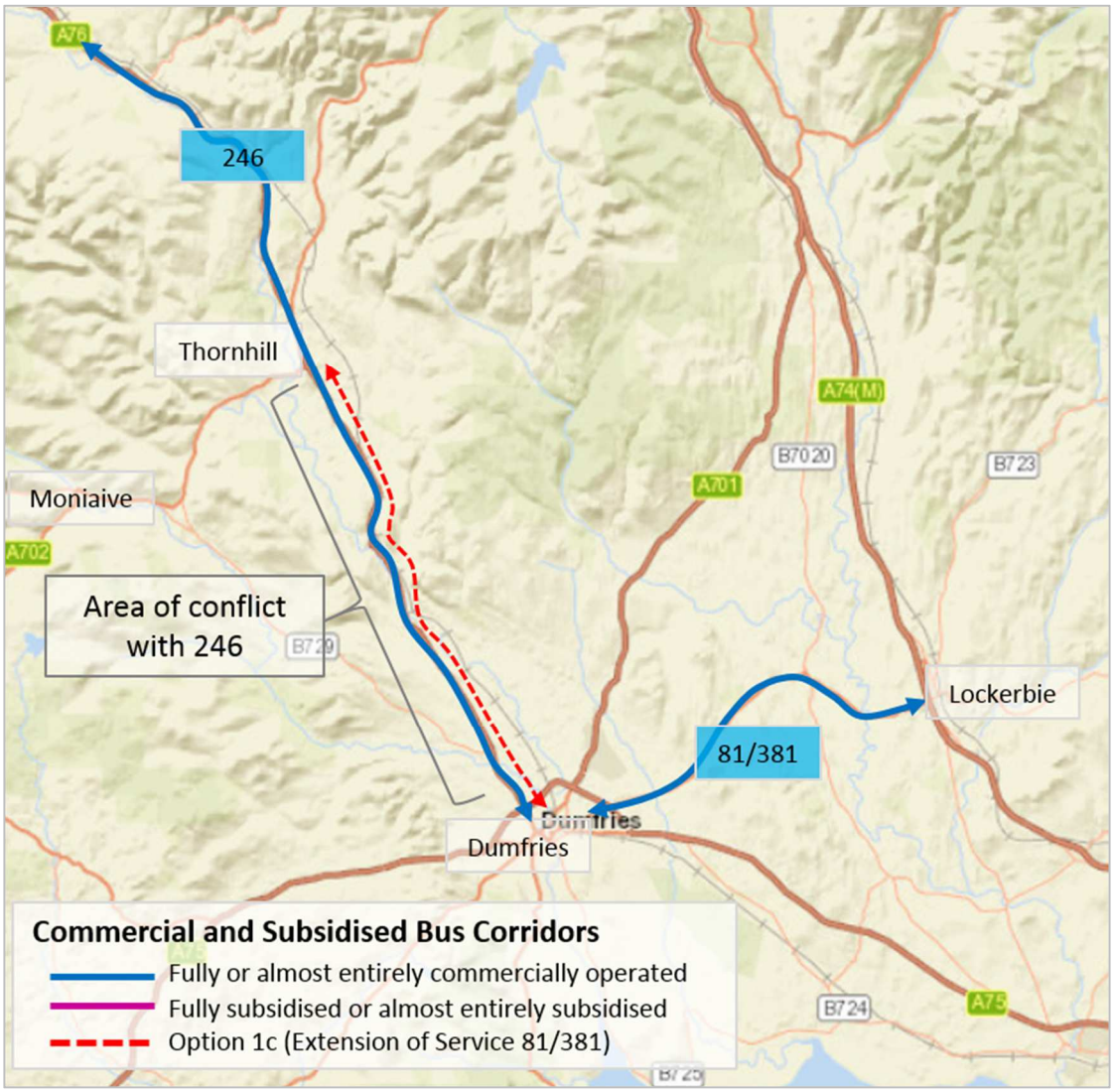

Figure 5.2: Commercial Vs. Subsidised Services – Option 1c

5.5.23 As noted in the discussion for Option 1a, under Section 63 of the Transport Act 1985, SWestrans cannot secure a service already provided by the market. In this instance, it would be very difficult to show a clearly different purpose to the existing service over the Thornhill to Dumfries section of the route. The option is therefore undeliverable in this regard.

5.5.24 In addition, if the legal issues could be overcome, the competition over the extended section of the route would raise the further issue of antagonising the existing Service 246 operator through impacting on the services patronage. As stated above, the fragile nature of the existing region

wide bus operations means minor impacts can have major consequences and there may be the unintended consequence of reducing service provision elsewhere.

Option 4: Direct bus service to Glasgow

5.5.25 If the service were to be run on a subsidised basis, there may be issues with the service operating in competition with the existing X74 service via Beattock/Moffat, as the additional services may capture some of the demand from these services for trips between Dumfries and Hamilton/Glasgow. As noted above, under Section 63 of the Transport Act 1985, SWestrans has a duty to secure services it thinks are required where they are not provided by the market, but it cannot secure a service already provided by the market. In this instance, it may be difficult to implement the additional service which may take demand from the existing commercially operated route.

Rail Feasibility Considerations

5.5.26 For Option 6, in relation to the feasibility of the railway station re-opening, the following was considered, with full details in Appendix G :

- How an extension of High Speed Rail 2 (HS2) into Scotland may impact on the GSWL, the opportunities that would enable and the steps which might be required to engage;
- The potential impact of the Scotland Route Study proposals on both the WCML and GSWL line in relation to both passenger and freight services;
- The role of the GSWL;
- Existing and potential future capacity on the rail routes;
- The effects of providing any new station(s) on the wider rail network;
- The potential impacts of more than one new station re-opening on the GSWL; and
- The potential use of the stations as rail freight hubs (as well as passenger stations).

5.5.27 In summary, the work highlighted:

- The Scotland Route Study and Rail Delivery Group's (RDG) "Investing in the Future Choices for Scotland's Railways 2019 and beyond" publications, in line with established policy, do not propose any new stations or routes. However, they do create an opportunity for dialogue on a more integrated approach to developing the GSWL and to providing benefits which will enable Thornhill Station to be delivered.
- In terms of the role of the GSWL, it is clear from the documents that:
  - The rail industry considers that the GSWL has a role as a diversionary route for freight;
  - The passenger capability proposals are all in the Glasgow suburban area; and
  - Outwith the Glasgow suburban area, the status of the rest of the GSWL is seen as part of the "Rural railway".
- A key opportunity is potentially how this move to becoming the WCML freight (possibly passenger) diversionary route presents an opportunity to secure upgrades and improve services for the Dumfries and Galloway area**. The publications present an opportunity for Dumfries and Galloway Council and SWestrans to enter into dialogue with the railway industry as there is a need for both the local authorities and the railway**

industry to work together to achieve their individual outcomes. This offers a more balanced dialogue than is often the case. In addition, while any future extension of an HS2 route into Scotland is unlikely to have any significant impact on services on the GSWL, it may offer an opportunity to upgrade the infrastructure on the route if it is required as a diversionary route during HS2 construction works.

- In terms of the addition of a new station stop at Thornhill, the re-timing of trains at both the northern or southern end of the GSWL route to accommodate the additional stop has been considered. At the northern end, re-timing issues are apparent and what appears to be a relatively simple re-timing becomes complex when the wider network is considered. Any significant re-timing at the north end of the route could require a comprehensive re-planning of all the services on this route, including the Barrhead and East Kilbride suburban services and the impact would be right into Glasgow Central station. Extending train journey times at the southern end of the route to provide the additional stop would cause interaction with trains running on the WCML due to the 'single lead' Gretna junction (where the twin tracks of the GSWL route come together into a short section of single line which then joins the northbound WCML). The re-timing of trains at the southern end of the GSWL line to accommodate the additional stop at Thornhill has the potential to destroy a number of currently published connections. As such, there is no generic solution to this issue and each train would need to be considered on its merits.

- However, a potential reduction in unnecessary pathing time, increases in the generic line speed, the potential for new trains (as noted in the Scotland Route Study), or improvements made as part of the Abellio ScotRail franchise agreement do offer alternative opportunities for the introduction of a stop at Thornhill Railway Station.

- A similar study is being undertaken for the Eastriggs area, for which a rail station re-opening option is also being considered. As both stations are on the same rail line, consideration has been made of the impact if both were to be re-opened. It is clear that should both stations be promoted, then additional, more detailed, timetabling work will be required to assess the impact of opening both stations on the operation of the whole GSWL route. Other rural communities on the GSWL route in East Ayrshire may also benefit from the provision of a station and there is a need to consider the strategic role of the full GSWL route in this part of Scotland and the potential implications of all potential additional stations and train services.

- The wider generic mismatch between passenger station and freight railheads on the modern railway means there is limited potential for a dual-use freight-passenger facility at Thornhill. However, the potential future freight use of the Ministry of Defence connection – around one mile west of the passenger station site should be noted.

Feasibility Appraisal Summary

5.5.28 Table 5.8 summarises the key feasibility issues.

Table 5.8: Part 1 Appraisal Against the Feasibility Criteria – Key Points

Option	Key Points
1a	From an engineering perspective, the option does not require the build of any infrastructure or any land purchase and as such is unlikely to present any physical feasibility challenges. Under Section 63 of the Transport Act 1985, SWestrans has a duty to secure services it thinks are required where they are not provided by the market, but it cannot secure a service already provided by the market. The key issue is the interpretation of "service": there are many examples of subsidised services that partially parallel commercial services.

Option	Key Points
	In this instance, in order to not run in parallel with existing services, the option would need to show a clearly different purpose to the existing services (Service 246 between Thornhill and Dumfries and Service 81/381 operating between Dumfries and Lockerbie) – and this may be difficult in the option's current form. In addition, as intonated by bus stakeholders and SWestrans, the overall viability of services in the region is, in many cases, only achievable due to the resource intensive nature of overall bus operations. As such, the overall bus network and operation across the region is highly fragile and even minor changes to routes or services (or any new competition between services), which have the potential to tie up resources or affect patronage, can have major consequences. This is a very important factor when considering any changes to the network which may impact on existing services.
1b	From an engineering perspective, the option does not require the build of any infrastructure or any land purchase and as such is unlikely to present any physical feasibility challenges. The option requires alterations to an existing bus service. Discussion with the existing operator highlighted: • The operator does not wish to impact on the timing of the service and its existing connections; • The re-timing of the service could adversely impact on existing service users and negatively impact on patronage if journey times were extended or overall bus times were altered; • A lack of desire to improve connections to the rail network which may take away from bus market share; and • The region wide issue of the highly intensive nature of bus operations to ensure overall regional commercial viability. The operator made it clear that even making minor adjustment to the timing of the service, or altering the routeing to serve the station could have unintended consequences on other service/routes. Given the above, it seems highly unlikely that the changes to the service would be deliverable.
1c	From an engineering perspective, the option does not require the build of any infrastructure or any land purchase and as such is unlikely to present any physical feasibility challenges. As noted above, in order to not run in parallel with existing services, the option would need to show a clearly different purpose to the existing services (Service 246 between Thornhill and Dumfries) – and this may be difficult in the option's current form. In addition, if the legal issues could be overcome, the competition over the extended section of the route would raise the further issue of antagonising the existing Service 246 operator through impacting on the services patronage. As stated above, the fragile nature of the existing region wide bus operations means minor impacts can have major consequences and there may be the unintended consequence of reducing service provision elsewhere.

Option	Key Points
3	From an engineering perspective, the option does not require the build of any infrastructure or any land purchase and as such is unlikely to present any physical feasibility challenges.
4	From an engineering perspective, the option does not require the build of any infrastructure or any land purchase and as such is unlikely to present any physical feasibility challenges. If the service were to be run on a subsidised basis, there may be issues with the service operating in direct competition with the existing X74 service via Beattock/Moffat, as the additional services may capture some of the demand from these services for trips between Dumfries and Hamilton/Glasgow. As noted above, Section 63 of the Transport Act 1985 says a council / partnership has a duty to secure services it thinks are required where they are not provided by the market. In this instance, it may be difficult to implement the additional service which may take demand from the existing commercially operated route.
6	In terms of the feasibility to implement a stop at the railway station in light of current established policy, the Scotland Route Study and RDG's "Investing in the Future Choices for Scotland's Railways 2019 and beyond" publications, do not propose any new stations or routes. However, they do create an opportunity for dialogue on a more integrated approach to developing the GSWL and to providing benefits which will enable Thornhill station to be delivered. A move towards the GSWL becoming the WCML freight (possibly passenger) diversionary route presents an opportunity to secure upgrades and improve services for the Dumfries and Galloway area with an opportunity for Dumfries and Galloway Council and SWestrans to enter into dialogue with the railway industry. While any future extension of an HS2 route into Scotland is unlikely to have any significant impact on services on the GSWL, it may offer an opportunity to upgrade the infrastructure on the route if it is required as a diversionary route during HS2 construction works. In terms of the feasibility to accommodate a new stop at Thornhill, re-timing trains at the northern end of the GSWL route is complex when the wider network is considered with a comprehensive re-planning of all the services on this route, including the Barrhead and East Kilbride suburban services required. The impact would be seen into Glasgow Central Station. Extending train journey times at the southern end of the route would cause interaction with trains running on the WCML due to the 'single lead' Gretna junction and has the potential to impact on a number of currently published connections. However, a potential reduction in unnecessary pathing time, increases in the generic line speed, reduced calls at other stations, and the potential for new trains or improvements made as part of the Abellio ScotRail franchise agreement, do offer alternative opportunities for the introduction of a stop at Thornhill Railway Station. The station build will require: two platforms; a cross-track, DDA compliant footbridge; and passenger facilities (including waiting shelters, Customer Information System (CIS), Public Address (PA) & CCTV systems with one ticket machine). Assuming a station site near the old station site is used, its location close to local roads means there is limited requirement for works to provide any major access to the station. The station would serve a wide rural area and bus access will be required. Considerable car parking is therefore required to serve this wide rural area. Overall, no major engineering feasibility issues are envisaged.

5.6 Affordability

5.6.1 The **affordability** appraisal has focussed on:

- For the **bus options** (Options 1a, 1b, 1c, 3 and 4)**,** consideration of: operating and maintenance costs; fare box revenue; and the level of subsidy which would be required to operate new services;
- For the **railway station option** (Option 6) in particular, a high-level costing exercise for the construction of a new station; and costing for mitigation measures (with the latter considered in collaboration with Network Rail and other stakeholders).

Bus Options Affordability Methodology

5.6.2 For the bus options, the methodology adopted has been to design service schedules for each of the options and to estimate the resources required to deliver them. These have then been costed using PBA's bus industry costing model, calibrated for local labour rates. For Option 1a and 1b, which seek to integrate bus and rail times, the schedules have been designed with rail departure and arrival times in mind.

5.6.3 Where sufficient base data exists, demand and passenger fares revenue have then been estimated and the results compared to the costs to establish the viability of each option. In cases where there is insufficient base demand data, 'break-even' analysis has been undertaken to establish how many passengers would be required for the service to achieve viability.

Option 1a: Provision of a dedicated bus service operating between Thornhill, Dumfries Railway Station and Lockerbie Railway Station, integrated to reduce interchange times between bus and rail

5.6.4 Six buses would be required to operate the bus-rail link service between Thornhill and Lockerbie. Total operating hours would be around 23,700 per year.

5.6.5 The total annual cost of service provision for Option 1a would be approximately £695k.

5.6.6 There is insufficient data available to forecast demand for the service; therefore, a break-even analysis has been undertaken to identify the number of passengers that would be required for the service to cover its costs and reach viability. To do this, an average single fare has been estimated through consideration of the cost of an adult single and return fare, a child return fare, the prevailing concession reimbursement rate and the proportion of trips made by adults, children and concessionary pass holders (split taken from the National Travel Survey), to estimate an average single fare of £2.42 per passenger.

5.6.7 Dividing the annual costs of £695k by the average fare of £2.42 means that the service would require approximately 285,000 single trips annually to break even.

5.6.8 The Office of Rail and Road (ORR) estimates of station usage for 2014-2015 shows total annual passengers station entries and exits of approximately:

- 380,000 at Dumfries Railway Station; and
- 215,000 at Lockerbie Railway Station; and therefore
- 595,000 at both Dumfries and Lockerbie Railway Stations.

5.6.9 The National Rail Travel Survey (NRTS, 2007)[2] shows that 10% of users accessing a railway station arrived by bus/coach. Rural areas and small towns will typically have a lower share of bus-based access to railway stations than this due to the nature of the rural bus network. For example, bespoke surveys of passengers at rural stations previously undertaken by the project team have shown a bus access mode share of 5% or less.

5.6.10 Assuming that 5% of passengers to both Dumfries and Lockerbie Railway Stations arrive by bus equates to a total of 29,750 passengers annually arriving or departing by bus. The required number of passengers for the Thornhill service to break even is far in excess of this (285,000) and **therefore the service is likely to require substantial subsidy to operate.**

5.6.11 It should be noted that the bus schedule for the option has been extended to cover the full existing operating day. It may be possible to 'scale back' the number of connecting bus services to concentrate on peak time rail arrivals/departures only to minimise the cost of the service and hence make the service more likely to require a lesser subsidy.

Option 1b: Extension of Service 246 to include a stop at Dumfries Railway Station – with adjustment of the timetable to reduce interchange time between bus and rail arrival/departure times

5.6.12 Revision of Service 246 to serve Dumfries Railway Station would involve a total annual additional cost of service provision of around £32k. This would require approximately 13,000 additionally passenger trips annually to break even (an additional 35 passenger trips a day – around 2 per service). It is anticipated that this could be achievable if rail and bus times were better integrated to encourage the use of the bus.

Option 1c: An extension of the existing Service 81 operating between Dumfries and Lockerbie to extend to Thornhill

5.6.13 In terms of operational costs:

- An extension of Service 81/381 (Lockerbie – Dumfries) to Thornhill on an hourly basis on Monday to Saturday, would require one extra bus operating around 20 additional hours per day. This has an annual cost of service provision of approximately £195k.

5.6.14 An average fare per passenger was calculated through consideration of the existing fares on Service 81 and similar to Option 1a, applying the passenger type split to generate an average fare per passenger of £2.78.

5.6.15 For the option, an annual cost of £195k, divided by an average fare of £2.78 requires 70,000 passengers to break even. Similarly, to the calculations presented for Option 1a, assuming that 5% of passengers to both Dumfries and Lockerbie Railway Stations arrive by bus equates to a total of 10,750 passengers annually arriving or departing by bus. The required number of passengers for the extension of the service to Thornhill to break even is far in excess of this (70,000) and **therefore the service is likely to require substantial subsidy to operate.**

5.6.16 The bus schedule for the option has been extended to cover the full existing operating day. It may be possible to 'scale back' the number of connecting bus services to concentrate on peak time rail arrivals/departures only to minimise the cost of the service and hence make the service require a lesser subsidy.

Option 3: Earlier & later (and Sunday) services between Thornhill, Moniaive & Dumfries

5.6.17 The option assumes:

[2] http://www.transport.gov.scot/system/files/documents/reports/NRTSProvisional2007.pdf - Table 6

- Extension of the current Service 202 (Dumfries – Moniaive – Thornhill) timetable to operate later into the evening;
- Extension of the current Service 202 (Dumfries – Moniaive – Thornhill) timetable to operate on Sundays with 2 hourly frequency; and
- Increased frequency of Service 236 (Dumfries – Thornhill via Kirkton and Auldgirth) on Sundays.

5.6.18 The operation of additional evening and Sunday journeys on services 202 and 236 can be accommodated using existing fleet with no additional vehicles required. The additional daily operating hours on Service 202 are 4 on Monday to Saturday and 8 on Sunday; for service 236 there are 9 additional hours on Sunday.

5.6.19 The total annual cost of service provision for Option 3 would be £57k.

5.6.20 Annual patronage for the services is 86,343.

5.6.21 Research by the Transport Research Laboratory (TRL)[3] shows that changes in service demand are directly proportional to changes in the level of service provision, with an average factor of 0.4. That is, a 10% increase in service leads to a 4% increase in demand, all else being equal.

5.6.22 Applying an elasticity factor of +0.4 gives 8,800 additional passengers.

5.6.23 The net cost of the service is known to be £178k. If the PBA costing model rates are applied to the existing service, gross cost would be £361k, meaning revenue is £183k. Dividing this figure by current annual patronage gives an average fare of £1.68 which means annual revenue from the service enhancements would be £15k.

5.6.24 Comparing annual costs of £57k and total revenue of £15k, **Option 3 would incur losses of £42k and would therefore likely require substantial subsidy.**

Option 4: Increased range of destinations served directly by bus

5.6.25 The option assume additional X74 Dumfries to Glasgow service via Thornhill (in addition to the existing route via the A701) to offer direct bus access to Glasgow.

5.6.26 In terms of operational costs, to provide an additional X74 service between Dumfries, Thornhill and Glasgow, a one bus operation on Monday to Saturday would cost £175k per year.

5.6.27 Applying a similar fares calculation to that undertaken for the other options above, estimated an average fare of £6.33 for the X74 service.

5.6.28 Service X74: An annual cost of £175k, divided by an average fare of £6.33 requires approximately 28,000 passengers annually to break even. Three additional services in each direction equates to six services a day and approximately 1,800 additional bus services per annum. If 28,000 passengers are needed annually for the service to break even, this equates to around 15 passengers per bus.

5.6.29 The Department for Transport bus statistics relating to the average occupancy on local bus services in Scotland (Table BUS0304 published in 2013 and updated in October 2016[4]) shows average bus occupancy to be 8.7 in 2015/2016. Given this is Scotland wide and therefore includes both urban and rural operations, the figure for the more rurally operating services is likely to be lower. In total, 15 people are required per bus for the service to break even. Given

[3] The Demand for Public Transport, TRL Report 593, TL, 2004

[4] https://www.gov.uk/government/statistical-data-sets/bus03-passenger-distance-travelled

that the average across Scotland (both urban and rural areas) is 8.7, it is unlikely the route would attract this level of patronage. This can be considered to be particularly the case given that the route via Thornhill would operate at a relatively low frequency (six services per day) and generally buses at lower frequency attract fewer passengers. Given that the service is unlikely to reach the 15 people per bus figure, the service is unlikely to be commercially viable and would require subsidy to operate.

Option 6: Re-open Thornhill Railway Station

Station Construction Cost

5.6.30 There are a number of factors which influence the cost of new stations, all of which are likely to be site specific, which makes accurate costing, or even comparison based costing difficult.

5.6.31 Some key features at most or all stations are:

- **Land costs**: although this is probably not a significant cost at Thornhill;
- **Access to public roads**: although this should not a significant cost at Thornhill as the railway is quite close to local roads;
- **Size of car parks**: Thornhill will serve a wide rural area. Proportionate car parking will therefore be required to serve the area, and Thornhill itself given the distance from the centre of population. Bus access will also be required;
- **Length of platforms**: at least sufficient for a four car 23m unit (ScotRail Class 156), so 100m required which is about the same, or shorter than, most recent new stations or those under construction;
- **Cross-track, DDA compliant footbridge:** generally a standard design so similar costs at sites that need independent cross-track access. It may be possible to use a public road underbridge at Thornhill which could save costs on a free-standing structure;
- **Passenger Facilities:** will be similar at all new (small) stations, some being linked to the number of platforms. Facilities will include waiting shelters, Customer Information System (CIS), Public Address (PA) & CCTV systems. Ticket Machines would tend to be provided at a base level of one per station;
- **Access to build**: where the level of complexity is driven by reduced working time due to the regular passage of trains which drives costs up. The train service at Thornhill is not intense and the night offers a period which is largely train free, so the costs are likely to be proportionately less. Access issues also drive Train Company compensation costs, which can be substantial; and
- **Signalling:** There may be requirements to move signals, as the station is close to the signal box and associated pointwork.

Comparative Costs

5.6.32 Appendix J presents a summary of the detail of a number of stations currently being constructed, or recently re-opened - note that pedestrian access and any new footbridge/underpass will be to full Mobility Impaired Access (MIA) standards. The data suggests outturn costs for these stations in the range **£8m - £14m**.

Thornhill Railway Station Capital Construction Cost

5.6.33 Of particular note is that:

- The **land value will be relatively low** (and Thornhill Station Action Group have had initial discussions with the surrounding land-owners who have verbally offered their support to the station development and suggested that they are prepared to offer the use of some land in relation to the station, possibly for use as a car park);
- The **public road** is not far away suggesting relative ease of access; and
- The **platforms will likely need to be about the same or shorter** than have been provided at most new stations.

5.6.34 For Thornhill, it is therefore suggested that the capital construction cost of the station would be in the range **£8 - £11m**.

Access Costs

5.6.35 Given the station is located around 1.5km outside of Thornhill, a shuttle bus type offering would need to be provided to enable appropriate access to the station Thornhill centre. The cost for this has been estimated at £145k annually assuming a service which operates to provide connections to all the arriving and departing trains.

Potential Catchment

5.6.36 In order provide an indication of the catchment area for the potential station, analysis has been undertaken mapping the population catchment areas for existing railway stations in the region[5], and then repeated with Thornhill Station assumed to be operational.

5.6.37 Figure 5.3 and Figure 5.4 show the existing and 'with station' catchment areas respectively (mapped with no 'cap' on the drive time to the nearest station). The analysis shows:

- A potential Thornhill Railway Station catchment population of 7,900 (with no limit on drive time to the station); and
- A potential Thornhill Railway Station catchment population of 6,505 (if a 30-minute drive time 'cap' to the station is assumed).

[5] Excluding Carstairs due to infrequent nature of service

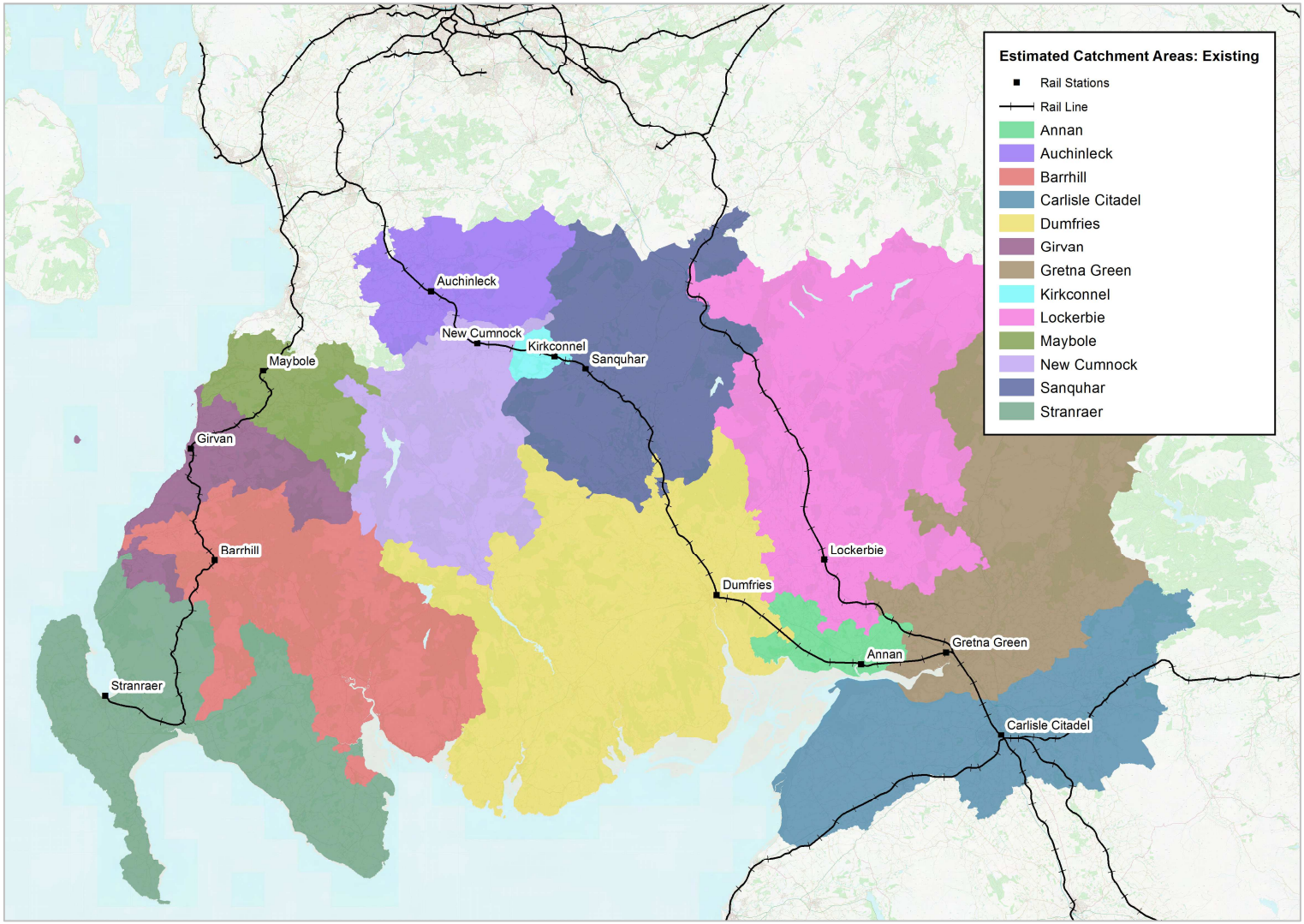

Figure 5.3: Existing Railway Station Population Catchment Areas (uncapped drive time)

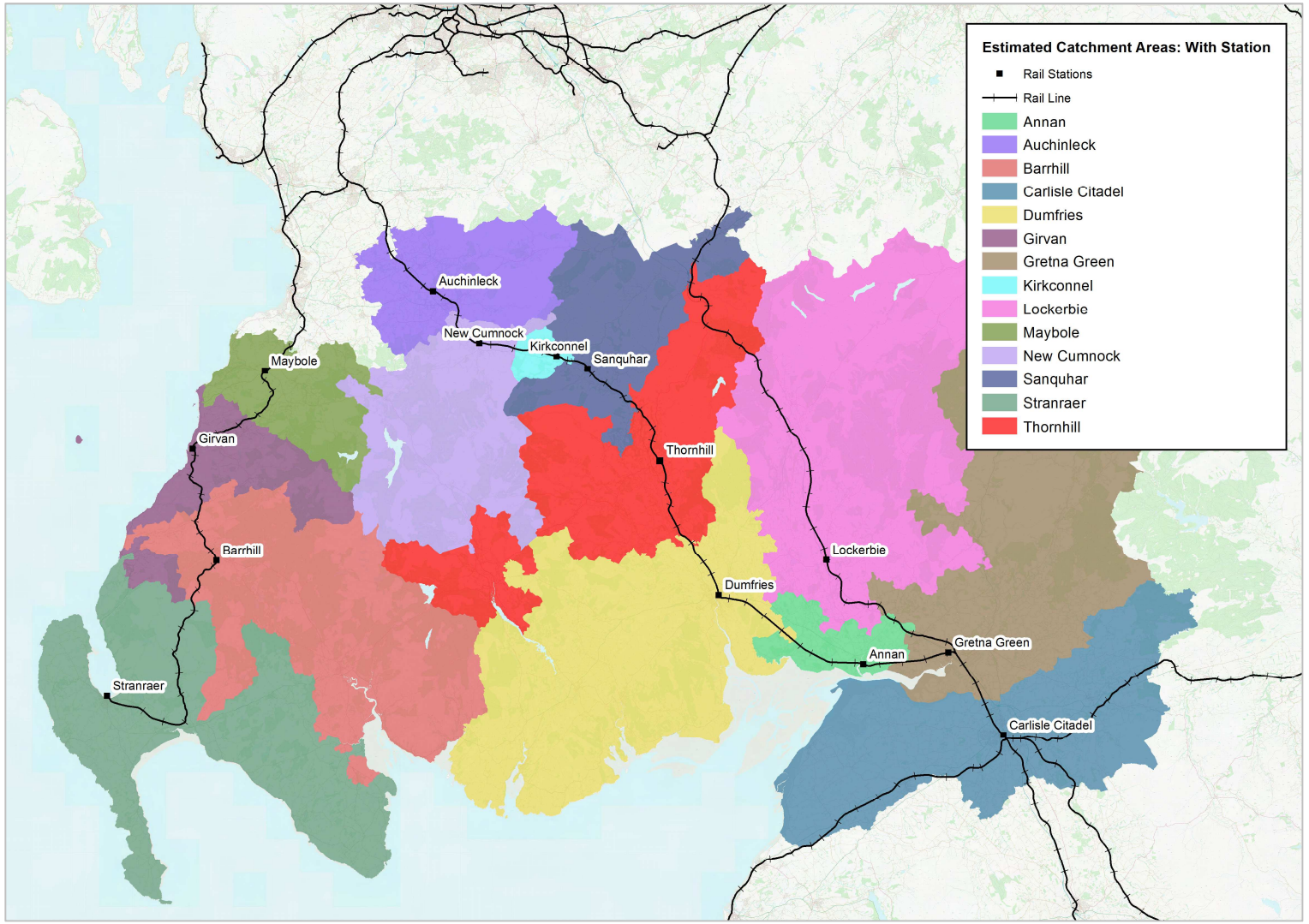

Figure 5.4: With Thornhill Station - Railway Station Population Catchment Areas (uncapped drive time)

5.6.38 The key points in relation to the affordability appraisal are presented in Table 5.9.

Table 5.9: Part 1 Appraisal Against the Affordability Criteria – Key Points

Option	Key Points
1a	Analysis of the operating costs for the service indicates an annual operating cost of £695k, requiring approximately 285,000 single trips annually to break even. Consideration of Office of Rail and Road station usage estimates and consideration of National Rail Travel Survey data shows that the service is unlikely to generate sufficient demand to cover operating costs and as such is not considered to be commercially viable unless the service is subsidised. SWestrans budget for the operation of subsidised bus services has recently reduced. It is therefore unlikely that funding is available to operate the service. It should be noted that the bus schedule for the option has been developed to provide connections to all trains. It may be possible to 'scale back' the number of connecting bus services to concentrate on peak time rail arrivals/departures only to minimise the cost of the service and hence make the service more commercially viable/require a lesser subsidy.
1b	The commercial viability analysis showed that the revision of Service 246 to serve Dumfries Railway Station would involve a total additional annual cost of service provision of around £32k. This would require approximately 13,000 additional passenger trips annually to break even (an additional 35 passenger trips a day - around 2 per service). It is anticipated that this could be achievable if rail and bus times were better integrated.
1c	The extension of Service 81/381 (Lockerbie - Dumfries) to Thornhill on an hourly basis Monday to Saturday would require one extra bus operating 20 hours per day. With an annual cost of service provision approximately £195k, this would require 70,000 passenger trips annually to break even. Assuming that 5% of passengers to Lockerbie Railway Station arrive by bus equates to a total of 10,750 passengers annually arriving or departing by bus. The required number of passengers for the service extension to break even is far in excess of this (70,000) and therefore the service is not commercially viable. SWestrans budget for the operation of subsidised bus services has recently reduced. It is therefore unlikely that subsidy funding is available to operate the service. It may be possible to 'scale back' the number of connecting bus services to Thornhill to concentrate on peak time rail arrivals/departures only to minimise the cost of the service and hence make the service more commercially viable/require a lesser subsidy. However, doing so would reduce the offering and therefore reduce the benefits in terms of improved integration between bus and rail.
3	The commercial viability analysis showed that the total annual cost of service provision for Option 3 would be £57k compared to additional annual revenue of £15k. Option 3 would therefore incur losses of £42k and would not be commercially viable. SWestrans budget for the operation of subsidised bus services has recently reduced. It is therefore unlikely that subsidy funding is available to operate the service.
4	The affordability analysis showed that new services between Dumfries, Thornhill and Glasgow which utilised one bus and operated Monday to Saturday would cost approximately £175k per year and would require 28,000 passengers per annum (or 15 passengers per bus) in order to break even. Given that average bus occupancy on local buses across Scotland (including in more populated areas where occupancy is higher) was just 8.7 in 2015/16, reaching this patronage figures for the service was felt to be unlikely especially given the rural

Option	Key Points
	nature of the community. As such the service was not considered to be commercially viable and would be likely to require substantial subsidy to operate.
6	The option requires the build of the railway station requiring two platforms whose length must be at least sufficient for a four car 23m unit (100m length is required which is about the same, or shorter than, most recent new stations or those under construction); a Cross-track, DDA compliant footbridge; and passenger facilities (including waiting shelters, Customer Information System (CIS), Public Address (PA) & CCTV systems with one ticket machine). Comparisons with other stations currently being constructed, or recently re-opened stations has allowed for an estimated station construction cost of £8 - £11m. A connecting shuttle bus to the station is estimated to cost around £145k annually to ensure connections from Thornhill centre to arriving and departing trains. While no analysis of potential revenue generation has been made, a very high level estimate of potential patronage has been made and shows: • A potential Thornhill Railway Station catchment population of 7,900 (with no limit on drive time to the station); • A potential Thornhill Railway Station catchment population of 6,505 (if a 30-minute drive time 'cap' to the station is assumed).

5.7 Public Acceptability

5.7.1 Table 5.10 shows the appraisal against the Public Acceptability criteria.

Table 5.10: Part 1 Appraisal Against the STAG Public Acceptability Criteria – Key Points

Option	Key Points
1a	Integration between bus and rail was highlighted in the public consultation exercises undertaken during the study. The option offers direct connections between bus and rail, and to both stations on the Glasgow South West Line and West Coast Mainline and its likely to be publicly acceptable. Furthermore, public consultation highlighted sentiment that the most significant transport problem faced by respondents was limited travel mode choice. It was also noted by some that they felt this option would provide better value for money than a rail station. Improving access to the rail network is likely to therefore be publicly acceptable, although there may be disappointment that a railway station in Thornhill itself is not provided given the strong sentiment for this during public engagement. For Options 1b (for the existing 246 service) and for Option 1c (for the existing 81/381 service) current bus users may not find bus service timetable changes acceptable if the existing running times suit their needs.
1b	
1c	
3	Increased bus frequencies and services which run earlier in the morning and later in the evening were the most popular potential improvements to bus services amongst respondents to the initial public engagement survey. Assuming that implementation does not impact any other services and given the improvement in accessibility offered, this option is likely to therefore be publicly acceptable. However, there may be disappointment that a railway station in Thornhill itself is not provided given the strong sentiment for this during public engagement.

Option	Key Points
4	The option is likely to be acceptable to the public given the direct connection to Glasgow that would be provided as no direct connection currently exists.
6	The option is likely to be widely accepted by the public given the survey responses during the public engagement which showed the strong sentiment for this option. If the station were to be re-opened, there would be some minor impact to existing rail users due to the additional rail stop at Thornhill. However, this is anticipated to be of the order of two minutes and is therefore relatively minor. Existing users may also oppose any required timetable changes that may occur. The re-opening of the station may impact on bus services running between Thornhill and Dumfries, with potential for these services to reduce in frequency if patronage is lost to rail. If so, smaller communities served by these buses (who would not benefit from Thornhill station) would see their overall accessibility reduce. This is unlikely to be publicly acceptable to these communities.

5.8 STAG Criteria Appraisal Summary

5.8.1 Appendix M shows the Appraisal Summary Tables (ASTs) for all options in full, with Table 5.11 showing a summary of the scoring for each option against all the appraisal criteria.

Table 5.11: Appraisal Summary Table - Part 1 Appraisal Score Summary

		Transport Planning Objectives			STAG Criteria				
		TPO1	TPO2	TPO3					
Option	**Decription**	Increase the mode share of sustainable transport for all journey purposes	Increase transport integration	Increase public transport accessibility	Environment	Safety	Economy	Integration	Accessibility & Social Inclusion
1a	RailBus	2	2	2	1	1	1	2	2
1b	Improved direct access to rail	1	0	1	1	1	1	2	1
1c	Improved direct access to rail	1	2	1	1	1	1	1	1
3	Earlier, later and Sunday services	2	2	1	1	1	1	1	1
4	Direct bus to Glasgow	1	2	1	1	1	1	1	1
6	Re-open Thornhill Station	2	2	3	1	1	2	2	3

5.9 Option Selection or Rejection

5.9.1 An option selection or rejection process has been undertaken to establish which options are worthy of further consideration and could be examined further at the STAG Part 2 Appraisal stage. Table 5.12 also shows whether each option has been selected or rejected at this stage of the appraisal.

Table 5.12: Key Appraisal Findings

Option	Option Description	Key Appraisal Findings	Select or Reject
1a	Dedicated bus service operating between Thornhill and Lockerbie Railway Stations, integrated with train times	• Scores well against all the TPOs • Would improve access to Glasgow and Edinburgh and other destinations further afield on the WCML, as well as improving inbound access to Thornhill • Provides additional connectivity across a longer operating day • Would provide improved integration between bus and rail services • Around 45- minute reduction in connecting time to trains at Lockerbie • Would require significant subsidy • Sections of the route between Thornhill and Dumfries and between Dumfries and Lockerbie would be in direct competition with existing commercial service creating legal issues with subsidy • Likely to be publicly acceptable given the improved direct access to faster trains on the WCML.	Select
1b	Altering bus Service 246 to includes stops at/close to Dumfries Railway Station, and re-timing the service to integrate with train arrivals/departures	• Improved public transport access to Glasgow South West Line trains removing the need for interchange across Dumfries town centre • Unlikely that bus operator would consider re-routeing the service to serve the stations as this would impact heavily on the service – which is currently timed to ensure connections at the northern end of the route (Cumnock and onwards to Kilmarnock) • Bus operator unlikely to want to improve connections to the rail network which may take away from their market share – likely that bus operators would rather ensure bus-to-bus connectivity • Would require subsidy	Reject
1c	Extending bus Service 81 / 381 to connect	• Extending the route to Thornhill would provide direct access to Lockerbie railway station with improved public transport access	Reject

Option	Option Description	Key Appraisal Findings	Select or Reject
	Thornhill directly to Lockerbie	to the West Coast Main Line opening up opportunities to more easily travel further afield • Would require subsidy • The extended (subsidised) section of Service 81 / 381 between Dumfries and Thornhill would be in direct competition with the existing commercially operated Service 246. This would raise two clear issues: o Legal issues with subsidising a service against existing commercial operations o Impacting on the patronage and commercially viability of Service 246	
3	Earlier & later (and Sunday) services between Thornhill, Moniaive & Dumfries (extending hours of Services 202 and 236 to operate later into evenings and on Sundays)	• Scores well against all the TPOs • Would open up employment opportunities that involve shift or weekend working which currently can only be accessed by those with a car • Would enable people to participate in additional later finishing cultural and social activities in Dumfries, including school children in extra-curricular events • Would enable travel back to the area from later running rail services • Would require subsidy • Later running services have recently been reduced across the region due to subsidy constraints and lack of patronage	Select
4	Dedicate Increased range of destinations served directly by bus: • Additional X74 Dumfries to Glasgow services via Thornhill	• Travel time from Thornhill to Glasgow would not be significantly better than existing bus connections to Sanquhar with onward travel by rail over much of the day • Re-routeing some of the existing X74 services via Thornhill would likely be more viable than additional services. However, this would be at the expense of a reduced service offering in Beattock and Moffat with an associated reduction in accessibility for existing users of the service. • Under Section 63 of the Transport Act 1985, SWestrans has a duty to secure services it thinks are required where they are not provided by the market, but it cannot secure a service already provided by the market. In this instance, it may be difficult to implement	Reject

Option	Option Description	Key Appraisal Findings	Select or Reject
		the additional service which may take demand from the existing commercially operated route between Beattock and Glasgow.	
6	Re-open Thornhill Railway Station	• Scores well against all the TPOs • Reduced travel time to Dumfries and Carlisle –travel time to Carlisle would often be quicker than by car • Additional modal choice for travellers • Additional connectivity will enable trips to and from the area much earlier / later in the day, opening up opportunities for employment that requires shift / weekend working • Likely to provide a very significant increase in the number of people able to access Thornhill from further afield • High public acceptability of the option likely • Impacts to existing users on the line with additional journey time due to rail stop at Thornhill • Impact on existing bus patronage and hence services due to the use of rail instead, with a potential reduction in bus services. This may reduce the accessibility of smaller communities between Thornhill and Dumfries • Existing timetable structure does not provide appropriate commuter access with the first train arriving in Dumfries after 09:00	Select

5.10 Further Engagement and Option Development

5.10.1 Given the points raised during the Part 1 appraisal, a stage of further option development was undertaken in light of the outcomes, in order to better define the options for appraisal at STAG Part 2. This was undertaken through further discussions with the client and key stakeholders.

5.10.2 The main thrust of the further option development involved engagement including:

- A workshop with **SWestrans and Dumfries and Galloway Council Officers** (Transportation, Planning, Environment and Economic Development officers) to discuss all the options and fully explore the benefits and issues associated with each.
- In relation to the **bus options**, face-to-face meetings with SWestrans, Stagecoach (West Scotland – also speaking on behalf of Stagecoach Cumbria) and Houstons Coaches, with the discussions focussing on:
  - Establishing views on the feasibility of the proposed new service timetables and route changes;

- Discussing the outcomes of the Part 1 commercial viability appraisal work;
- Discussing potential grant/subsidy requirements; and
- Discussing the potential to alter the proposed options to adjust services at specific times of day to concentrate on peak time services only to minimise the cost of the new/altered services and move closer to commercial viability.

- In relation to the **rail options, engagement was undertaken, via email, with:**
  - Network Rail
  - ScotRail
  - East Ayrshire Council
  - Strathclyde Partnership for Transport

5.10.3 Appendix N presents the comprehensive outcomes of the engagement with the key points discussed here.

Option 1a: Dedicated direct bus service operating between Thornhill, Dumfries and Lockerbie Railway Stations

5.10.4 Given the outcomes of the Part 1 appraisal and the further engagement, the option was felt to be unlikely to be deliverable in its current form. Therefore, a variant of Option 1 was discussed and agreed with SWestrans.

Variant Option

5.10.5 One potential way to adapt the option so as not to run against existing commercial services would be to provide a direct service from Thornhill to Lockerbie Railway Station **only** which routed along the A76 from Thornhill to the A75 at Dumfries, then routed directly on the A709 to Lockerbie i.e. avoiding the Thornhill to Dumfries, and Dumfries to Lockerbie market, and operating uniquely as a 'rail-link' between Thornhill and Lockerbie (as shown in Figure 5.5). While potentially removing the legal issues, removing the inter-town markets from the potential patronage would create a service requiring far larger subsidy. Such a service, with such a narrow focus to its purpose, would only capture a small target market and is likely to have to be more of a mini-bus type offering. There is no precedent of a bespoke direct rail-bus in Dumfries and Galloway and implementing such a service would likely lead to calls for similar services from other communities.

5.10.6 In order to better serve the study area communities, such a service would start in Moniaive, routing through Penpont to Thornhill and Closeburn, before being an 'express' service direct to Lockerbie via the A76, A75 and then A709.

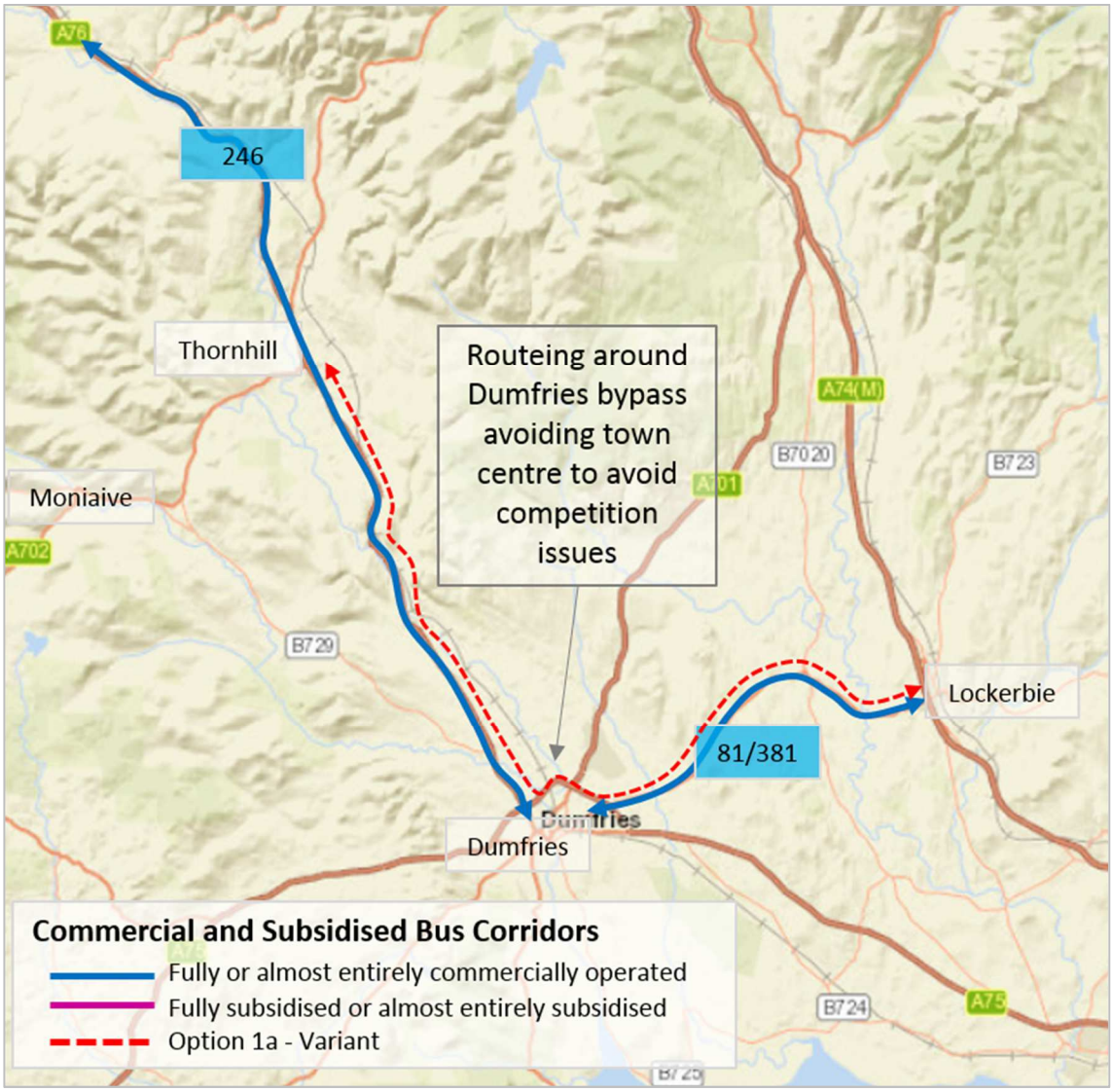

Figure 5.5: Commercial Vs. Subsidised Services – Option 1a - Variant

Option 6: Re-open Thornhill Railway Station

5.10.7 To inform discussion with rail industry stakeholders, two key option development tasks were undertaken:

- **Engineering Feasibility Work** – which involved a site visit to Thornhill to establish the potential viability for a railway station with key considerations being station access from the road network. A paper was produced which was provided to the stakeholders for comment and is provided in Appendix O . The work highlighted:
  - There are two possible options for the station site (as shown in Figure 5.6):
    - Re-activation of the former station; or
    - Building a station to the north of the rail bridge over the road probably with access through the Buccleuch field (but alternatively using the former Cattle Mart site) just to the north of the former station. This site offers the flexibility to put in place a facility that could be expanded over time (through platform lengthening) as demand and hence train lengths increased.

- Access to a station site from the west of the railway line (the village side of the line) is preferable, to avoid a narrow rail overbridge and sharp road bend with poor visibility;
- A rail overbridge will be required;
- The possibility of a single platform station, while potentially cost effective, is not considered appropriate given:
  - The increased time penalty associated with the additional cross over points required;
  - The potential signalling required over the whole area and the associated extra costs which may outweigh any cost savings associated with just single platform provision;
  - The addition of new conflicts adding further difficulty to timetabling.

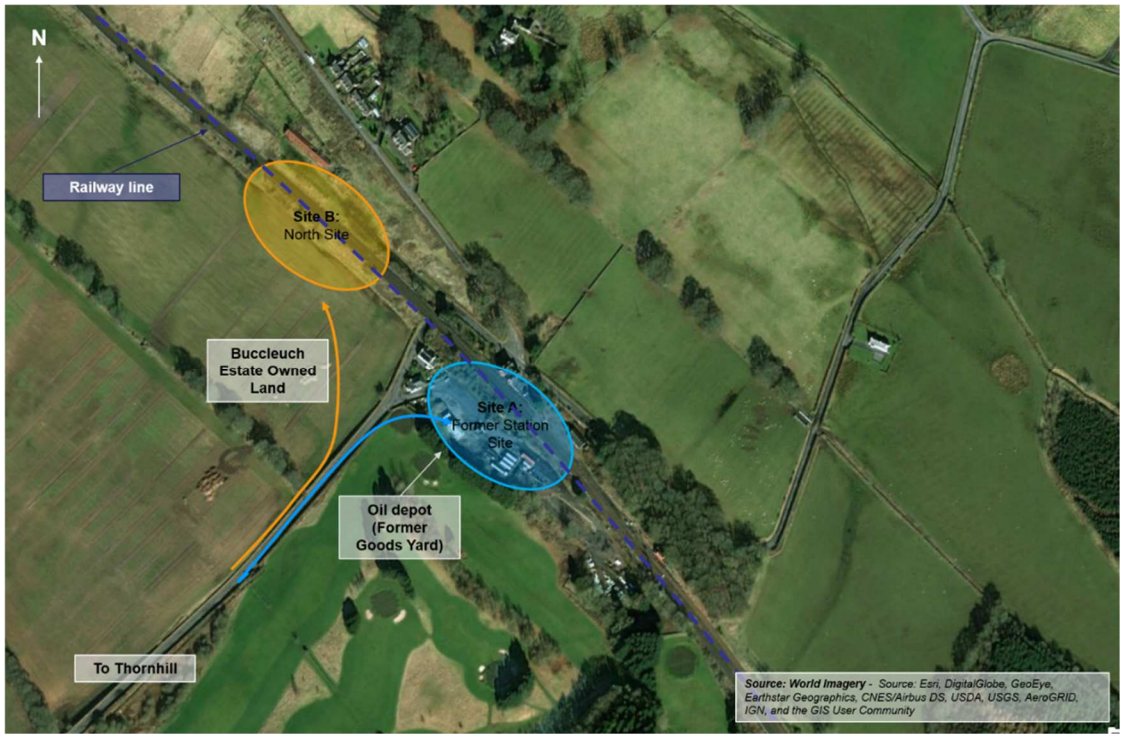

Figure 5.6: Potential Station Sites

- **Development of a potential timetable for the GSWL** which included a stop at Thornhill (and given the parallel study for Eastriggs, a potential timetable for the GSWL which included stops at both Thornhill and Eastriggs). The timetable was shared with the stakeholders for comment and is included in Appendix P . The work highlighted the potential to adjust existing timetables (December 2017 timetables) to allow for a rail stop at Thornhill (and potentially another new stop) on all currently passing services, without significant structural alterations.

5.10.8 As noted above, Appendix N presents the comprehensive outcomes of the engagement. The key points raised were:

- The introduction of a railway station at Thornhill is likely to impact on the existing commercially operated Service 246 (running from Kilmarnock to Dumfries). If the service were no longer viable, the existing operator would potentially curtail the service at Thornhill or further north. As such, the smaller communities between Thornhill and Dumfries served

by the route would lose the service and hence the accessibility to Thornhill which it provides;

- The introduction of a railway station at Thornhill is unlikely to impact on the existing Service 236 between Thornhill and Dumfries. It serves many small communities between the towns which would not benefit from the new railway station;
- The timetable developed to include Thornhill was considered appropriate and at a level of detail suitable for this stage in the project lifecycle by the rail industry stakeholders;
- The existing timetable structure does not provide a good morning peak arrival nor evening peak departure for trips from Thornhill to Dumfries. This effectively restricts rail to leisure travel. Restructuring the timetable to achieve a commuting service to Dumfries would almost certainly increase franchise subsidy.

5.10.9 It was therefore considered feasible for Option 6 to be considered further at Part 2 Appraisal, with cognisance taken of the key points noted above.

6 Part 2 Appraisal

6.1 Introduction

6.1.1 The STAG Part 2 Appraisal phase requires a more detailed appraisal of the options taken forward from Part 1 and it includes detailed appraisal of the selected option's performance against the:

- TPO's;
- STAG criteria;
- Cost to Government; and
- Risk and Uncertainty.

6.2 Options for Appraisal

6.2.1 Given the outcomes of the further option development, the options to be appraised at STAG Part 2 are noted in Table 6.1.

Table 6.1: STAG Part 2 – Options for Appraisal

Option	Option Description	Comment
1a	Dedicated bus service operating between Moniaive / Thornhill and Lockerbie Railway Station	The option assumes: ▪ A direct service between Moniaive / Thornhill and Lockerbie railway station – that does not route via Dumfries – routeing via the A76 / B709; ▪ A mini-bus type service offering; and ▪ The service is fully subsidised.
3	Earlier & later (and Sunday) services between Thornhill, Moniaive & Dumfries	The option assumes: ▪ Extension of the current Service 202 (Dumfries – Moniaive – Thornhill) timetable to operate later into the evening; ▪ Extension of the current Service 202 (Dumfries – Moniaive – Thornhill) timetable to operate on Sundays with 2 hourly frequency; and ▪ Increased frequency of Service 236 (Dumfries – Thornhill (via Kirkton and Auldgirth) on Sundays.
6	Re-open Thornhill Railway Station	The option assumes: ▪ The station is located on the Thornhill village (west) side of the railway line; ▪ The station will operate as a two-platform station; and

Option	Option Description	Comment
		▪ The assumed timetable will be as that presented in Appendix P .

6.3 Data Collection

Station Usage Surveys – Sanquhar Station

6.3.1 In order to assess the likely demand for travel from a new railway station at Thornhill, PBA commissioned ProTel Fieldwork to undertake boarding/alighting counts and platform interview surveys at Sanquhar Railway Station. Sanquhar was selected as the best fit for a comparator station for Thornhill. The data has been used in the development of a Demand Forecasting Tool used to forecast revenue and travel time benefits, as discussed in Section 6.6. This section presents the high level findings of the surveys. Appendix Q presents the full survey analysis in detail.

6.3.2 Three types of surveys were undertaken. These were as follows:

- Passenger Counts
  - Survey teams undertook passenger counts from 0600-1300 on Tuesday 23rd and Wednesday 24th January 2018 and from 0830-1530 on Saturday 27th January.
  - Surveyors counted how many passengers boarded and alighted all trains which called at the station during the survey period.
  - These counts allowed a sample rate to be estimated for the platform surveys.
- Platform Interview Surveys
  - Survey dates and times were as per platform surveys.
  - Surveyors asked departing passengers about their current journey and wider usage of Sanquhar station. Where it was not possible to survey all passengers during the time available, passengers were provided with a paper survey and return envelope.
- Online Surveys
  - Leaflets were also posted through the doors of all residential properties in Sanquhar, requesting that residents complete an online survey relating to their use of Sanquhar station. The questions in the online survey aligned closely with those in the platform survey, although they did not refer to a specific journey.

6.3.3 A total of 33 passengers boarded trains departing from Sanquhar and one passenger alighted at Sanquhar over the survey period. Given that platform passenger interviews were completed with 26 of the departing passengers, a very high sample rate of circa 80% was achieved.

6.3.4 The online survey was less successful. Leaflets were posted to all properties in Sanquhar requesting that residents complete an online survey regarding their usage of Sanquhar Station, but only 8 responses were received. Sanquhar is home to approximately 890 households (2011 census).

6.3.5 Detailed analysis of survey results can be found in Appendix Q , but key findings are presented here. These findings relate to the passenger count and platform surveys only, given the very small sample size achieved via the online survey.

- Weekend demand is approximately twice as high as weekday demand at Sanquhar.
- During the week, the majority of trips to/from Sanquhar station relate to destinations in the south (e.g. Dumfries), but at the weekend the majority of trips relate to destinations to the north (e.g. Glasgow).
- Approximately 80% of respondents' trips originated within 2km of Sanquhar Station. This shows that while Sanquhar is the closest train station for a very large area (as shown in Section 5.6), the catchment area is predominantly local.
- The majority of respondents walk to Sanquhar station (62%) and circa 30% use the car.
- More than 80% of rail trips from Sanquhar are made for leisure or personal business purposes.
- Overall, Glasgow is the most common destination for rail trips from Sanquhar, while more than half of respondents also report using the train to travel to Dumfries and Carlisle.
- The most commonly cited reason for using the train is that it is quicker than other options.
- Approximately half of respondents were in employment, and approximately half were not.
- Respondents had approximately the same level of access to cars as the rest of the Sanquhar population.

6.4 Option Appraisal

6.4.1 The following section presents the appraisal of the options against the STAG Part 2 criteria:

- TPO's;
- STAG criteria;
- Cost to Government; and
- Risk and Uncertainty.

6.5 Appraisal against the Transport Planning Objectives

6.5.1 The appraisal of the options against the TPOs is shown in the section which follows, with the detailed analysis undertaken to support the appraisal shown in Appendix R . Firstly, the overall approach to each is described.

Transport Planning Objective 1: Appraisal

Enable an effective day trip by public transport to key education, retail and social opportunities in Glasgow, Ayr, Edinburgh and Carlisle

6.5.2 In order to appraise the options, TRACC accessibility software was used to consider existing and 'with option' journey times in the morning period (08:00 – 12:00) from Thornhill to:

- Glasgow;

- Ayr;
- Edinburgh; and
- Carlisle.

6.5.3 The reverse trip from the four strategic locations to Thornhill in the afternoon / evening period (16:00 – 20:00) was also considered. For Option 3, given the additional services are later running weekday services (as well as the weekend services), a period between 20:00 and 00:00 was considered to ensure the benefits were captured.

6.5.4 A similar assessment was also undertaken considering Sanquhar, in order to provide a comparator location.

6.5.5 The time periods considered sought to identify whether the transport option would enable an effective day trip to the strategic locations such that a meaningful amount of time could be spent in undertaking activities in the visited location.

Transport Planning Objective 2: Appraisal

Provide public transport connectivity which enables travel to and from the area across the day and across the week

6.5.6 This TPO has been assessed through consideration of:

- The earliest available northbound and southbound connections from Thornhill in both the existing and 'with option' situations; and
- The latest available northbound and southbound connections to Thornhill in both the existing and 'with option' situations.

Transport Planning Objective 3: Appraisal

Increase the inbound public transport catchment to support education, tourism and local businesses

6.5.7 In order to appraise the options, TRACC accessibility software was used to consider the number of people who can reach Thornhill by public transport within 1 hour, 2 hours and 3 hours, both in the existing situation and with the options in place in the morning and evenings periods. This provides an indication as to the accessibility of Thornhill for those coming into the area.

6.5.8 For Option 3, given the additional services are later running weekday services (as well as the weekend services), the evening period of between 20:00 and 00:00 has been used in the analysis to ensure the benefits were captured.

6.5.9 The key points relating to each option are shown in the table below.

Table 6.2: Part 1 Appraisal Against the TPO – Key Points

Option	TPO		Key Points	Score
1a	1	Enable effective day trip by public transport to key education, retail and social opportunities in Glasgow, Ayr, Edinburgh and Carlisle	The results, as expected, highlight the reduced journey times to Edinburgh and Glasgow, the greatest improvement being a 45-minute reduction in the journey time back from Edinburgh in the evening period. Consideration of the comparable journey times between Sanquhar and Glasgow shows that in the existing situation, the travel time from Thornhill to Glasgow is around 35 minutes slower in the morning period and around 50 minutes slower in the evening period. With the addition of the option, travel from Thornhill is only around 25 minutes slower in the morning period and just 20 minutes slower in the evening period. It is important to note that changing working habits do however mean that some people do not attend their official place of work on a daily basis, and therefore are more likely to consider travelling further/for longer on a few days of the week. As such, there is greater flexibility for the travel time to be longer than commonly considered acceptable if making a trip every day i.e. someone may accept a commute time of 90 minutes if they are only making the trip 3 days a week, whereas someone commuting every day may only accept a much shorter travel time. In this regard, improved access to Edinburgh and Glasgow would be highly beneficial. The reduced journey time between Thornhill and Edinburgh and Glasgow is likely to enable more time in the strategic locations to undertake activities, enabling a more effective day trip to these locations. Therefore, the option provides a positive benefit against this TPO. Note that there is no change in access time to either Carlisle or Ayr.	2
	2	Provide public transport connectivity which enables travel to and from the area across the day and across the week	The option provides 13 new connections to Lockerbie from Thornhill on a Weekday/Saturday. The additional connectivity will enable trips to and from the area much earlier / later in the day, opening up opportunities for employment that requires shift / weekend working which were previously inaccessible by public transport.	2
	3	Increase the inbound public transport catchment to support education, tourism and local businesses	The analysis shows an increase in the number of people able to access Thornhill with the option in place, especially in the afternoon / evening period where there is an increase of 40% in the number of people able to access Thornhill in under 3 hours.	2

Option	TPO		Key Points	Score
3	1	Enable effective day trip by public transport to key education, retail and social opportunities in Glasgow, Ayr, Edinburgh and Carlisle	As no additional morning services are considered for this option, the analysis does not show any difference between the existing situation and the options. The analysis shows that at present, it is not possible to travel between any of the four strategic locations and Thornhill after 20:00. In the evening period however, the option provides three new opportunities to travel back from Glasgow, Edinburgh and Carlisle with the additional bus services providing connections from arriving trains into Dumfries back to Thornhill. As such, the option provides the connectivity required to extend the current time spent in the strategic locations and enables a more effective day trip to these places to undertaken activities.	2
	2	Provide public transport connectivity which enables travel to and from the area across the day and across the week	The option provides an extension of the operating day by 1 hour 30 minutes on weekdays, providing greater connectivity to Thornhill from Dumfries in the evenings. While the option only increases the operating day on a Sunday by around 20 minutes, there are an additional 8 connections offering far greater flexibility in time of travel.	2
	3	Increase the inbound public transport catchment to support education, tourism and local businesses	The analysis shows: • As would be expected, no change in the morning period, given the option is focussed on evening and Sunday services. • In the evening period there is marked increase in the number of people able to access Thornhill of 42% in under 2 hours and of just over 70% in under 3 hours. • The greater ability for an increased number of people to access the town in the evenings may be especially beneficial from a tourism perspective in supporting locally based social activities (concerts, festivals etc.) in the study area.	1
6	1	Enable effective day trip by public transport to key education, retail and social opportunities in Glasgow, Ayr, Edinburgh and Carlisle	Between 08:00 and 12:00: • It is currently over half an hour quicker to access **Glasgow** from Sanquhar compared to from Thornhill. This differential reduces to just 10 minutes with the option in place, bringing the journey time from Thornhill down from just over 2 hours to 1 hour 40 minutes. • It is currently over 40 minutes quicker to access **Ayr** from Sanquhar compared to from Thornhill. This differential reduces to 20 minutes with the option in place, bringing the journey time from Thornhill down from 2 hours 30 minutes to just over 2 hours.	3

Option	TPO		Key Points	Score
			• It is currently nearly 30 minutes quicker to access **Carlisle** from Sanquhar compared to from Thornhill, even though Thornhill is geographically closer to Carlisle. With the option in place, it becomes over 20 minutes quicker from Thornhill than Sanquhar, bringing the journey time from Thornhill down from 1 hour 40 minutes to just 55 minutes. **This difference especially opens up opportunities for a more effective day trip to Carlisle.** Between 16:00 and 20:00: • It is currently 50 minutes quicker to return from **Glasgow** to Sanquhar compared to Thornhill. This differential reduces to just 10 minutes with the option in place, bringing the journey time to Thornhill down from 2 hours 20 minutes to 1 hour 40 minutes. • It is currently 50 minutes quicker to return from **Ayr** to Sanquhar compared to Thornhill. This differential reduces to just 13 minutes with the option in place, bringing the journey time to Thornhill down from 2 hours 30 minutes to under 2 hours. • It is currently 15 minutes quicker to return from **Carlisle** to Sanquhar compared to Thornhill, even though Thornhill is geographically closer to Carlisle. With the option in place, it becomes around 20 minutes *quicker* to Thornhill than Sanquhar, bringing the journey time to Thornhill down from around 1 hour 30 minutes to just 55 minutes. **This difference especially opens up opportunities for a more effective day trip to Carlisle.** Travel times to **Edinburgh** are unaffected. This is to be expected given a rail station at Thornhill would be on the GSWL, on which Edinburgh is not located. The reduced journey time between Thornhill and Glasgow, Ayr and especially Carlisle, has the potential to enable more effective day trips to these places to participate in social and educational activities, as well as enabling more effective commuting and business trips.	
	2	Provide public transport connectivity which enables travel to and from the area across the day and across the week	There is an increase in weekday and Saturday northbound connections with the option in place, with the rail services providing 10 additional connections. There is an increase in operating hours for the option for weekday, Saturday and Sunday travel, with: • An additional 5 hours' coverage during the weekday and Saturday in terms of access for northbound travel; and	2

Option	TPO		Key Points	Score
			• An additional 1 hour 20 minute and 3 hours 30 minute coverage for southbound travel on a weekday/Saturday and Sunday respectively. Specifically, of note is the ability to travel from Dumfries to Thornhill on a Sunday at around 23:45. The additional connectivity will enable trips to and from the area much earlier / later in the day, opening up opportunities for employment that requires shift / weekend working which were previously inaccessible by public transport.	
	3	Increase the inbound public transport catchment to support education, tourism and local businesses	The analysis highlights the very significant increase in the number of people able to access Thornhill, with over a 30% increase for those able to access the area in under an hour in both the morning and evening periods. In addition: • There is over an 80% increase in the number of people able to access the area in under 2 hours in the morning, and just over a 60% increase in the afternoon / evening period. • There is a 47% increase in the number of people able to access the area in under 3 hours in the morning and afternoon / evening periods. This has the potential to substantially increase the accessibility of the area to support education, tourism and local businesses.	3

6.6 STAG Criteria Appraisal

6.6.1 This section sets out the approach taken and key points in relation for appraisal of the options against the STAG criteria. The outcome of the appraisal can be found in Table 6.11.

Environment

6.6.2 The Part 2 environmental appraisal considers:

- Noise and vibration;
- Global air quality – carbon dioxide (CO2);
- Local air quality – particulates (PM10) and nitrogen dioxide (NO2);
- Water quality; drainage and flood defence;
- Geology;
- Biodiversity and habitats;
- Landscape;
- Visual amenity;
- Agriculture and soils; and
- Cultural heritage;

6.6.3 The methodology employed in assessing each sub-criteria and the completed option assessment tables are presented in Appendix S with a summary of the key findings provided in Table 6.3.

Table 6.3: STAG Environmental Appraisal Criteria – Summary

Option	Option Description	Key Findings	Score
1a	Dedicated direct bus operating between Thornhill and Lockerbie	An environmental appraisal of this option found it would have a minor positive effect on the environment. The option would be likely to encourage some minor modal shift from private car to bus and rail and as a result would see a reduction in vehicle greenhouse gas emissions, air pollution and noise. As the option would utilise the existing road network it would not require acquisition of new land - as such there will no likely impact on biodiversity, geology, soils, the water environment, landscape and cultural heritage.	1
3	Earlier & later (and Sunday) services between Thornhill, Moniaive & Dumfries		1

Option	Option Description	Key Findings	Score
6	Re-open Thornhill Railway Station	The option would involve the construction of the railway station at Thornhill. As land acquisition is required, construction may have a potential negative impact on local biodiversity, geology, soils, the water environment and cultural heritage. Further assessment is required to understand these impacts fully. There may also be long-term noise impacts in the area close to the station due to train deceleration and acceleration. However, the option does not involve the running of additional trains (just an additional stop for existing trains) and therefore there would be little adverse impact on the environment in terms of additional greenhouse gas emissions. The option would benefit public health through improving access to essential community facilitates and services, and promoting social inclusion for those without a car. It was noted during the economic baselining work that private car ownership and use is high in the study area. Any modal shift to rail that could be achieved would reduce car use and associated noise, air pollution and greenhouse gas emissions.	-1

Safety

6.6.4 The STAG safety criteria includes two sub-criteria:

- Accidents; and
- Security.

6.6.5 The options being appraised are unlikely to generate significant modal shift from private car to public transport. Given this, it is not considered that the options will have a measurable impact on the number of transport related accidents and/or their severity. The appraisal against the safety criteria has therefore been largely qualitative and has focussed on the security sub-criteria.

6.6.6 The full option appraisal against the Safety criteria is shown in Appendix T with a summary of the key findings provided in Table 6.4.

Table 6.4: STAG Safely Appraisal Criteria – Summary

Option	Option Description	Key Findings	Score
1a	Dedicated direct bus operating between Thornhill and Lockerbie	No material impact anticipated for accident rates or severity due to the option. Security benefits for public transport users no longer requiring to interchange in Dumfries to reach Lockerbie Railway station.	1

Option	Option Description	Key Findings	Score
3	Earlier & later (and Sunday) services between Thornhill, Moniaive & Dumfries	No material impact anticipated for accident rates or severity due to the option. No significant security benefits.	0
6	Re-open Thornhill Railway Station	No material impact anticipated for accident rates or severity due to the option. Whilst the proposed station is unlikely to be staffed, it is assumed that a CCTV system will be installed to ensure a formal surveillance. No such surveillance system currently exists for bus stops in the area. In addition, the lighting in the station environment is likely to be of a better quality than existing lighting at bus stops in the area, leading to real and perceived security improvements for public transport users. Security issues highlighted for foot and cycle access to the new station site given the distance from Thornhill.	1

Economy

6.6.7 At the Part 2 stage, the economy appraisal has focused on:

- Transport Economic Efficiency (TEE) - the benefits ordinarily captured by standard cost-benefit analysis, with a modelling exercise undertaken for Option 6, informed by the data collected during the platform surveys at Sanquhar station. A demand, revenue and benefits generation modelling exercise for the station re-opening was undertaken which is described in Appendix U.1.

Option 1a (RailBus to Dumfries and Lockerbie) and Option 3 (Earlier & later (and Sunday) bus services between Thornhill, Moniaive & Dumfries)

6.6.8 TEE benefits have not been estimated for the bus options 1a and 3 as the options are entirely new services or new instances of services. TEE benefits are typically primarily made up of travel time savings and changes in the cost of travel.

6.6.9 Users of the new bus services will be primarily either:

- People who previously drove to the station to go to the same destination
  - These people will likely have a longer journey times and potentially higher 'out of pocket' costs – the benefits to them will be more qualitative and convenience based
- People who previously walked / cycled to the station to go to the same destination

- The options here are aimed at longer distance connections where active travel is much less likely

- People who previously got a lift to the station to go to the same destination
  - There may be cost savings here due to the 'double-trip' nature of these trips but travel time savings would be unlikely

- People who were not previously train users and have switched their destination

- People who were not previously travelling at all and are making new trips
  - For both these groups, it is not possible to evidence how these journey patterns may change and hence what the scale of benefits would be

6.6.10 For the rail options, we have established from the station surveys how existing rail passengers would have travelled in the absence of rail. So by implication we can estimate how users of the new stations would have travelled previously and therefore determine the benefits to them of switching to rail. It was not possible to undertake a similar 'counterfactual' exercise for rail-link bus services as there are no equivalents.

Option 6: Re-open Thornhill Railway Station

Demand and Revenue Modelling

6.6.11 A demand forecasting exercise was undertaken to estimate the passenger demand and revenue generated by a new railway station at Thornhill. This exercise also considered the knock-on effects of a new station upon demand and revenue at the adjacent Sanquhar and Dumfries stations, in addition to the journey time costs borne by through traffic on the line. This allowed calculation of a net base year impact in terms of journeys and revenue – i.e. how many additional rail journeys would be generated overall and how much additional revenue would be raised if the station were to open today.

6.6.12 The approach taken to the calculation of these impacts is discussed in Appendix U.1, and split into the following elements:

- Outbound demand at Thornhill Station;
- Inbound demand at Thornhill Station;
- Transfer of existing rail passengers to Thornhill Station;
- Journey time impacts on through passengers.

6.6.13 Table 6.5 sets out the Base Year demand and revenue results.

Table 6.5: Base Year Results

Market Segment	Journeys	Revenue
Outbound Demand	17,912	£112,694
Inbound Demand	6,709	£58,237
Thornhill Station Usage	**24,622**	**£170,931**
Transfer from Adjacent Stations	-6,989	-£57,078

Impact on Through Pax	-1,855	-£8,833
Overall Net Impact	**15,778**	**£105,020**

Benefit Cost Ratio Calculations

6.6.14 In order to calculate a Benefit Cost Ratio (BCR) for the potential station re-opening, the calculated anticipated demand and revenue impacts have been estimated over the 60-year appraisal period along with the costs and the overall financial impacts have been discounted to 2010.

6.6.15 The associated journey time benefits have been calculated and discounted to 2010[6], to then generate an overall BCR for the option.

6.6.16 To calculate the benefits, the following steps were undertaken:

- The demand figures calculated above comprised of:
  - **'Station Switchers'** – existing train users switching from other stations;
  - **New rail trips**, either:
    - Entirely new trips;
    - Those switching from car; or
    - Those switching from other public transport modes (bus).

  The proportions were estimated on the basis of the platform surveys where people were asked how they would have made that journey in the absence of a train service.
- For trips switching from other modes:
  - LENNON data was utilised to consider the distribution of these trips based on trip origins and destinations at Sanquhar and Dumfries stations; and
  - Time savings from these trips was estimated to determine the benefits based on the assumptions on journey purpose.
- In line with STAG, overall demand was projected forward for 30 years using a 2.5% per annum growth rate (based on recent local trends in rail passenger growth), with no further growth for the following 30 years;
- The volume of through passengers was estimated from the LENNON data, with each affected passenger assigned a 2-minute travel time disbenefit (again based on an assumed purpose split);
- The figures were combined to provide an estimate of the overall net benefits assuming an opening year of 2023;
- The benefits were then discounted to a base year of 2010 to provide the Present Value of Benefits (PVB).

[6] In line with guidelines in the Treasury Green Book and STAG

6.6.17 The station costs were estimated as set out in Appendix J and a number of differing cost assumptions were used to sensitivity test the impacts on the BCR:

- £11m – the higher end of the estimated range;
- £8m – the lower end of the estimated range;
- £5m and £2m – to account for a level of optimism bias already inherent in the cost figures as they are based on other station build ***outturn*** costs.

6.6.18 The full resulting BCR figures are presented in Table U.5 in Appendix U . Assuming a station cost of £8m achieves a BCR of 0.46 (if revenue is also included in the benefits). A station cost of £3.5m would be required for the re-opened station to 'break-even' over the 60-year appraisal period. It should be noted that the low BCR figure of less than 1 (with the assumed £8m station cost) is not untypical of rural stations where the case for the station is driven more by social need than monetary benefits.

6.6.19 Note that the additional cost to operate a shuttle bus service from the town to the station to meet all arriving and departing trains was estimated at £145k annually, and has not been included in the above calculations.

Economy Appraisal Summary

6.6.20 The full option appraisal against the Economy criteria is provided in Table 6.6

Table 6.6: STAG Economy Appraisal Criteria – Summary

Option	Option Description	Key Findings	Score
1a	Dedicated direct bus operating between Thornhill and Lockerbie	As noted above, it is not meaningful to calculate a BCR figure for this option, however the service operational costs are highly likely to outweigh the benefits, even if the potential revenue is considered (details of the estimated Cost to Government are provided in Section 6.7). A bus service offering a direct connection between Thornhill and Lockerbie is unlikely to provide journey times quicker than by private car. As such, users accessing Lockerbie Station at present are unlikely to switch modes based on journey time benefits alone. However, for those who are being 'dropped off' at the station, the option has the potential to save around 1 hour 30 minutes of drive time (Thornhill to Lockerbie and back) for those ferrying the passenger to and from the station.	-2
3	Earlier & later (and Sunday) services between Thornhill, Moniaive & Dumfries	As noted above, it is not meaningful to calculate a BCR figure for this option, however the service operational costs are highly likely to outweigh the benefits, even if the potential revenue is considered (details of the estimated Cost to Government are provided in Section 6.7).	-1
6	Re-open Thornhill	The appraisal has highlighted that the station would not achieve a BCR at the lower end of the assumed cost	-2

Option	Option Description	Key Findings	Score
	Railway Station	banding for the station construction. Assuming a station cost of £8m is estimated to achieve a BCR of 0.46 (if revenue is also included in the benefits). A station cost of £3.5m would be required for the re-opened station to 'break-even' over the 60-year appraisal period. It should be noted that the low BCR figure of less than 1 (with the assumed £8m station cost) is not untypical of rural stations where the case for the station is driven more by social need than monetary benefits. The additional cost to operate a shuttle bus service from the town to the station to meet all arriving and departing trains was estimated at £145k annually. The implementation of a rail station at Thornhill is likely to impact on the commerciality of operating bus services between Thornhill and Dumfries which may subsequently be reduced or removed effecting the smaller communities they serve (which are not situated such as to be able to benefit from the rail halt at Thornhill) i.e. Closeburn, Auldgirth etc. It should be noted that given the more aged demographic of the area, many people hold a concessionary bus pass and are therefore entitled to free bus travel across Scotland. If new rail services were to be introduced which subsequently led to a reduction in bus services serving the area, this could have financial implications on those who are now required to pay for rail (for which only a part-fare discount is applied). In general, rail fares are higher than the equivalent trip by bus, and therefore a reduction in bus service, with a need to utilise rail, could impact financially on all those who currently use the local bus network, especially concessionary pass holders. In addition, the 'fixed' permanence of a railway station could provide reassurance in the future connectivity and accessibility of the community, potentially impacting on people choices as to where to live and work.	

Integration

6.6.21 The STAG integration criteria focuses on three key integration elements:

- Transport integration;
- Transport and Land-use Integration; and
- Policy Integration

6.6.22 Detailed appraisal was undertaken at the Part 1 stage of the study, focussing on the transport integration elements of the integration criteria, and specifically focussing on the bus options.

6.6.23 At this stage of the appraisal, further appraisal building on the Part 1 work and further considering the options against all three elements of the integration criteria has been undertaken.

6.6.24 The full option appraisal against the Integration criteria is shown in Appendix V (including appraisal against the Policy Assessment Framework) with a summary of the key findings provided in Table 6.7.

Table 6.7: STAG Integration Appraisal Criteria – Summary

Option	Option Description	Key Findings	Score
1a	Dedicated direct bus operating between Thornhill and Lockerbie	The option offers significant reductions in interchange time for public transport users between Thornhill and onward rail connections from Lockerbie Railway Station to further afield. The option would and remove the need to interchange between bus services in Dumfries en-route to Lockerbie Station. An improved connection to Lockerbie Railway Station, offering improved access to Carlisle, Edinburgh and Glasgow, may encourage housing development in the village as noted in the Local Development Plan. The assessment of the option against the STAG Policy Assessment Framework shows the option scoring well against all national objectives and sub-objectives.	2
3	Earlier & later (and Sunday) services between Thornhill, Moniaive & Dumfries	The option would offer increased accessibility, and hence integration, to both later running bus and rail services from Dumfries, enabling access both from and to the study area later in the evening and at weekends. The *Dumfries Housing Market Area* section in the *2014 Dumfries and Galloway Local Development Plan* notes that in order to open up additional areas for development it is necessary to consider numerous road safety issues, including linkages to the wider settlements. This option provides increased later evening and weekend services not only linking Thornhill and Dumfries, but en-route serving smaller local communities such as Moniaive, Kirkton and Auldgirth. As such this may help tackle some of the road safety issues by reducing traffic, to some extent, on the roads around Thornhill. The assessment of the option against the STAG Policy Assessment Framework shows the option scoring well against all national objectives and sub-objectives.	1
6	Re-open Thornhill Railway Station	Provision of the rail station itself does not offer any direct mode-to-mode integration benefits, but the rail network is an integrated network and providing a station opens up access to the UK wide integrated rail network. However, the station's implementation would remove the need for transfer between bus and rail modes. The station may encourage housing development in the village as noted in the Local Development Plan – although it should be noted that the proposed housing is all located to the south-west of Thornhill, and if built out would be the furthest dwellings from the station. In addition, the station is located some 1.5km from the centre of the village and 700m	2

Option	Option Description	Key Findings	Score
		from the edge of the community. As such, the station would not be well integrated into the community. The assessment of the option against the STAG Policy Assessment Framework shows the option scoring well against all national objectives and sub-objectives.	

Accessibility and Social Inclusion

6.6.25 The TPOs for the study are mainly focussed on the connectivity and accessibility of the area in terms of enabling effective day trips to strategic location by public transport, ensuring public transport connectivity across the day and across the week, and making the area more accessible for those coming into the area. Building on the analysis for the TPOs, as presented in Appendix R and summarised in Section 6.5, Appendix W explores the further benefits in terms of:

- Community Accessibility considering public transport network coverage and local accessibility and;
- Comparative Accessibility considering the distribution of impacts by people groups and geographical location.

6.6.26 As noted above, the full option appraisal against the Accessibility and Social Inclusion criteria is shown in Appendix W with a summary of the key findings provided in Table 6.8.

Table 6.8: STAG Accessibility and Social Inclusion Appraisal Criteria – Summary

Option	Option Description	Key Findings	Score
1a	Dedicated direct bus operating between Thornhill and Lockerbie	The option provides increased public transport coverage for the area with the new direct link to Lockerbie. The option is particularly beneficially to those without a private car or unable to drive. This includes: • Those on lower incomes and those less-abled for whom driving is not an option and those for whom owning a car is not possible due to the costs involved. The increased accessibility may open up new job opportunities further afield; • The elderly who have stopped driving, and in particular through improved accessibility to the major hospitals in Edinburgh; • Those seeking Higher Education opportunities, through improved accessibility to Edinburgh which may be of particular benefit to those for whom living away from home is not affordable; and • Children under the age of 17, through increased ability to travel independently, with access to a greater range of extra-curriculum and social activities in which to participate.	2

Option	Option Description	Key Findings	Score
		The option would benefit public health through improving access to essential community facilitates and services, and promoting social inclusion for those without a car. Thornhill is located in a very rural location. The improved access to the WCML would connect the community to trains offering travel to much further afield. The option would remove the issue of parking at Lockerbie Station for the residents of the study area travelling there. A number of respondents to the public survey noted that they regularly travelled to Edinburgh, so this would be their preferred option. Note that it would be much easier than driving and parking at Lockerbie. A key benefit of improved accessibility to and from the study area will be in reducing the feelings of remoteness of the community and enabling local people to feel connected and part of a wider Scotland. This is especially important in terms of the long term sustainability of the community and the retention of younger people in the area. The option provides better equality of access to all, enabling fair access to the wider opportunities.	
3	Earlier & later (and Sunday) services between Thornhill, Moniaive & Dumfries	The option does not provide increased geographical coverage for the area but does provide increased coverage in terms of the times over which services are operational. The option is particularly beneficially to those without a private car or unable to drive. This includes: • Those on lower incomes and those less-abled for whom driving is not an option and those for whom owning a car is not possible due to the costs involved. The increased accessibility to Dumfries may open up new job opportunities which require shift or weekend working as well as enabling better access to social and recreational activities in Dumfries which have a finish time later than 20:30 (the current time of the last bus back to Thornhill); • School children, for whom the option would provide an increased ability to travel independently, providing access to greater range of extra-curriculum and social activities in which to participate in Dumfries; and • Local businesses, especially those connected to the tourism industry, by enabling people to visit the area in the evenings, attending local events. Thornhill is located in a very rural location. The improved access to Dumfries would enable the community to participate in a greater range of activities in the region's biggest town. This may help combat feelings of community isolation.	2
6	Re-open Thornhill	The option provides increased public transport coverage for the area with new direct access to the rail network. This	3

Option	Option Description	Key Findings	Score
	Railway Station	enables improved connectivity and reduced access time to locations on the GSWL including Glasgow, Dumfries and Carlisle. The option is particularly beneficially to those without a private car or unable to drive. This includes: • Those on lower incomes for whom owning a car is not possible due to the costs and the less abled by opening up new job opportunities. This may be particularly true for opportunities in Carlisle, for which the travel time with the option reduces to less than hour, which could be considered a satisfactory commute time. It should be noted that the train would in fact be quicker than the private car to both Dumfries and Carlisle: • Local businesses, especially those connected to the tourism industry, by enabling people to more easily visit the area. The existence of a rail station does tend to place a location 'on the map': • The elderly who have stopped driving for whom the improved access may enable easier accessibility to the major hospitals in Glasgow; • Those seeking Higher Education opportunities; and • Children under the age of 17 through providing an increased ability to travel independently, providing access to a greater range of extra-curriculum and social activities in which to participate in both Dumfries and Carlisle. It should be noted that the station is located 1.5km outside of the village, which presents an accessibility issue for those less abled and the elderly. Thornhill is located in a very rural location. The improved access to Dumfries would enable the community to participate in a greater range of activities in the region's biggest town. As with Option 1, it is important to note that a key benefit of improved accessibility to and from the study area will be in reducing the feelings of remoteness of the community and enabling local people to feel connected and part of a wider Scotland. This is especially important in terms of the long term sustainability of the community and the retention of younger people in the area. The option provides better equality of access to all enabling fair access to the wider opportunities.	

6.7 Cost to Government

Option 1a: Dedicated direct bus operating between Thornhill and Lockerbie

6.7.1 The commercial viability of Option 1a, has been revisited in light of the changes made to the service routeing (not routeing into Dumfries to avoid competition with commercially run services).

6.7.2 Previously it assumed that standard single decker buses of the type used by Stagecoach on inter-urban routes would be utilised to run the service. This was on the basis that the service would route via Dumfries (and the station) and therefore would be open to passengers generally on the corridors being served.

6.7.3 In order to not compete directly with existing commercial services, the new direct Thornhill to Lockerbie proposals would only be likely to attract rail passengers. As such, demand is likely to be lower and as such smaller buses can be assumed to be utilised on the route. These smaller buses would still comply with DDA legislation with low floor, easy access for wheelchair users etc.

6.7.4 Maintenance and fuel costs of the smaller buses are much lower than a full-size single decker and as such the estimated operating costs per bus have come down considerably. Therefore, the overall operational costs for the service has also reduced.

6.7.5 In addition, the journey time and operating miles have also reduced given the shortened route which avoid Dumfries.

6.7.6 The cost for the provision of Option 1a is now £254k (down from £695k).

6.7.7 Given the service is now a direct Thornhill to Lockerbie Station service, the average fare has been revisited. Previously an average fare of £2.42 was assumed (but that accounted for shorter trips on the bus i.e. those between Thornhill and Dumfries). However:

- The road distance of the route is 43 miles which is similar to Dumfries to Carlisle for which Stagecoach charge £8.30 single or £9.60 return.
- The crow flies' distance is about 19 miles, so is more similar to Dumfries to Castle Douglas which is £3.40 single / £6.20 return.

Given this, the average fare has been assumed to be around £5.00 for a single and £7.50 for a return. Similar average fare calculations were then undertaken using the same assumptions applied at Part 1 regarding trip categories to calculate a revised average single fare of £3.60.

6.7.8 Dividing the annual costs of £254k by the average fare of £3.60 means that the service would require approximately **70,500** single trips annually to break even.

6.7.9 The Office of Rail and Road (ORR) estimates of station usage for 2014-2015 shows total annual passengers station entries and exits of approximately:

- 215,000 at Lockerbie Railway Station.

6.7.10 The National Rail Travel Survey (NRTS, 2007)[7] shows that 10% of users accessing a railway station have arrived by bus/coach. Rural areas and small towns will typically have a lower share of bus-based access to railway stations than this due to the nature of the rural bus network. For example, bespoke surveys of passengers at rural stations previously undertaken by the project team have shown a bus access mode share of 5% or less.

6.7.11 The platform surveys undertaken at Lockerbie Station were considered and showed, of those surveyed, 4% had accessed the station by bus. Assuming 4% of passengers to Lockerbie Railway Stations arrive by bus equates to a total of 8,600 passengers annually arriving or departing by bus. The required number of passengers for the Thornhill service to break even is far in excess of this (70,500) and therefore the service is highly unlikely to be commercially viable.

[7] http://www.transport.gov.scot/system/files/documents/reports/NRTSProvisional2007.pdf - Table 6

6.7.12 It should be noted that the bus schedule for the option, has been extended to extend the service over the full existing operating day. It may be possible to 'scale back' the number of connecting bus services to concentrate on peak time rail arrivals/departures only to minimise the cost of the service and hence make the service more likely to be commercially viable/require a lesser subsidy.

6.7.13 A high level assessment was undertaken to estimate the level of subsidy required to support the service. The following was undertaken:

- Lockerbie platform surveys which were undertaken as part of a separate study (but were identical to those undertaken at Sanquhar), were used to establish the number of rail passengers alighting at Lockerbie who came from Thornhill or the surrounding area (the DG3 postcode);
- Passenger figures were uplifted to a total day count using ORR LENNON entries and exits data;
- From the Lockerbie platform surveys, the percentage of users arriving at the station by bus was established (4%);
- The percentage arriving by bus was then applied to the estimated number of daily passengers arriving from Thornhill to estimate the total number of rail users assumed to arrive at Lockerbie by bus from Thornhill;
- Using the average single fare calculated of £3.60, and the estimated passengers using the service, an overall annual revenue figure was calculated;
- Increasing levels of modal shift were assumed to establish how the revenue figure would change if a greater number of passengers utilised the service.

6.7.14 The results showed the high subsidy that would be required, around £240k - £250k annually, to operate the service. This equates to around 8% of SWestrans total bus subsidy.

6.7.15 If the service were to be implemented, it could require reducing services elsewhere in order to meet SWestrans budgetary constraint for the procurement of subsidised services. The very narrow focus as a 'RailBus', only capturing a small target market may mean a more 'taxi-bus' type offering would be more appropriate. In addition, given there are no other bespoke RailBus' type offerings in Dumfries and Galloway, implementing such a service for Thornhill may lead to calls for similar services from other rural communities with high cost implications.

6.7.16 It should however be noted that the service would provide a connection not currently available and as such may entice a number of new users who are not captured in this analysis.

6.7.17 In terms of bus services which require subsidy, the Transport Act 1985, which governs the operation of local bus services, sets out how a local transport authority can procure a bus service that is not being provided by the market. It also includes cases where new services need to be pump primed, i.e. where short term start-up funding is required until passenger demand reaches a level where the service becomes viable. If SWestrans wished to secure services, there would be an element of risk to both the service operator and SWestrans surrounding the uptake for the service and the patronage that may be achieved. It would be more likely that a gross cost contract be appropriate in order to encourage operator bids. The major risk would then be borne by SWestrans.

Option 3: Earlier & later (and Sunday) bus services between Thornhill, Moniaive & Dumfries

6.7.18 There have been no changes to the anticipated services to be provided as part of this option. As such, the work undertaken at STAG Part 1 remains valid in terms of the estimated operational costs and revenue.

6.7.19 The total annual operating cost was estimated as £57k with total revenue estimated at £15k. Therefore, Option 3 would require £42k in subsidy to 'break-even'. This equates to around 1% of SWestrans total bus subsidy.

6.7.20 As noted for option 1a, it would be more likely that a gross cost contract be appropriate in order to encourage operator bids, with the major risk then be borne by SWestrans.

Option 6: Re-open Thornhill Railway Station

6.7.21 For Option 6, over the 60-year appraisal period, Table 6.9, below shows:

- Assumed station cost, based on a range of values (in today's prices) as set out in Appendix U.1);
- Present Value of Benefits (PVB): discounted to 2010 values;
- Present Value of Cost (PVC): the station costs with optimism bias, discounted to 2010 values; and
- Net Present Value (NPV): PVB-PVC.

Table 6.9: Option 6 – Cost to Government (PVC and PVB discounted to 2010)

Assumed Station Cost (£m)	PVB (£m)	PVC (£m)	NPV (£m)
£11.0	£3.5	£10.7	-£7.1
£8.0	£3.5	£7.8	-£4.2
£5.0	£3.5	£4.8	-£1.3
£2.0	£3.5	£1.9	£1.6

6.7.22 Additionally, it should also be noted that a shuttle bus operating between Thornhill village centre and the station has been estimated to cost around £145k annually to operate. This cost would be borne by SWestrans.

6.8 Risk and Uncertainty

6.8.1 The overall risk and uncertainty inherent in the implementation of the options has been considered and is summarised in Table 6.10.

Table 6.10: Risk and Uncertainty

Risk	Risk Type	Comments	Potential Mitigation
Delivery Risk	Infrastructure Risk	Options 1a and 3 propose new bus routes / services. These services would operate on existing roads and utilise existing bus stops. Therefore,	Ensure detailed design work considers fully the implementation issues at an early stage to ensure the feasibility of

Risk	Risk Type	Comments	Potential Mitigation
		there is no infrastructure risk associated with them. Option 6 requires the build of a new station. The site visits undertaken during Part 2 Appraisal highlighted two potential sites for the station in the vicinity of the old station site. Note that for both sites, access, car parking and overbridge requirements would need to be considered in detail to establish their feasibility (as well as potentially upgrading the road access from Thornhill) and further detailed design work is required to investigate which site is the most suitable. As the station is located 1.5km to the east of Thornhill, suitable active travel infrastructure is required to ensure a safe and attractive route to the station which is appropriately surfaced and lit.	the station. This would include ensuring adequate parking was available.
	Planning Risk	In terms of Option 6, there is a risk that detailed planning permission may not be able to be obtained due to the land required for implementation of station, although it is noted that some of the various land owners required have indicated their willingness to lease land for the purposes of building the station.	Ensure early consideration and discussion with land owners to obtain agreement on the infrastructure to be provided and the land requirements.
	Construction Risk	For Option 6, the implementation of the station represents a not insignificant infrastructure project and there is a risk around the budget required for this increasing particularly given that construction is unlikely to start until some years from now if this were taken forward. To make some allowance for this, Optimism Bias of 44% has been applied to the station build capital costs to account for the degree of uncertainty at this stage. However, it should be noted that the capital station costs have been drawn from *outturn* costs of recently build stations and as such the level of optimism biased applied is very robust and could potentially be reduced or even removed.	On-going revisiting of the costs of the infrastructure as design work progresses to ensure the cost estimates are as robust as possible. In addition, the costs should have optimism bias applied reflective of the stage in the design process.

Risk	Risk Type	Comments	Potential Mitigation
Operational Risk	Operational Risk	In terms of Options 1a and 3, the main operational risk in taking options forward pertains to the likelihood of bus operators to be encouraged to operate the services. The work undertaken to establish the commercial viability of the services has highlighted that neither option would be commercially viable. Operators are unlikely to operate services which are not deemed commercial and as such both options would require a level of subsidy to operate. While estimates of potential service demand have been made, it is not yet known what the overall patronage of the services may end up being. As such there would be a short to medium term financial burden and risk on SWestrans in offering a level of subsidy during the procurement process – which may be in excess of that required. There is additionally the ongoing risk that, once operational, at a future date operators will withdraw their support for a service, and / or public funding becomes more constrained and the required subsidy to operate the service can no longer be provided. In terms of Option 6, rail services are already operational on the line through Thornhill and as such the operational risk should be minimal. This however assumes the feasibility of adding the additional rail halt into existing timetables and securing agreement on this from Transport Scotland / Scotrail etc. The initial work undertaken to establish this feasibility has highlighted the need to adjust services at the Southern end of the route (i.e. into / out of Carlisle). This therefore requires consideration of trains on the WCML. Further discussion with Network Rail / TransPennine Express / Virgin Trains etc. is required to buy-in and awareness by all parties throughout of process.	For Option 1a and 3, ongoing discussion with bus operators as to their willingness to operate services and the levels of patronage on the routes. For Option 6, ongoing discussion with all rail industry parties throughout any Business Case and / or GRIP process.

Risk	Risk Type	Comments	Potential Mitigation
	Demand Risk	For Options 1a and 3, the greatest uncertainty surrounding the operation of the options and their viability relates to the demand for the services and the level of subsidy required. There is a risk that the demand for the services will be lower than estimated. Patronage on the services which proves to be lower than estimated would create a risk to the SWestrans if subsidy were being provided and a risk to the operator through reduced revenue. It may be that a service, if implemented, may be subsequently removed, impacting on the areas accessibility and sustainability. For Option 6, the level of demand anticipated would need to be considered in detail during the GRIP process, to ensure robust estimates to allow for an appropriate understanding during any franchise tendering process.	For Options 1a and 3, revising the estimates of demand. using a more detailed bus patronage model. For Option 6, detailed demand modelling work during the GRIP process.
	Financial Risk	For Option 1a and 3, there is a risk around the estimated operational costs for the services increasing particularly given that option implementation is unlikely to start until some years from now if this were taken forward.	On-going revisiting of the operational costs for the services to ensure the estimates are as robust as possible.

Part 2 Engagement

6.8.2 A Public Event was held on 17th January 2019 in Thornhill from 17:30 – 20:30 at Wallace Hall Academy in Thornhill. The purpose of the event was to present information about the study, covering all stages of the study including the problems identified, the options generated and the option appraisal process and key appraisal findings. The events were publicised via social media by the Council and also communicated to local people through Thornhill Railway Station Action Group.

6.8.3 A feedback form was available for completion at the event asking participants about the severity of the problems identified, the impacts of the problems on them and their community, and their thoughts on the options and how they would benefit them. Pre-paid envelopes were also made available if people wished to complete the feedback form at home and post back. Furthermore, the feedback survey (identical to that handed out at the event) was made available online for completion.

6.8.4 The Public Event material was also made available online after the event, with the link to the online version of the feedback survey alongside it. The Council further publicised that the material was available.

6.8.5 In total, 329 people attended the event on the night, with a total of 616 feedback surveys completed (combined paper, posted and online surveys completed).

6.8.6 Full analysis of the feedback survey is presented in N.2.

6.8.7 In terms of public acceptability of the options:

- 85% (n=501) of respondents felt that Option 6 would have a major positive impact for travelling to and from the Thornhill area;
- 38% (n=225) thought that Option 3 would have a major positive impact on the area; and
- 24% (n=143) felt that Option 1a would have a major positive impact on the area.

6.8.8 Respondents were asked to state which was there preferred option for the future, as shown in Figure 6.1:

- 90% (n=533) stated that their preferred option was Option 6, to re-open Thornhill railway station;
- 6% (n=33) selected Option 3; and
- 4% (n=25) selected Option 1a.

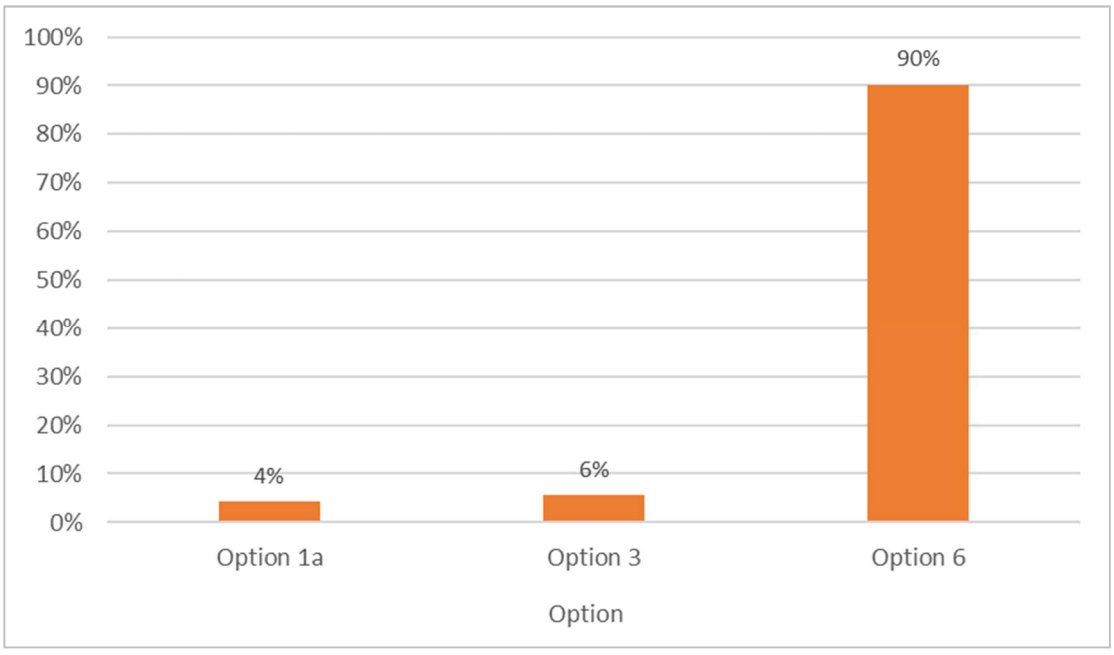

Figure 6.1 Preferred Option

6.8.9 Prior to the Public Event on 17th January, face-to-face meetings were held in Thornhill with members of Thornhill Station Action Group and with pupils of Thornhill's Wallace Hall Academy. Appendix N presents the discussions at these meetings.

6.9 Overall Option Scoring

6.9.1 A concise overview of the Part 2 Appraisal scoring is shown in Table 6.11.

Table 6.11: Appraisal Overview against the TPO's and STAG Criteria

		Transport Planning Objectives			STAG Criteria				
		TPO1	TPO2	TPO3					
Option	**Decription**	Enable an effective day trip by public transport to key education, retail and social opportunities in Glasgow, Ayr, Edinburgh and Carlisle	Provide public transport connectivity which enables travel to and from the area across the day and across the week	Increase the inbound public transport catchment to support education, tourism and local businesses	Environment	Safety	Economy	Integration	Accessibility & Social Inclusion
1a	Dedicated direct bus service operating between Thornhill and Lockerbie Railway Stations	2	2	2	1	1	-2	2	2
3	Earlier & later (and Sunday) services between Thornhill, Moniaive & Dumfries	2	2	1	1	0	-1	1	2
6	Re-open Thornhill Railway Station	3	2	3	-1	1	-2	2	3

7 Conclusions

7.1 Introduction

7.1.1 This study has identified and evidenced the transport problems and opportunities for Thornhill and the surrounding area, developed a set of Transport Planning Objectives to express the outcomes sought for the study, and generated and appraised a number of transport options to provide solution(s) to meet the objectives and alleviate the problems.

7.2 Problems and Opportunities Summary

7.2.1 Thornhill is a rural community, which while connected reasonably well to Dumfries, suffers from a lack of strategic public transport connectivity further afield in terms of a lack of direct routes, long journey times and poor service frequency. This is especially pertinent to those without access to a car (those who cannot afford or prefer not to buy or run a vehicle) and those unable to drive (the young, the elderly and those less able). In addition, the lack of strategic public transport accessibility results in a high reliance on the private car in the study area by those who do have access to a car but would prefer to use public transport.

7.2.2 This lack of strategic connectivity is felt across the community and particularly in terms of:

- Constrained access to higher education, particularly in terms of the need of young people to leave the area to further their education after secondary school;
- Constrained access to social activities for all, but again particularly for young people who must rely on others for transport to / from the area which is reducing their opportunities to gain independence;
- Making it difficult to access healthcare, particularly at the major health centres in Ayr and Glasgow;
- Limiting visitors to the area, and thereby impacting on local tourist related businesses and reducing the areas ability to realise the full potential of the area's tourist offering; and
- Making the area a less attractive proposition for in-migration.

7.2.3 For strategic and also local buses that do serve the area, the limited operating hours of services curtail the ability of the local community to access employment opportunities (e.g. those requiring shift or weekend working) and participate in social opportunities.

7.2.4 While access to the rail network can be gained at Dumfries and Sanquhar to join the Glasgow South West Line, poor integration between the bus and rail networks, in terms of both the integration of timetables and a lack of physical integration between bus stops with rail stations, means the rail network is not easily accessible. Long interchange times create extended journey times, with analysis presented in this report, highlighting the reduced connectivity to and from Thornhill compared to the nearby similar rural community at Sanquhar. The requirement to interchange, particularly in Dumfries, requires a 10-15-minute walk across the town centre, presenting difficulty for anyone with mobility issues.

7.2.5 Lockerbie Station on the West Coast Main Line is also favoured by local people to take advantage of the much faster trains to Edinburgh and Glasgow. Connections by public transport to Lockerbie are however poor by public transport with no direct accessibility and bus to bus interchange required in Dumfries. Those without access to a car are significantly disadvantaged in this regard. The West Coast Mainline also provides more regular access to trains, with large gaps in the timetable on the Glasgow South West Line, when there are no services over large parts of the day, including: northbound between around 09:30 and 12:00 and between around

16:30 and 19:00; and southbound before 08:30 and between around 14:30 and 17:30. This restricts use of the rail network.

7.2.6 It is important to note that Carlisle is seen by many in the area as a key economic, retail and social centre, being much closer to Thornhill than Glasgow. Public transport access to Carlisle requires interchange in Dumfries, either to an onwards bus connection or to rail. In this regard, those resident in Thornhill are at a significant disadvantage compared to the neighbouring village of Sanquhar, further geographically from Carlisle, but much closer in terms of access time.

7.2.7 It is clear from the identification of problems and through the engagement exercises undertaken, that the community requires stronger strategic connectivity and it is recognised that active travel cannot be readily utilised to undertake such longer distance trips. However, there is potential for active travel to provide connections to the strategic transport network and also form part of the tourist offering of the area.

7.2.8 An important issue when considering public transport across not just the study area, but also more widely across the region, is the fragile nature of existing bus operations, with many local services reliant on local government subsidy. Budget cuts means the level of available subsidy has been reducing year on year over the last 5 years. This is undermining people's faith in the bus network and future dependence on services.

7.2.9 It is clear that a key benefit of improved connectivity to and from the study area will be in reducing the feelings of remoteness of the community and enabling local people to feel connected and part of a wider Scotland. This is especially important in terms of the long term sustainability of the community, and the retention of the economically active population and younger people in the area, while ensuring equality of access for all to the wider opportunities.

7.2.10 As such, the Transport Planning Objectives for the study were set to reflect the above:

- **TPO 1:** Enable an effective day trip by public transport to key education, retail and social opportunities in Glasgow, Ayr, Edinburgh and Carlisle
- **TPO 2:** Provide public transport connectivity which enables travel to and from the area across the day and across the week
- **TPO 3**: Increase the inbound public transport catchment to support education, tourism and local businesses

7.3 Options and Appraisal Findings

7.3.1 Seven options were initially developed with three options taken forward to the end of the appraisal. These are:

- **Option 1a:** RailBus to Lockerbie Station: dedicated bus from Thornhill which integrates with train arrival and departure times at Lockerbie Railway Station.
- **Option 3:** Earlier & later (and Sunday) services between Thornhill, Moniaive & Dumfries
- **Option 6:** Re-open Thornhill Railway Station

7.3.2 The appraisal of the options has highlighted some key points. It is not the purpose of this report to recommend one option over another, but to present the key appraisal findings for all options.

7.3.3 It is clear that there is limited subsidy available to subsidise further bus services in the area, and that any new services, such as those proposed in Options 1a and 3 may have to come at the expense of subsidised services elsewhere.

7.3.4 Option 1a has the potential to enable much improved access to Edinburgh, reducing the journey time differential between public transport and the private car; and also, public transport journey times between Thornhill and those from neighbouring Sanquhar. The additional connectivity to the West Coast Main Line offers increased opportunities for the community to access locations further afield as well as providing ease of access into the area, promoting local tourism, supporting local businesses and also enabling a wider catchment area for local employers. The option would also help alleviate the current pressure on parking at Lockerbie Station.

7.3.5 It should be noted that the option is unlikely to be heavily utilised and unless substantially more demand for the service could be generated, would require significant support from the public purse to operate. Given the likely low passenger numbers, a much reduced 'on-demand' taxi-bus type offering is likely to be more proportionate than a schedule service bus.

7.3.6 The key benefits of Option 3 are focussed on reducing the time constraints on access to and from the area, enabling better access later on in the evening and at weekends. This has specific advantages in terms of employment and social access both into and out of Thornhill.

7.3.7 It is clear that there is strong local support for the re-opening of a railway station in Thornhill, with public engagement over the course of the study strongly emphasising the desire of the local community for this. While the case for Option 6, the re-opening the station in Thornhill, is highly unlikely to 'stack up' from an economic perspective (unless the station build cost could be substantially reduced from the current estimate), the case for such an intervention, like in many other rural locations, will be heavily focussed on the connectivity and accessibility benefits such an intervention could bring. The case for intervention cannot perhaps be judged in the same way as urban rail schemes and must be considered in terms of the wider social benefits to the local community and ensuring the community has equality of access. There was a very strong public preference for the opening of the station over other options.

7.3.8 The analysis undertaken has highlighted the much improved strategic connectivity of the area that could be achieved if the station were re-opened including the key benefit in terms of accessing Carlisle, which would then be within acceptable commuter time. In addition, the improved access to Carlisle offers greater retail and social opportunities for younger people. Journey times to key strategic centres would also be more closely aligned to those available from Sanquhar, allowing for quality of access from Thornhill. A key benefit would also be the increased accessibility of Thornhill to the wider area, allowing visitors ease of access and supporting the local tourism industry. Access to the area would also be possible over an extended period of the day as rail services operate over a longer time period.

7.3.9 It is noted that the rail station would be located approximately 1.5km outside of Thornhill and that in order to provide suitable access, the station would require a connecting bus or 'taxi-bus' type link. In addition, an improved shared-use walking and cycle path to the station would be required with appropriate lighting.

7.3.10 Cognisance must also be taken of the potential impact on existing bus services in the area if the rail station were to re-open. Smaller communities served by local buses may experience a reduction in bus service if the rail station were reinstated, and this impacted significantly on bus patronage, and hence overall bus operation viability. This would be detrimental to the connectivity of these smaller communities. It is also important to note the financial penalty of undertaking trips by rail for those who are entitled to concessionary bus passes and the financial burden reduced bus operations may place on those even within Thornhill (for whom the rail network is easily accessible but not easily *financially* accessible).

7.4 Summary

7.4.1 Overall, all options offer a number of key benefits, with Options 1a and especially Option 6 offering greater strategic connectivity potential than Option 3, but with an attached heavier financial requirement. While Option 1a provides improved connectivity to Edinburgh, Option 6 significantly improves direct public transport connectivity to Glasgow and Carlisle enabling much

quicker access to jobs, social opportunities and healthcare in these major employment, social and retail centres.

Appendix A Initial Engagement and Consultation

A.1 Initial Public Consultation

A.1.1 An online public survey was produced and made available over the period 26th February 2016 – 27th May 2016. The survey asked questions on:

- Modal use;
- Most frequented destinations and the purpose of these trips;
- Problems when using various travel modes; and
- Suggested improvements to the transport network.

A.1.2 For those unable to complete the survey online, a telephone number was made available through which paper copies could be requested.

A.1.3 The survey was publicised by a variety of means as follows:

- Leaflets were delivered to 2365 households within the DG3 4 and DG3 5 postcode areas. The extent of this area is shown in Figure A.1, with Figure A.2 showing a copy of the leaflet distributed.
- Information on the survey was provided to each of the Community Councils in the study area (Carronbridge, Closeburn, Glencairn, Keir, Penpont, Tynron, and Thornhill) for distribution via their internal communication network;
- A Press Release on the survey was issued; and
- Information and links to the surveys were included on the SWestrans website.

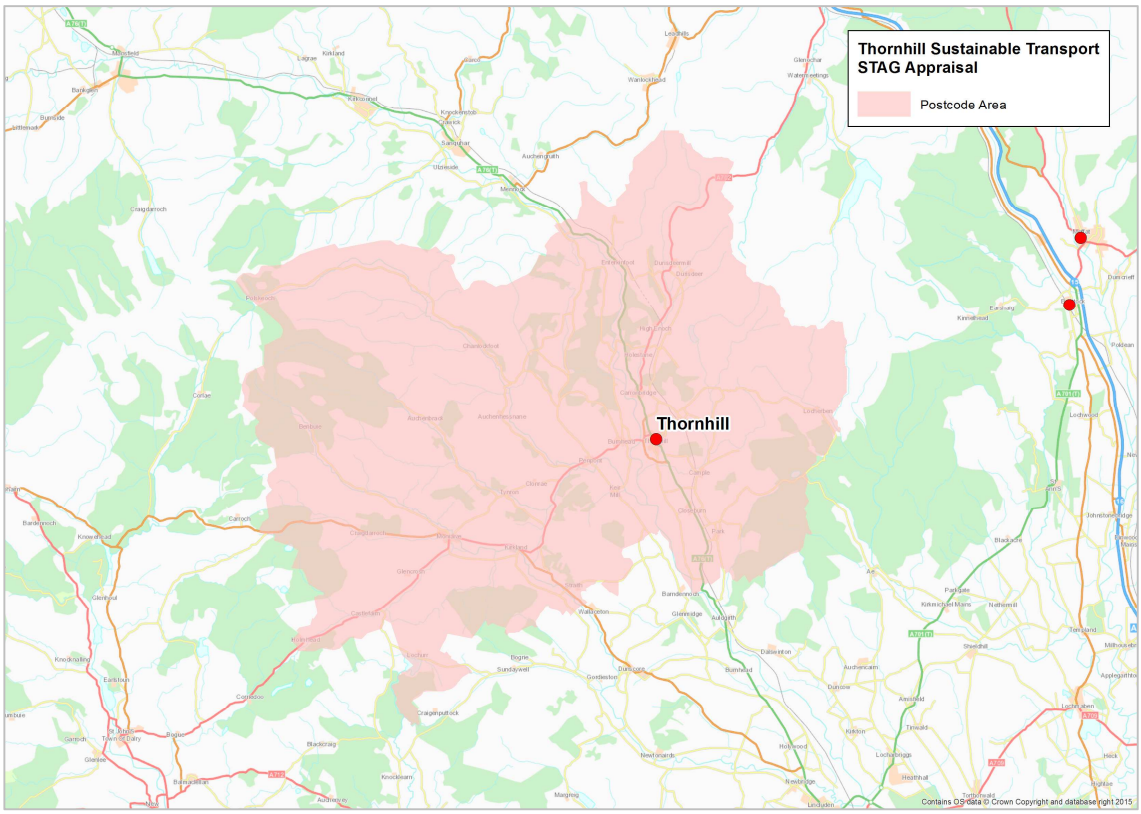

Figure A.1: DG3 4 and DG3 5 Postcode Area to which Leaflets were distributed

Figure A.2: DG3 4 and DG3 5 Postcode Area to which Leaflets were distributed

A.1.4 In total, **275** responses were received to the survey, with the largest proportion of respondents (30%) living within the village of Thornhill itself. A further 61% live in the surrounding area, including the villages and settlements of Closeburn (15%), Moniaive (18%) and Tynron (11%).

A further 7% resided in the wider Dumfries and Galloway area, with the small number of remaining respondents living outwith the region.

A.1.5 More responses were received from females (61%) (n=164) than males (37%), with a small number of people preferring not to respond to the question.

A.1.6 The survey was completed by a wide range of age groups, with the highest level of responses being generated by the 45 – 54 year old group. Figure A.3 shows the breakdown of responses by gender and age groups.

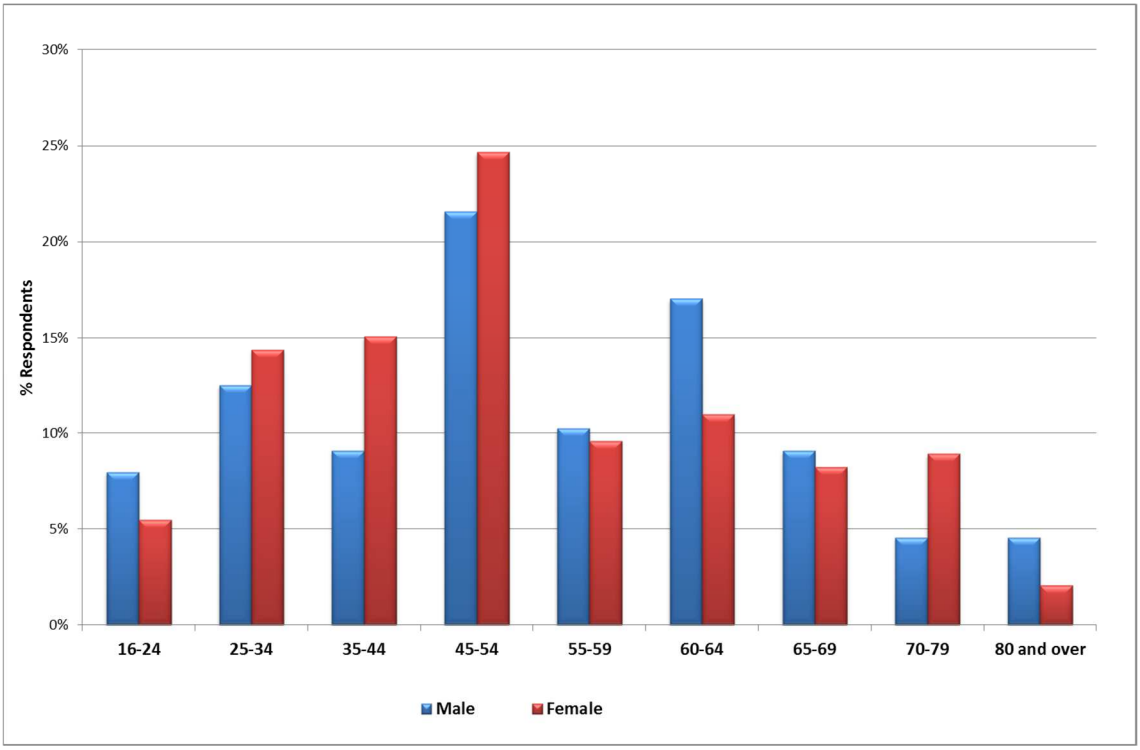

Figure A.3: Age/Gender Breakdown

A.1.7 Car is the most dominant mode for those who travel in the study area, with 71% of respondents (n=271) indicating they either drive or travel as a passenger in a car as their main mode of travel on a daily basis. 21% travel by bus with a further 1% utilising rail. Active modes account for 7% of responses. Figure A.4 illustrates main mode of travel across the study area.

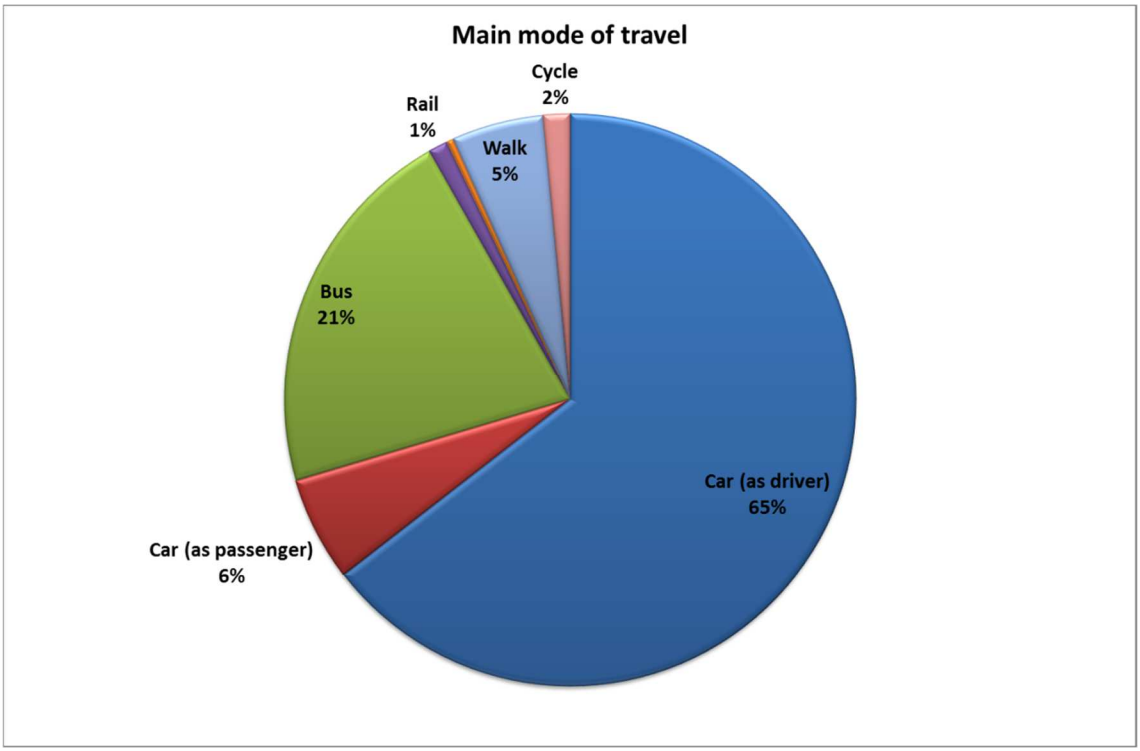

Figure A.4: Main mode of travel

A.1.8 Respondents were asked which locations they regularly travel to and the journey purpose for each location. Results are shown in Figure A.5. Results from the survey suggest that Dumfries is a key destination for the people of the area, this was mostly driven by retail/shopping, leisure, health appointments and also employment opportunities. There is also significant travel to Glasgow, mainly driven by retail, shopping and leisure.

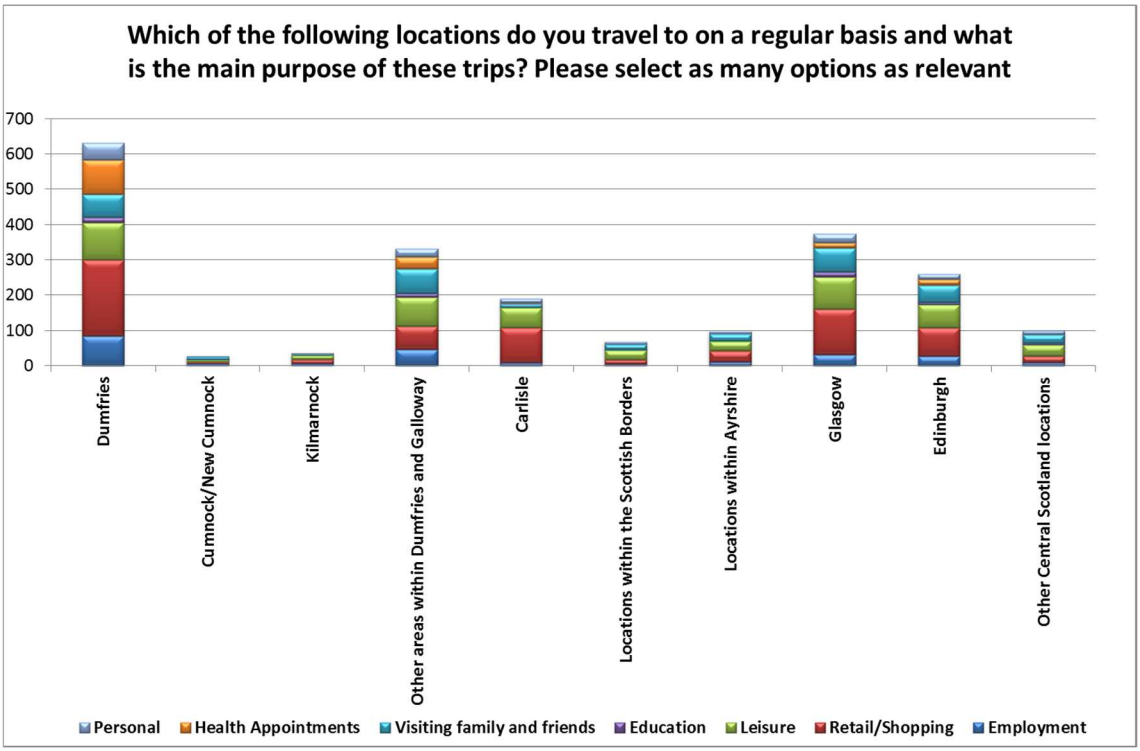

Figure A.5: Locations people regularly travel to and Journey Purpose

Problems on the Transport Network

A.1.9 Respondents were asked two questions with regards transport problems faced in the area. The initial question asked respondents to note if they believed each stated transport problem represented an issue to them. This was a multiple response question with respondents free to comment on each (n=261). Results showed that by far the most common problems were:

- Limited choice of travel modes (72%)
- Lack of direct public transport routes (66%)
- Long travel times to get to destinations (46%)
- Cost of public transport (29%)

A.1.10 The second question asked respondents to note what they believed to be **the single biggest transport problem in the area**. Whilst the three options listed above were again listed as the biggest issues, limited choice of travel modes was noted as the single biggest transport issue by 35% of respondents (n=260). Results can be seen in Figure A.6.

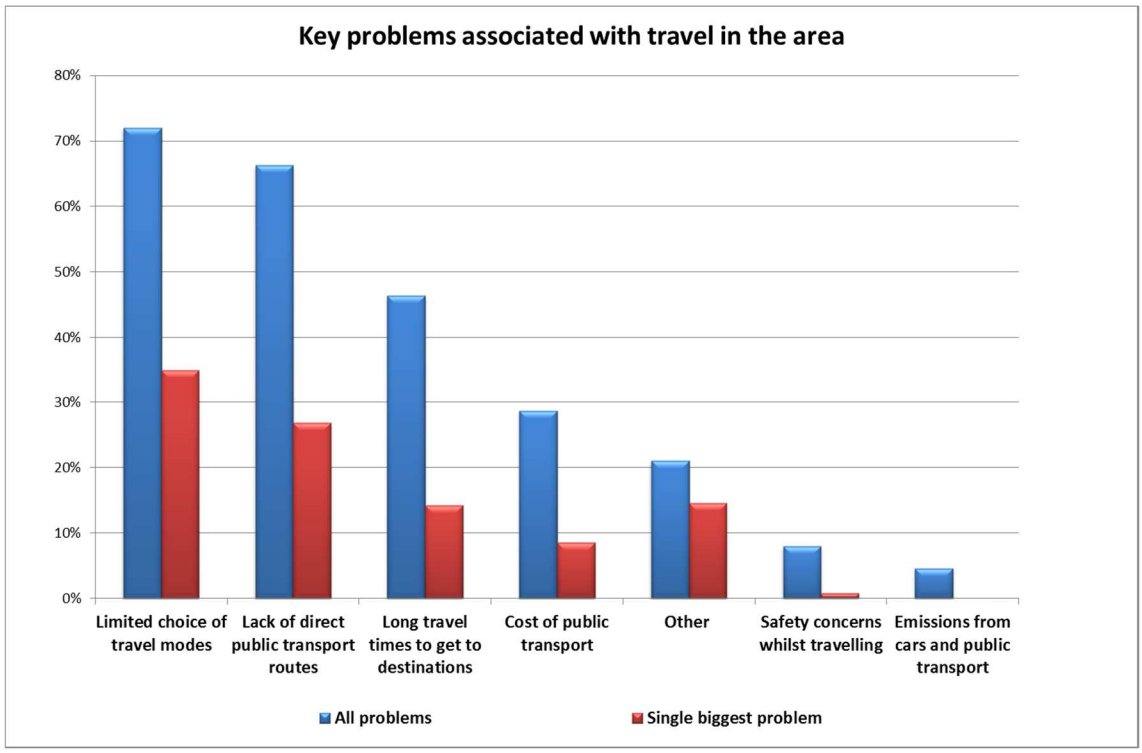

Figure A.6: Key Problems Associated with the Transport Network

Road Network

A.1.11 In total, 224 respondents identified themselves as regular drivers/passengers and were routed to the following questions with regards the road network.

A.1.12 Road users were asked to note the key issues they faced on a regular basis when travelling. Poor quality of roads was the largest issue, noted by 76% of respondents (n=221). Being caught behind HGVs and slow-moving vehicles (49%) and Congestion and Delay (22%) were also noted as key issues. Figure A.7 shows the key problems faced on the road network.

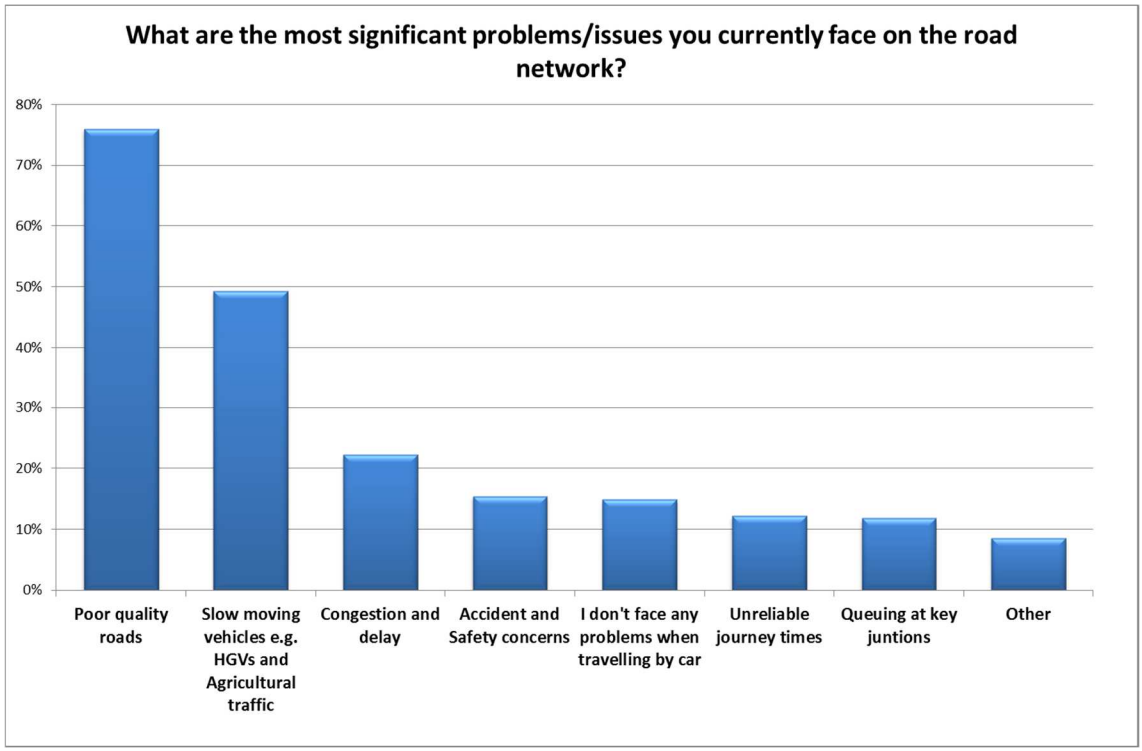

Figure A.7: Issues on the road network

A.1.13 Respondents were asked to consider how the identified problems with the road network impacted upon them. Figure A.8 shows that 55% of respondents (n=201) noted that they had to begin their journey early or late to avoid delays. 'Difficulties in accessing key services such as health, education and shopping' was also noted, as was being 'late for and missing appointments.'

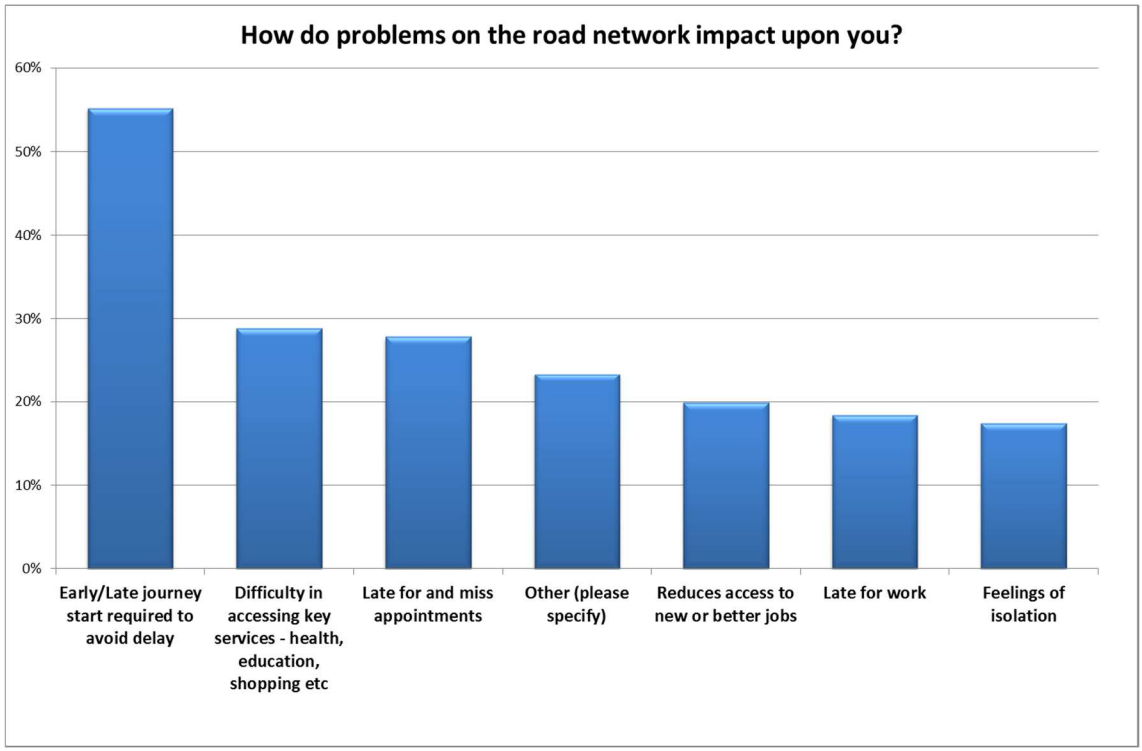

Figure A.8: Impacts of Problems on the road network

Bus Travel

A.1.14 In total, 113 respondents identified themselves as regular bus users. The remaining 144 respondents were asked why they do not currently travel by bus in the study area. 'Low frequency' and 'No direct routes to where I need to go' were the biggest reasons to not travel by bus as noted by 50% and 45% of respondents respectively (n=143). Other common reasons given were, 'Prefer the car', (32%) and 'Long journey times' (31%).

A.1.15 Bus users were asked to note the key issues they faced on a regular basis when travelling. Three issues were clearly prevalent, 'Service frequency' was the largest issue, noted by 75% of respondents (n=112). 'Lack of direct routes' (37%) and 'Service reliability' (25%) were also noted as key issues. Figure A.9 shows the key problems faced on the bus network.

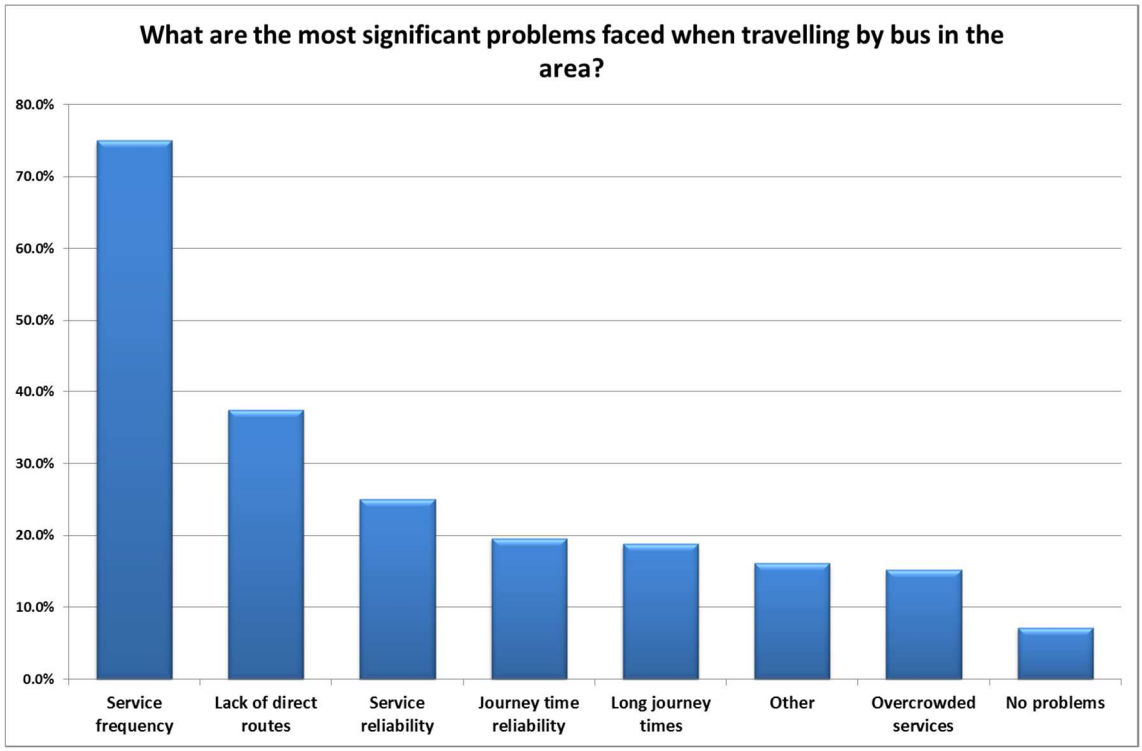

Figure A.9: Problems faced when travelling by bus

A.1.16 Respondents were asked to consider how the identified problems with bus travel impacted upon them. Figure A.10 shows the impacts of the identified problems. 'Difficulty in accessing key services' as indicated by 43% of respondents (n=102) and 'Early/Late journey start required to avoid delay' as indicated by 42% of respondents were the key impacts raised.

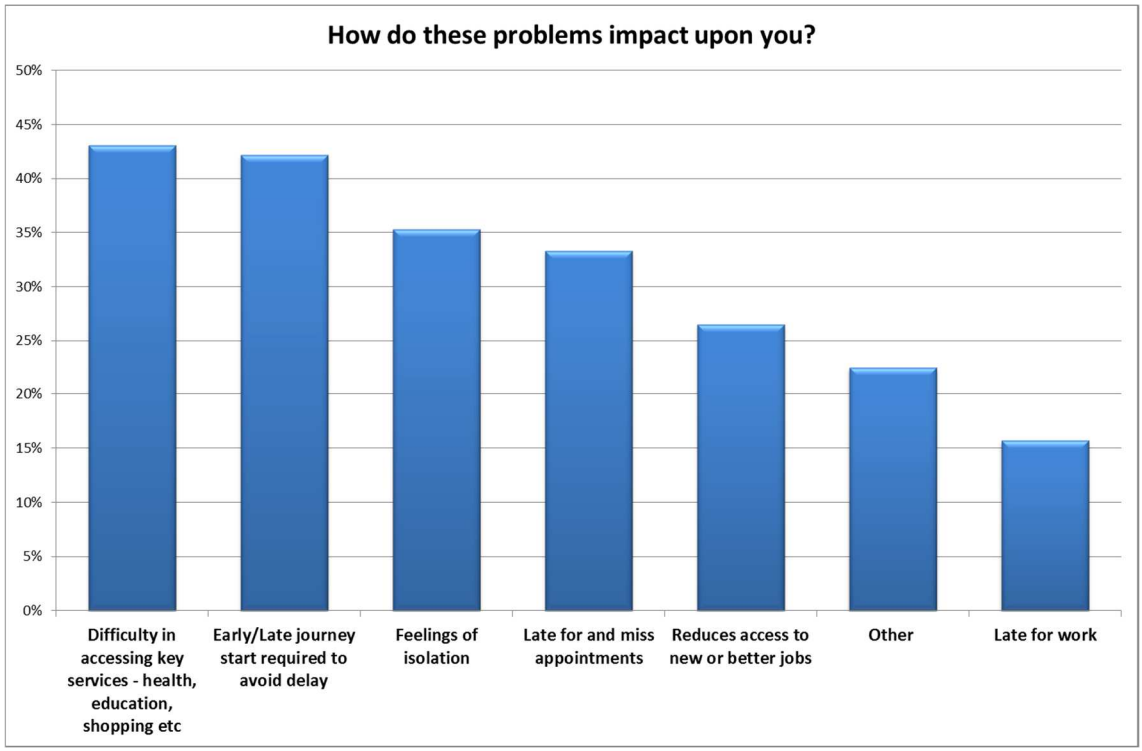

Figure A.10: Impacts of Problems with the bus network

A.1.17 All respondents were asked which improvements to the bus network would have a positive effect on them. Note that this question was not limited to bus users only. 'Increased bus frequencies' and 'Services which run earlier in the morning/later in the evening' and 'increased direct bus services' were judged to be the most popular improvements, suggested by 60%, 50% and 44% of respondents respectively. (n=252). 'Increased express bus services to major cities' (39%) and 'Reduced fares' (27%) were also judged to be important. Results are shown in Figure A.11.

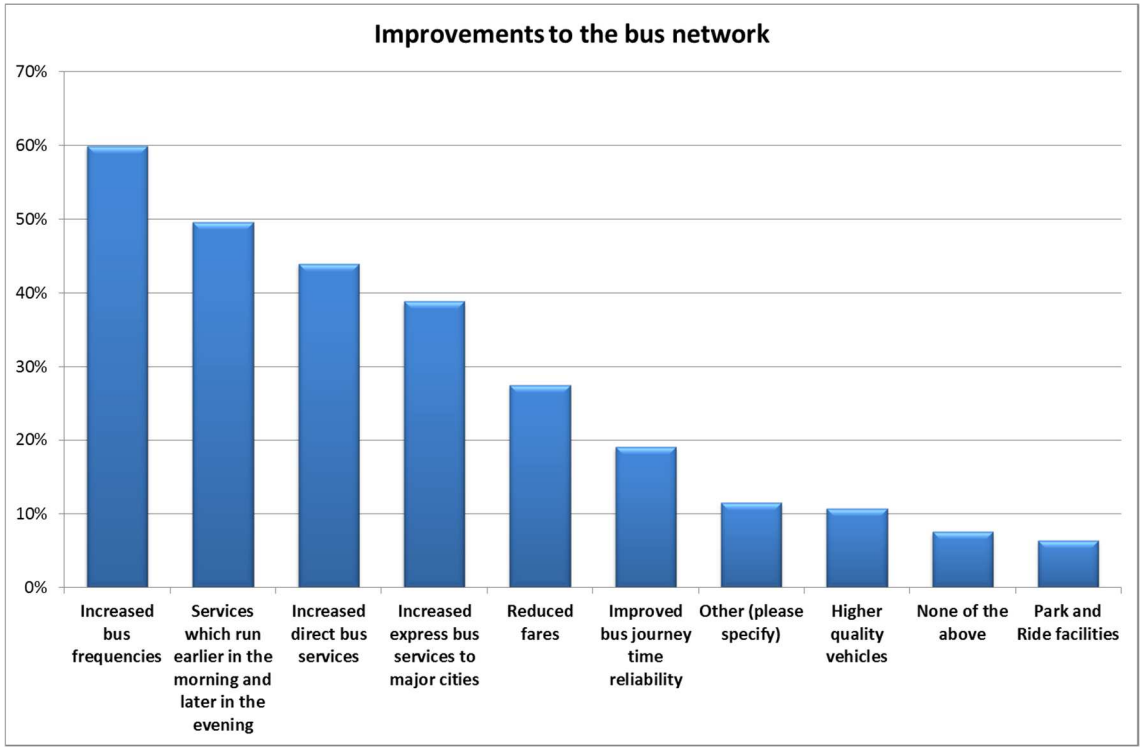

Figure A.11: Improvements to bus services

Rail Travel

A.1.18 In total, 100 respondents identified themselves as regular rail users. The remaining 155 respondents were asked why they do not currently travel by rail in the study area. Unsurprisingly, 'Nearest station is located too far away' was the biggest reasons to not travel by rail as noted by 77.1% of respondents (n=153). Other common reasons given were, 'No routes to where I need to go' (16.3%) and the cost of rail travel (29%).

A.1.19 Rail users were asked to note the key issues they faced on a regular basis when travelling. Given the lack of station in the immediate area, it was unsurprising that 'No rail station close enough for effective use' was the most common answer, as noted by 71% of respondents (n=96). Long journey times to get to the nearest station (65%) and 'Service frequency from nearest station' (31%) were also noted as key problems. Figure A.12 shows the key problems faced when travelling by rail.

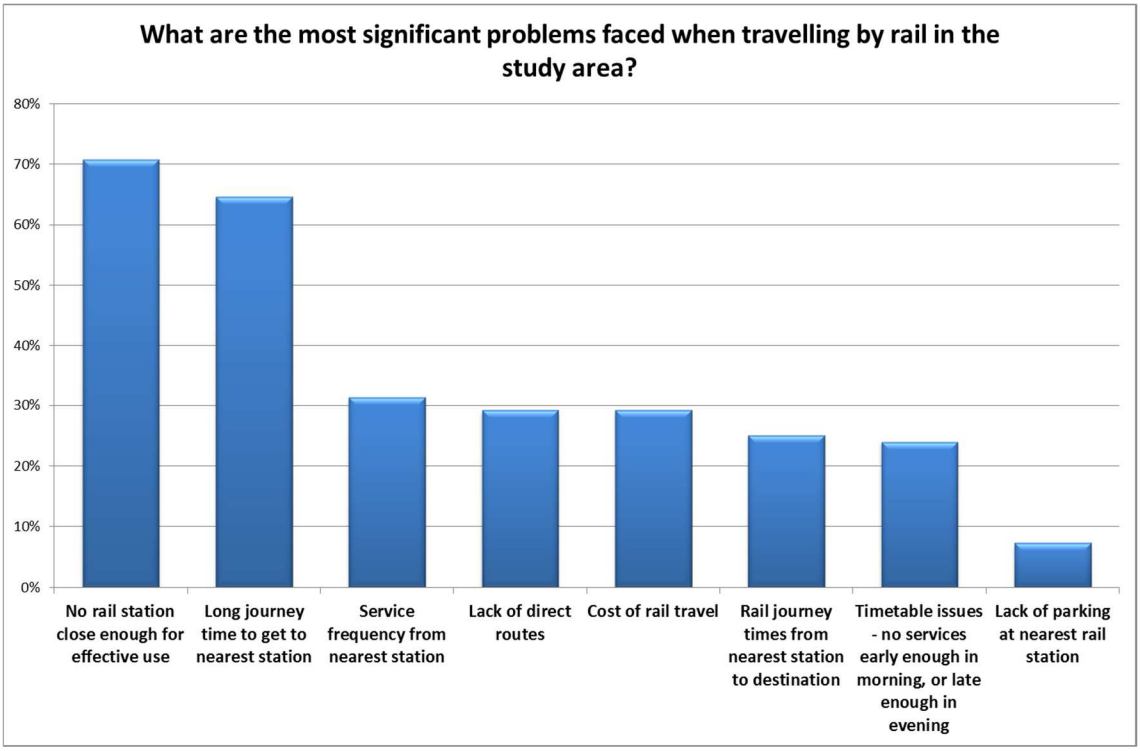

Figure A.12: Impacts of Problems faced when travelling by rail

A.1.20 Respondents were asked to consider if the introduction of a rail station within the study area would have any impact/effect upon them. In total 86% of respondents (n=252) stated there would be an impact or effect upon them should a station be opened.

A.1.21 A further question asked how the presence of a new station would impact upon the respondent. The most common answers provided included 'Increased access to retail and leisure opportunities further afield' 84% (n=217), 'Reduce the feeling of distance from towns and cities' 65%, and 'Increased potential employment opportunities', 57%. Full details are provided within Figure A.13. Interestingly, the results correlate well with earlier questions on where people would like to travel to for trip purposes, suggesting travel for leisure and entertainment opportunities are important in the study area.

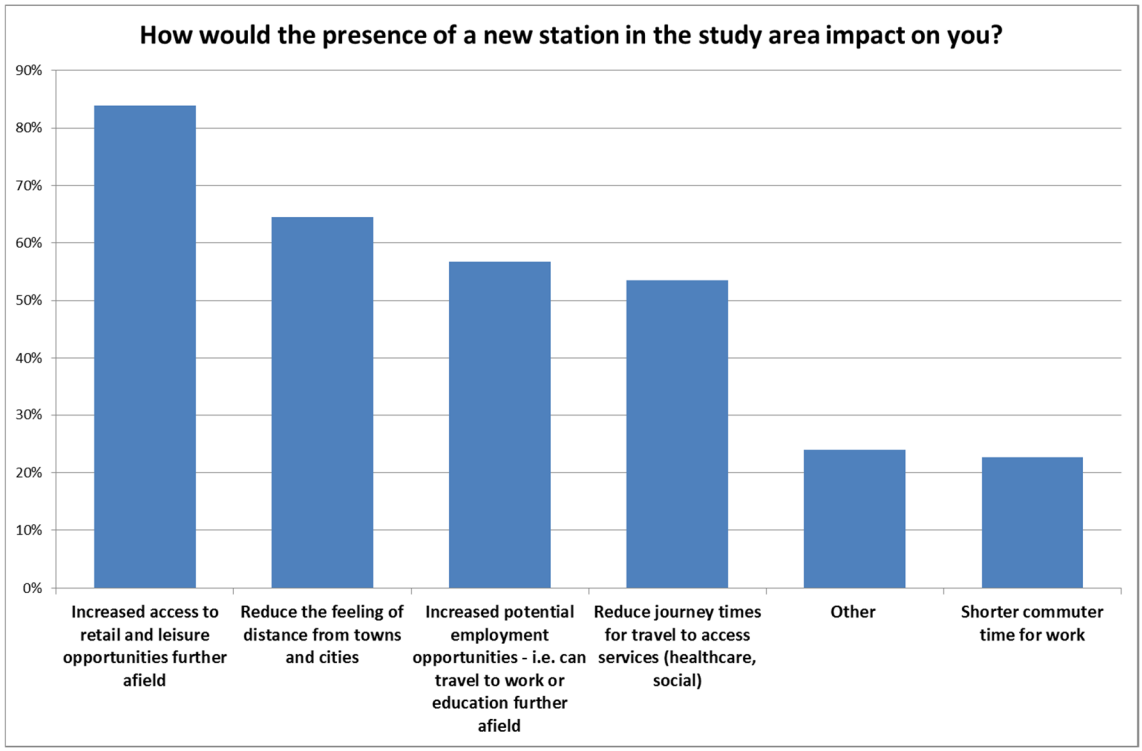

Figure A.13: Impacts of a new rail station in the study area

Active Travel

A.1.22 In total, 89 respondents identified themselves as people who regularly use active travel (walking and cycling).

A.1.23 All respondents were asked what the main barriers to using active modes of travel were. The most common response was that distances were too far to use active modes. This was suggested by (63%) (n=243). This type of answer is typical within a rural location. 'Concerns over safety 31%, 'Weather' 29%, and 'Lack of available walking and cycling routes' 23%, were also deemed as barriers to active travel. Barriers to walking and cycling can be seen in Figure A.14.

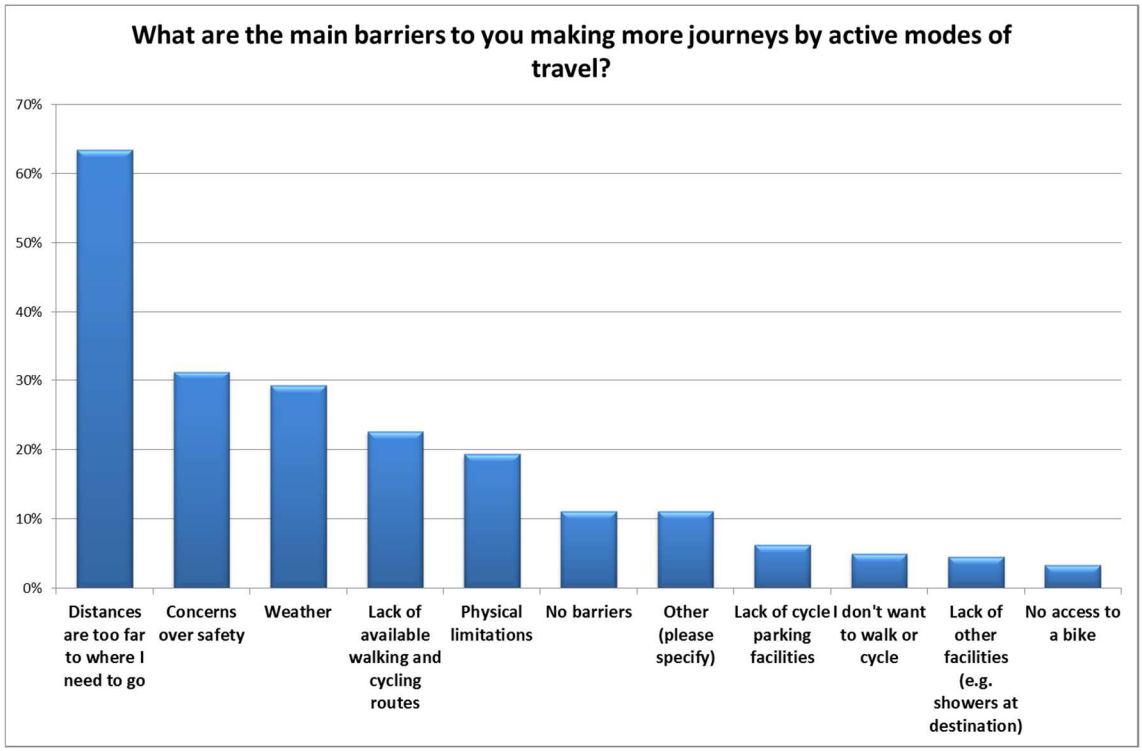

Figure A.14: Barriers to active travel

Suggested Interventions

A.1.24 Respondents were provided a list of mode specific interventions and asked to convey what sort of benefits each would have on them personally, should they be delivered. Interventions included the following:

- Road based improvements
- Additional/enhanced bus services
- Rail station at Thornhill with appropriate rail services;
- Rail station at Closeburn with appropriate rail services
- Improved walking and cycling facilities.

A.1.25 Figure A.15 shows that the public believe road and bus services will all provide strong benefits however, the respondents clearly believe the provision of a rail station at Thornhill will provide significant benefits, with 77% of those who answered the question (n=241) noting it would provide a major benefit. By comparison, only just over 40% of respondents believed a rail station at Closeburn would bring major benefit.

A.1.26 Road based improvements were judged to provide major benefits (63%, n=224), as were additional/enhanced bus services (63%, n=230). However, around a third of respondents thought a rail station at Closeburn (35%, n=221) and improved walking and cycling facilities (35% n=217) would bring only minor benefits.

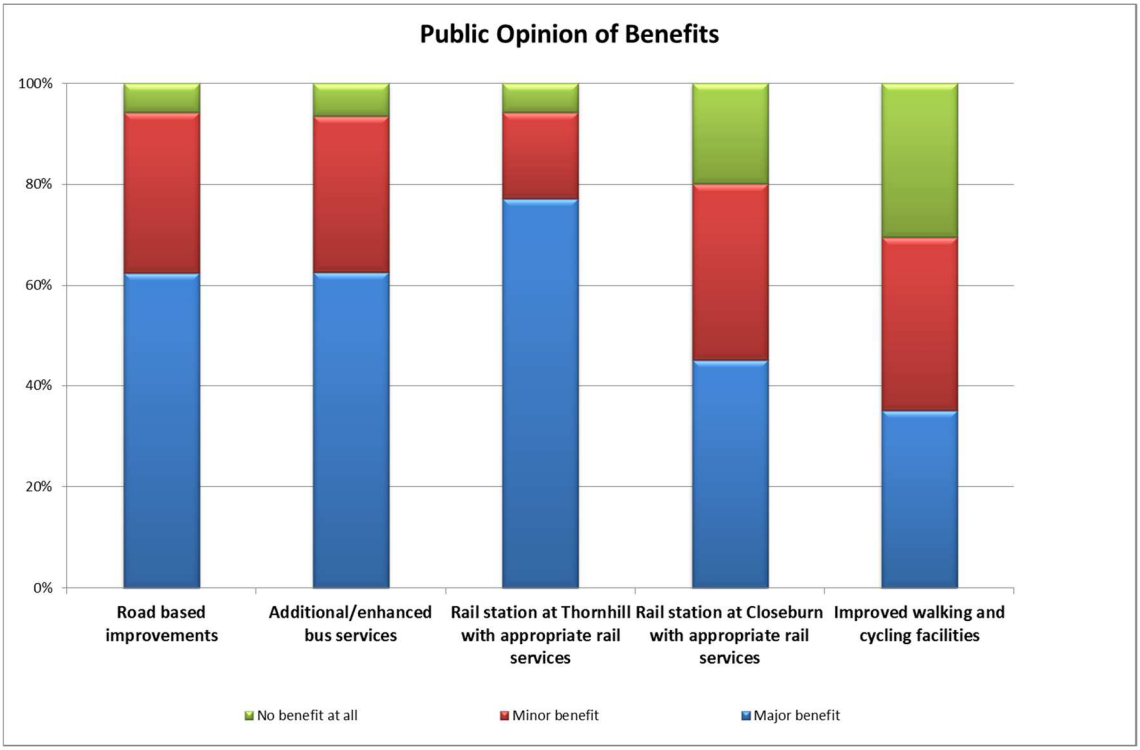

Figure A.15: Opinions on scale of benefits from mode based improvements

Open Responses

A.1.27 The survey also provided the opportunity for people to provide open comments. Many respondents used this section to call for the re-opening of the train station at Thornhill, citing the station would improve connectivity and mean passengers do not have to travel to Sanquhar or Dumfries to catch a service. Others indicated the economic benefits the station would bring for local businesses and increased tourism.

"A station at Thornhill, being equidistant from Sanquhar and Dumfries is an ideal option. Not just for leaving the area, in my case to work, but also for bringing visitors in."

A.1.28 A number of respondents commented that the cost of bus fares is prohibitive for some younger people and the current timetabling has a real impact on their ability to participate in activities outside of school.

"Just to emphasise the need to really try and join up strategies over rural exclusion, active schools and bus times, especially from Wallace Hall to the villages to the west of Thornhill, activities finish at 5pm and the last bus west is at 4.25pm therefore many pupils are excluded from sports and clubs at the Academy as they can't get home [without] parents etc. helping."

A.1.29 There were also comments about the removal of Sunday services and hence the lack of Sunday access to Moniaive, resulting in poor access, with negative impacts on the local community and local businesses.

A.1.30 Some respondents indicated they do not feel safe cycling in the Thornhill area, particularly the A76 ("unpleasantly dangerous"), and that measures to cater for walking and cycling would be welcome by restricting the speed limit beyond villages where there are houses and building cycle and walking pathways.

A.2 Bus Operators

Stagecoach

A.2.1 An initial meeting with Stagecoach West Scotland was held on the 27th April 2016.

A.2.2 Stagecoach operates the commercial Service 246 on the A76 which runs from Dumfries to Cumnock and passes through Thornhill. This used to be a tendered service but now operates commercially, and makes the journey at least hourly, with peak times receiving higher frequencies. Northern parts of the route, Sanquhar, Kirkconnel, Wanlockhead etc. are still subsidised.

A.2.3 The consultation highlighted:

- The main locations which people are trying to access from the study area are Dumfries, Cumnock, Kilmarnock and Ayr.
- One of the major flows of passengers is school children coming from Dumfries to go to school at the relatively prestigious Wallace Hall Academy in Thornhill.
- Despite the flows of school children etc. concessions still account for a large number of movements within the study area.
- There is anecdotal evidence of people travelling on buses from the Thornhill area to meet with and interchange onto the X74 service north.
- Stagecoach does not currently integrate the Service 246 timetable with the rail timetable at New Cumnock or Dumfries.
- Within the study area, there seem to be very regular road works on the A76 which can affect operations.
- The major issue which affects bus services in the area is **congestion within Dumfries town** centre itself which causes timetable delays and then knock on effects for bus services as they try to access, pass through and leave the town. Issues in Dumfries lead to problems of congestion and journey time reliability. Stagecoach believes it is more important to improve issues within Dumfries, which may include priority measures, than putting in interventions elsewhere.
- Stagecoach suggested there may be anecdotal evidence that people from the area want improved access to Edinburgh.

Local bus operators

A.2.4 Discussion with **SWestrans** highlighted their current subsidising of the operation of 51 timetabled local bus services. Recent budget cuts, seeing the overall subsidy available drop from £3.74m in 2015/16 to £3.40m in 2018/19, has led to the reduction of a number of services. Reductions were aimed at services with the lowest demand level at evenings and on Sunday's in order to minimise the impact to bus users. The on-going constrained budget for subsidised services is a key issue when considering option generation for this study.

A.2.5 Telephone consultation was undertaken with **Houston Coaches** on 25th April 2016. Houstons currently provide three services between Thornhill and Dumfries via a number of villages in the area as follows:

- Service 202
- Service 236

- Service 246

A.2.6 The discussion highlighted:

- Dumfries is the main destination of passengers from Thornhill. There was not perceived to be demand for services to other locations for which there is not already a service operating.
- SWestrans has cut the evening services of the 236 as a result of low patronage. This was felt to be acceptable as demand was very low.
- Patronage on the services is felt to be relatively high during the day. Outside of the peaks the service is well used by older people, most of whom are travelling into Dumfries to access shopping and other services.
- Before 8am and after 5pm the runs are busy with people travelling to and from employment.
- The bus stops in Thornhill were felt to be of a reasonable standard, with no requirement for improvements. Outside of Thornhill, the buses often pick up on a hail and ride basis so stops are less of an issue.
- There are no issues with congestion along the route except in Dumfries (particularly acute at Whitesands). This congestion can delay the service but is not a big issue as passengers are understanding of the issue.
- There may be potential for a Park & Ride site on the Lockerbie side of Dumfries. However, a Park & Ride would not be successful unless there was an associated package of measures to reduce car travel into Dumfries centre. The feeling was that people would rather sit in a traffic queue in their own cars than be on the bus. It would be difficult to provide bus lanes as the routes are narrow.
- In terms of access to rail stations, Service 236 goes quite close to Dumfries Rail Station (approximately a ten-minute walk) and Service 202 directly serves the station. It was felt that the service would be used by people accessing the station although no figures were available as to the potential number doing so.
- There was **no perception that there was demand for any improvement in the frequency of the services or extension of the operating day**. It was suggested that there would be a lack of demand for the services if such changes were made and additional subsidy would be required.
- In general, **Thornhill was felt to have a reasonably good bus service** which works well for the community with no major issues or problems.

A.2.7 Telephone consultation was undertaken with **James Robertson** on 24th May 2016. James Robertson Coaches currently provide one service within the vicinity of Thornhill as follows:

- Service 212

A.2.8 The discussion highlighted:

- Patronage on the route is reasonable with approximately 800 passengers carried per month.
- The service is used by people shopping and to access both employment and education, with no particular dominant destination i.e. people travel both ways on the route.

- There is a reduced Saturday service (which runs at around 80% of the weekday service) and no Sunday service. However, patronage is lower on the weekends and the current provision is felt to be adequate for the demand.

- In terms of connectivity to areas outside of Dumfries and Galloway, connections were felt to be adequate with the Service 212 timetable aligning reasonably well with onward connections from Thornhill.

- There are no problems with capacity or congestion on the route.

- While Service 212 does not connect to the rail stations there are a number of bus services which do, and this was not felt to be a problem.

- In general, for a town of its size Thornhill is felt to have a good bus service, with no specific problems reported.

A.2.9 A telephone consultation was undertaken with Brownriggs Coaches on 24th May 2016. Brownriggs currently provide one service within the vicinity of Thornhill as follows:

- Service 221 - Wanlockhead - Sanquhar – Kirkconnel

A.2.10 The service is primarily run by Stagecoach with Brownriggs running one morning and one afternoon return service Monday – Saturday from their base in Thornhill. The route initially ran from Wanlockhead to Sanquhar, with the link to Kirkconnel which runs as part of the morning service only being recently added.

A.2.11 Brownriggs previously operated Service 202 (Dumfries – Dunscore – Moniaive – Thornhill) but that route is now operated by Houstons. The company also previously operated Service 224 (Leadhills – Wanlockhead – Thornhill – Dumfries). This service ran once per month but was removed as part of funding cutbacks.

A.2.12 The discussion highlighted:

- Patronage on the 221 is not particularly high as the service only operates twice a day. However, there has been a very slight increase in patronage on the service since the removal of service 224.

- The service is primarily used by children attending Sanquhar Academy.

- Demand on Service 213 is felt to not be sufficiently high to warrant the current specification of the bus service. The route is currently covered by two buses and two drivers and this is felt to be excessive.

- Service 213 connects to Dumfries. However, it was felt that this connection may not be necessary. Service 246 provides the primary connection to the town, with the 213 seen as a feeder service for this route. If the timetables for the two services were better coordinated it was felt that Service 213 would no longer need to connect to Dumfries. A more coordinated approach to the provision of routes which takes a whole picture view is required.

- As with the other SWestans operated services, the Service 213 only operates Monday – Friday. However, it is felt that there may be demand for the service on a Saturday.

- While there are bus services which directly connect Thornhill to the rail stations in Dumfries and Sanquhar, the timetables for the buses are not necessarily aligned with the rail timetable, with the result that passengers may have to wait at the rail stations. There is a danger that providing better links to the rail stations would encourage passengers to travel by rail rather than bus, detracting from the bus market.

- Bus stop infrastructure is generally of a good standard and there are no issues in this regard.
- There has always been an issue with getting in and out of Dumfries at peak times. This is a result of the volume of traffic entering and exiting the city. While bus lanes would be advantageous in this respect there is limited road space for such provision.
- In general, Thornhill was felt to have a reasonably good bus service for a town of its size which works well for the community with no major issues or problems identified by the public.

A.3 Thornhill and District Community Transport

A.3.1 Repeated attempts were made to contact **Thornhill and District Community Transport** but they were unable to be reached for comment.

A.4 Transport Scotland

A.4.1 A meeting with Transport Scotland was held on 16th March 2016. Transport Scotland explained that they would need to see the outcome of the STAG Case for Change before they would be able to consider any transport proposals and provide comment. A discussion was held with Transport Scotland on 22 November 2018 to discuss their comments on the report overall. Cognisance of Transport Scotland's comments has been undertaken in the development of this report.

A.5 Rail Operators

Network Rail

A.5.1 A meeting with a representative from Network Rail was held on 27th May 2016. A number of general comments (which apply to the more detailed stages of the STAG appraisal) were noted as follows:

- Where new stations are proposed, the full STAG appraisal should include: a detailed analysis of capacity on the entire route; the timetable on the entire route; a costing exercise for construction of a new station; and costing for all mitigation measures (with the latter considered in collaboration with Network Rail and other stakeholders);
- It was noted that the effect of providing a new station on the wider rail network and the associated mitigation costs are often given insufficient consideration in appraisals; and
- In the first instance only suitably, accessible stations should be considered with 'low cost' stations such as Conon Bridge (which did not meet all modern standards in terms of accessibility and provisions) to be avoided.

A.5.2 With respect to Thornhill specifically, the following was noted:

- Accessibility to a new station at either Thornhill or Closeburn could be an issue;
- It was noted that this section of the GSWL has 'closed boxes' meaning that infrastructure improvements or more signallers would likely be required in order to deliver a new station;
- There may be issues with gradient in and around Thornhill which could have knock on effects on the timetable, particularly for freight trains;
- The GSWL is a diversionary route for the WCML which means that capacity has to be available for this purpose; and

- The freight industry has recently been working with Network Rail to use the GSWL rather than the West Coast Main Line (WCML) for freight purposes in order to provide more capacity on the mainline.

Scotrail

A.5.3 A meeting with a representative from ScotRail was held on 29th April 2016. It was noted that:

- At the moment, ScotRail is focussed on the existing commitments providing station expansions and redevelopments including at the following areas: Perth, Stirling, Motherwell and Aberdeen.

- Whilst ScotRail does get involved with Network Rail and Transport Scotland regarding discussions on moving potential new stations forward, it is not ScotRail's role to identify and pursue new stations. ScotRail take guidance from the priorities set by Transport Scotland. ScotRail does suggest additional projects to Transport Scotland, but generally not in terms of new stations. Projects that ScotRail identify and suggest will often be at existing stations which it can further develop. Enhancements to parking stock being a key example. At present, the majority of activity is focussed on the North East and Inverness region.

A.5.4 It should be noted that ScotRail explicitly said it is not their role to judge station viability but have noted a number of concerns with a potential station at Thornhill, including:

- General concerns about the population of the catchment area;

- Siting a station east or south of Thornhill would weaken any argument for a rail station;

- This section of rail line is a diversionary route for the WCML. As such there is a requirement to provide train paths as and when necessary. This was an important route over the winter 2015/16 as the WCML had to be closed due to storm damage.

Appendix B Transport Supply and Trends

B.1 Existing Bus Services

B.1.1 The existing services to/from the Thornhill study area include:

- **Service 101/102/200 Dumfries - Thornhill/Moffat – Edinburgh (Stagecoach West Scotland / DG Buses) -** there is one daily departure (Monday to Saturday) from Dumfries to Edinburgh via Thornhill of services 101/102/200 (departing Dumfries at 0911) and one departure from Edinburgh to Dumfries via Thornhill (departing Edinburgh at 1720). Only one service in each direction on a Sunday. The journey time between Edinburgh and Thornhill is 150 minutes and between Dumfries and Thornhill is 25 minutes.

- **Service 202 Dumfries - Dunscore - Moniaive – Thornhill (Houston's Coaches) -** Service 202 connects Dumfries to Thornhill via Moniaive on Monday - Saturday. There are:

  - Two services daily connecting Dumfries Rail Station to Moniaive and a further 4 services connecting Dumfries (from other town locations) with Moniaive. These services connect with Service 212 in Moniaive for onward travel to Thornhill;

  - Two services per day from Dumfries (Whitesands) direct to Thornhill (at 1555 and 1750) and one service from Thornhill to Dumfries (departing at 0715). No Sunday service;

  - Three services daily connecting Moniaive to Dumfries Rail Station and a further 2 services connecting Moniaive with Dumfries (from other town locations). These services connect with Service 212 from Thornhill;

  - One service per day from Thornhill direct to Dumfries (Rail Station) (at 0715) and No Sunday service; and

  - No Sunday services

- **Service 212 Moniaive - Tynron - Keir Mill – Thornhill (James Robertson) -** Service 212 connects Moniaive to Thornhill, with three services from Moniaive to Thornhill Monday – Friday (departing Moniaive at 0935 and 1125 and 1315) and three services daily from Thornhill to Moniaive (departing Thornhill at 1240, 1410 and 1625). On a Saturday, there is a reduction in frequency with one less service in each direction (the 1315 from Moniaive and the 1240 from Thornhill not running). Journey times is 30 minutes.

- **Service 213 Thornhill - Gatelawbridge - Park – Dumfries (DG Buses) -** Service 213 connects Thornhill with Dumfries, with four departures in each direction Monday to Friday and a journey time of approximately 45 minutes.

- **Service 236 Dumfries - Kirkton - Auldgirth – Thornhill (Stagecoach West Scotland / Houstons Coaches) -** there are nine services a day from Dumfries, with the first and last services departing Dumfries, Whitesands at 0645 and 1745 respectively. In the reverse direction there are eight services per day, with the first and last service departing Penpont at 0745 and Thornhill at 0752 and 1855. The journey time is approximately 30-40 minutes. Two services operate on Sunday from Dumfries, with one service to Dumfries. Note that no Sunday services call at Penpont – with Thornhill the first/last calling point.

- **Service 246 Dumfries - Thornhill - Cumnock – Ayr (Stagecoach West Scotland / Houstons Coaches) -** there are 13 services a day (Monday to Saturday) between Dumfries and Thornhill, with seven of these travelling onto Cumnock and Ayr. The journey time between Dumfries and Thornhill is approximately 25 minutes and the journey time between Thornhill and Ayr is approximately 130 minutes.

B.1.2 In addition to the above timetabled services, Thornhill and District Community Transport offer a range of community transport services including group individual transport services for those who have difficulty using conventional bus routes. While at present there are no demand responsive transport (DRT) services, Dumfries and Galloway Council is currently in the process of examining provision and demand for such services across the local authority area.

B.2 Existing Train Services

B.2.1 Table B.1 shows the typical journey times and adult fares from Sanquhar and Dumfries to a range of destinations.

Table B.1: Approximate Journey Times and Typical Fares

From	To	Approximate Journey Time (minutes)	Anytime single	Anytime return	Off-peak return
Sanquhar	Dumfries	27	£5.80	£10.00	£7.10
	Carlisle	65	£12.00	£20.30	£16.70
	Kilmarnock	40	£10.60	£13.50	10.70
	Glasgow	80	£14.40	£24.30	£19.70
	Newcastle	160	£33.30	£52.70	£43.00
	Ayr	150	£10.60	£13.50	£10.50
Dumfries	Sanquhar	26	£5.80	£10.00	£7.10
	Carlisle	40	£11.80	£19.10	£15.70
	Kilmarnock	65	£17.30	£26.40	£21.70
	Glasgow	115	£17.60	£34.90	£21.70
	Newcastle	130	£22.70	£52.70	£43.00
	Ayr	100	£18.90	£28.60	£23.30

B.3 Public Transport Benchmarking

B.3.1 Table B.2 compares the number of buses / trains and the average journey time to key destinations from Thornhill and a number of other towns in Dumfries and Galloway.

Table B.2: Public Transport Benchmarking

		Thornhill	Lockerbie	Sanquhar	Castle Douglas
Rail Station		No	Yes	Yes	No
Public Transport Mode Share		3%	4%	3%	5%
To Glasgow (Weekday) Number of:	Bus	0	1	0	0
	Trains	0	10	10	0
To Edinburgh (Weekday) Number of:	Bus	1	0	0	0
	Trains	0	6	0	0
To Dumfries (Weekday) Number of:	Bus	37	29	9	25
	Trains	0	0	11	0
To Carlisle (Weekday) Number of:	Bus	0	4	0	1
	Trains	0	17	10	0
To Glasgow Average Journey Time:	Bus	0	80	0	0
	Trains	0	62	78	0
To Edinburgh Average Journey Time:	Bus	159	0	0	0
	Trains	0	67	0	0
To Dumfries Average Journey Time:	Bus	29	35	45	34
	Trains	0	0	27	0
To Carlisle Average Journey Time:	Bus	0	80	0	70
	Trains	0	23	65	0

B.4 Census Travel-to-Work

B.4.1 The travel-to-work analysis below makes use of 2011 Census data for Scotland at Output Area level for the mode of travel to work and at Intermediate Geography level for the distribution of travel to work patterns (as explained in Appendix D of this report). Figure B.1 shows the main mode used for travel-to-work for the Thornhill study area residents.

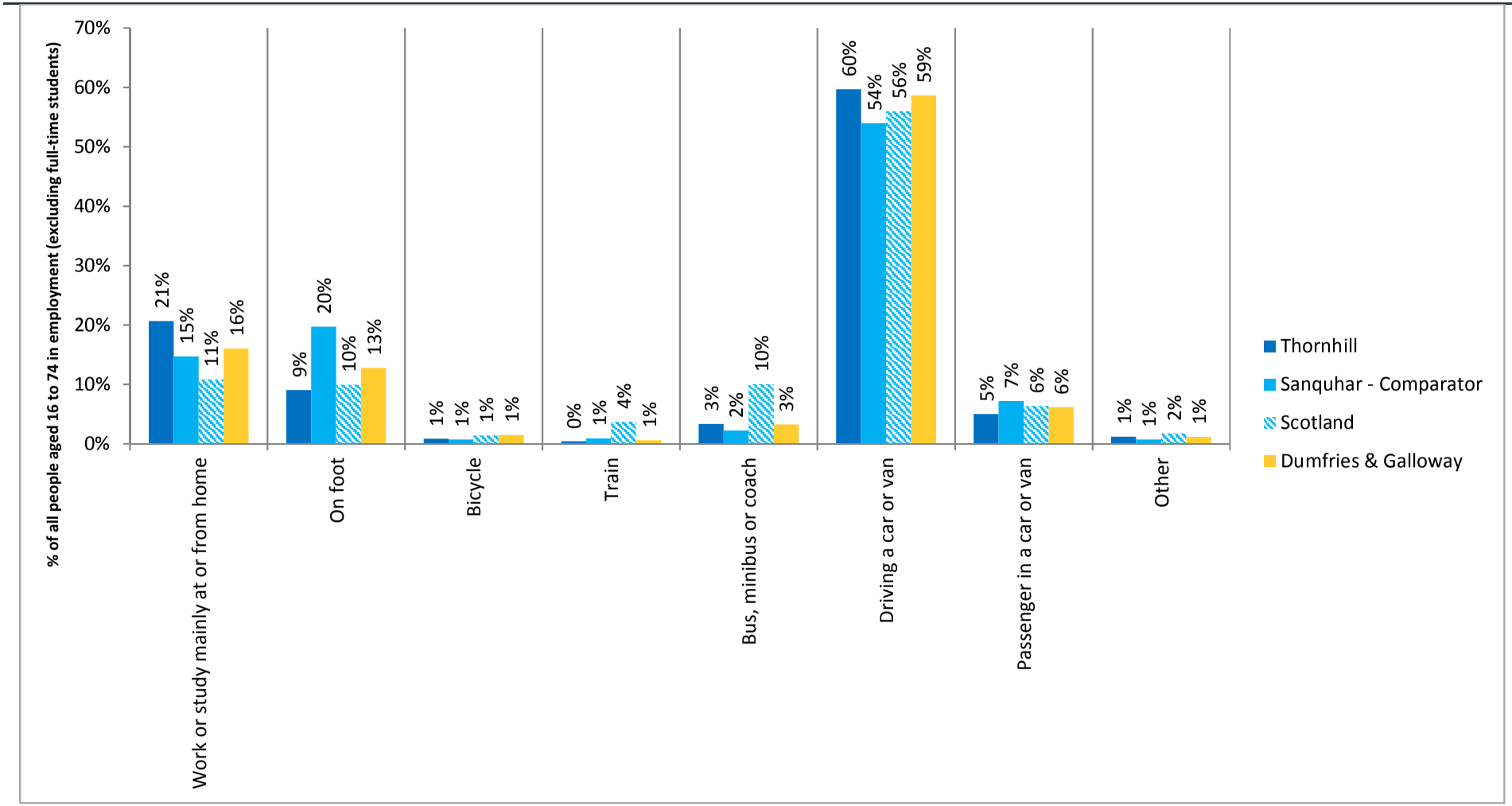

Figure B.1: Method of Travel-to-Work (Source: Census 2011)

B.4.2 Table B.3 shows the main work destinations for people living in the study area. Key points are:

- the majority of those who live in Thornhill work in other towns within the Dumfries and Galloway local authority;
- the residents from Thornhill mainly commute to Mid Nithsdale (774 people), Nithside and Nunholm (324) and Dumfries South (236 people) in Dumfries and Galloway;
- the proportion of residents who commute to either Glasgow or Edinburgh is very low;
- the proportion of residents working at or from home is rather high at 18%.

Table B.3: Distribution of Travel-to-Work Patterns – Main Work Destinations (Source: Census 2011)

Work Destination	Thornhill (Residence)	
	Number	%
Dumfries and Galloway	2108	65%
Working at home	596	18%
No fixed place of work	382	12%
Carlisle	22	1%
Glasgow City	18	1%
Other	102	3%

B.4.3 Figure B.2 constitutes the graphic representation of the figures included Table B.3 and reinforces the idea that residents in the study area mostly commute locally.

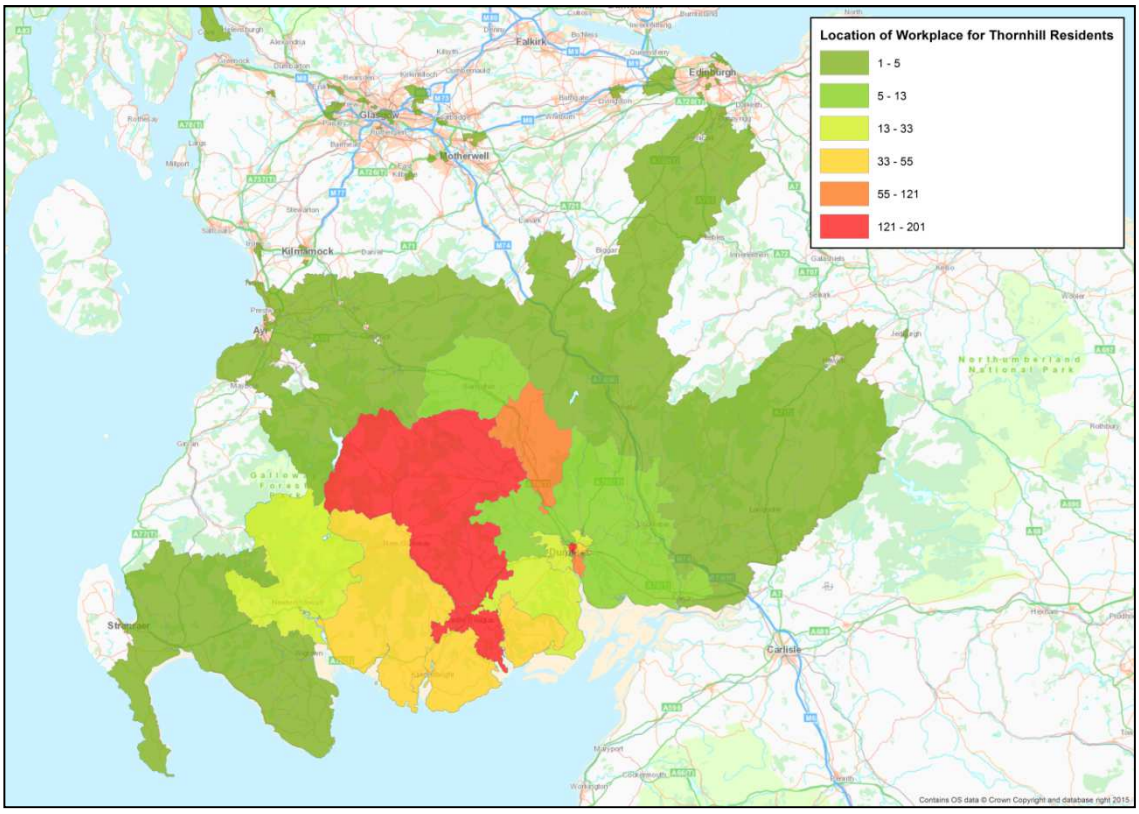

Figure B.2: Distribution of Travel-to-Work patterns – Main Work Destinations (Source: Census 2011)

B.4.4 Table B.4 displays the main places of residence for people working in Thornhill. Key points are:

- The majority of people who work in Thornhill live in other towns within Dumfries and Galloway; the top three areas are Mid Nithsdale (419 people), Crocketford and Carsphairn (296 people) and Upper Nithsdale (82 people);
- Of the total people working in Thornhill, the proportion commuting from outside Dumfries and Galloway is only 4%.

Table B.4: Distribution of Travel-to-Work Patterns – Main Places of Residence (Source: Census 2011)

	Thornhill (Workplace)	% (Workplace)
Dumfries and Galloway	834	97%
East Ayrshire	8	1%
South Lanarkshire	6	1%
Aberdeenshire	5	1%
North Lanarkshire	2	0.2%
Other	4	0.5%

Appendix C Accessibility Baselining

C.1 Car Drive Time Accessibility

C.1.1 Experian UK data was used to calculate car drive time accessibility for the study area. Figure C.1 illustrates car drive times in the AM peak period (0700-0959) from a central point in Thornhill. The isochrones indicate the differing drive times in five minute bands from 5 minutes to 30 minutes, which was chosen as the upmost value someone would drive to use a potential rail station at this location.

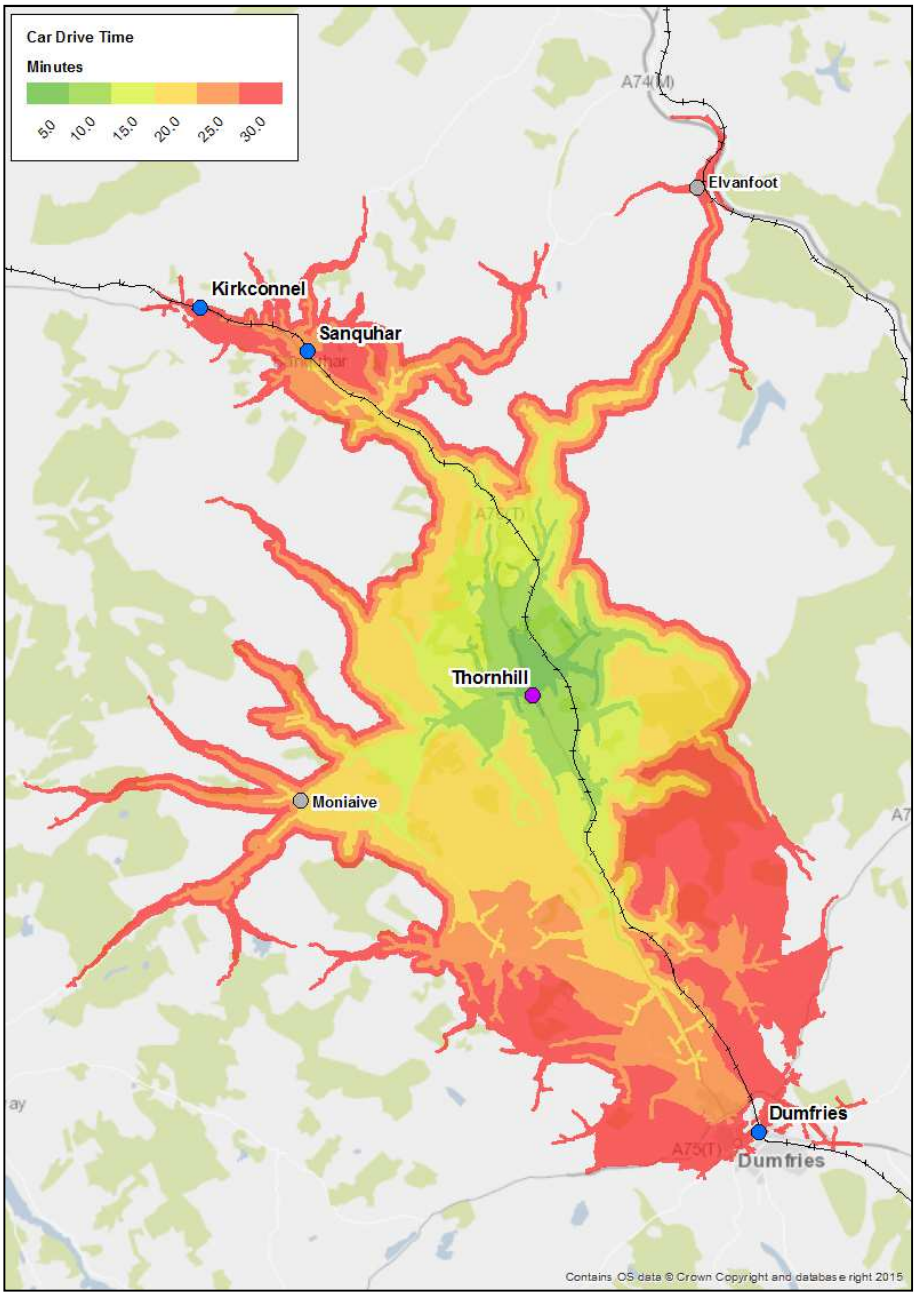

Figure C.1: Car Drive Times in the AM Peak Period (0700-0959)

C.1.2 Figure C.2 highlights the potential population catchment within each of these five-minute time bands. The numbers produced are based on 2011 census population data and represent total population. Each person in the figure represents 1,000 people.

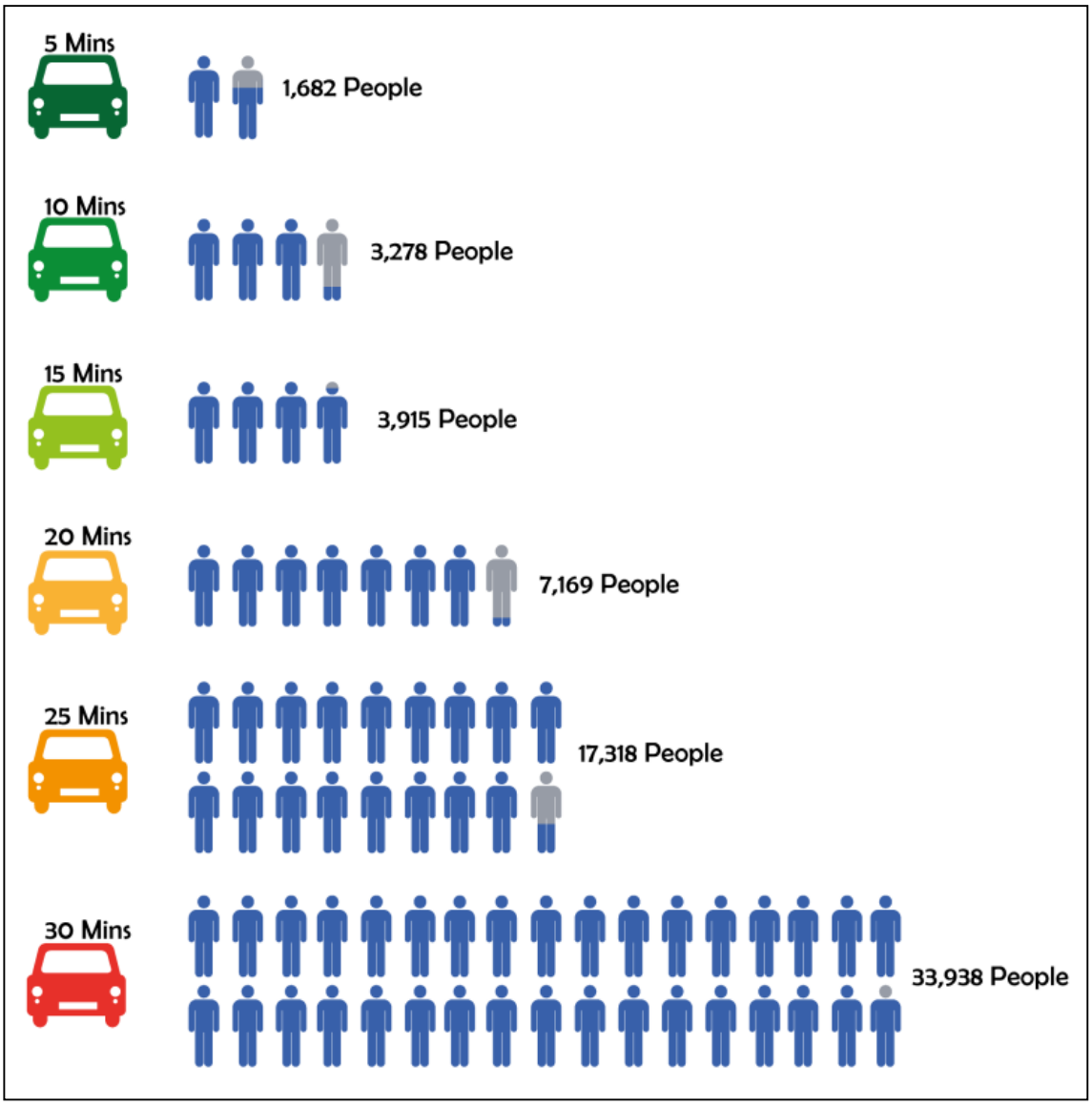

Figure C.2: Population Catchment in Five Minute Time Bands

C.2 Public Transport Accessibility

C.2.1 TRACC software can be used to map the public transport accessibility of a settlement. It takes account of timetables in their entirety, including frequency, length of operating day and interchange times. However, it does not account for walk times to bus stops / rail stations or the quality / reliability of the services.

C.2.2 Figure C.3 shows the output from TRACC Accessibility software which shows how far people can travel using the current public transport services from Thornhill in the AM Peak (0700-0959).

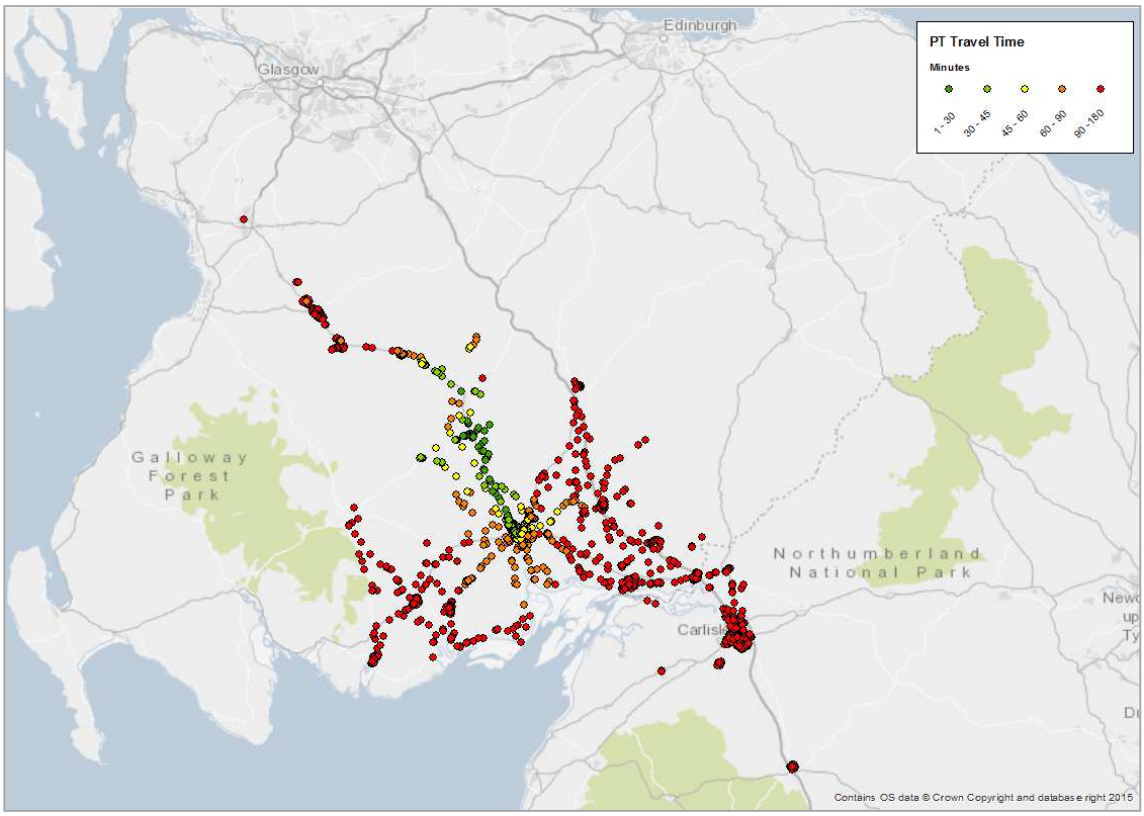

Figure C.3: Public Transport Accessibility - AM Peak

C.2.3 Figure C.3 demonstrates that:

- Travel is mainly restricted to a narrow corridor along the A76 and railway line, before branching out slightly further around the Dumfries area.
- Travel east and west is constrained heavily with a journey time of over 100 minutes to reach Castle Douglas in the west and Lockerbie in the east.
- Carlisle in the south can be reached in just over 2 hours as a result of interchange between bus and rail in Dumfries.

C.2.4 Travel times in the AM Peak are further highlighted in Figure C.4 which sets out the travel time by public transport from Thornhill in the AM Peak to each of the 5 main settlements in the local area.

C.2.5 As is common in these rural areas many of the smaller settlements are connected by rural buses which serve multiple locations in one service, which explains slightly large journey times. Further locations such as Kilmarnock and Carlisle are dependent on rail travel and thus require an interchange the local bus service in either Sanquhar for Kilmarnock or Dumfries for Carlisle. This need for interchange again explains the long journey times to these locations, shown in Figure C.4.

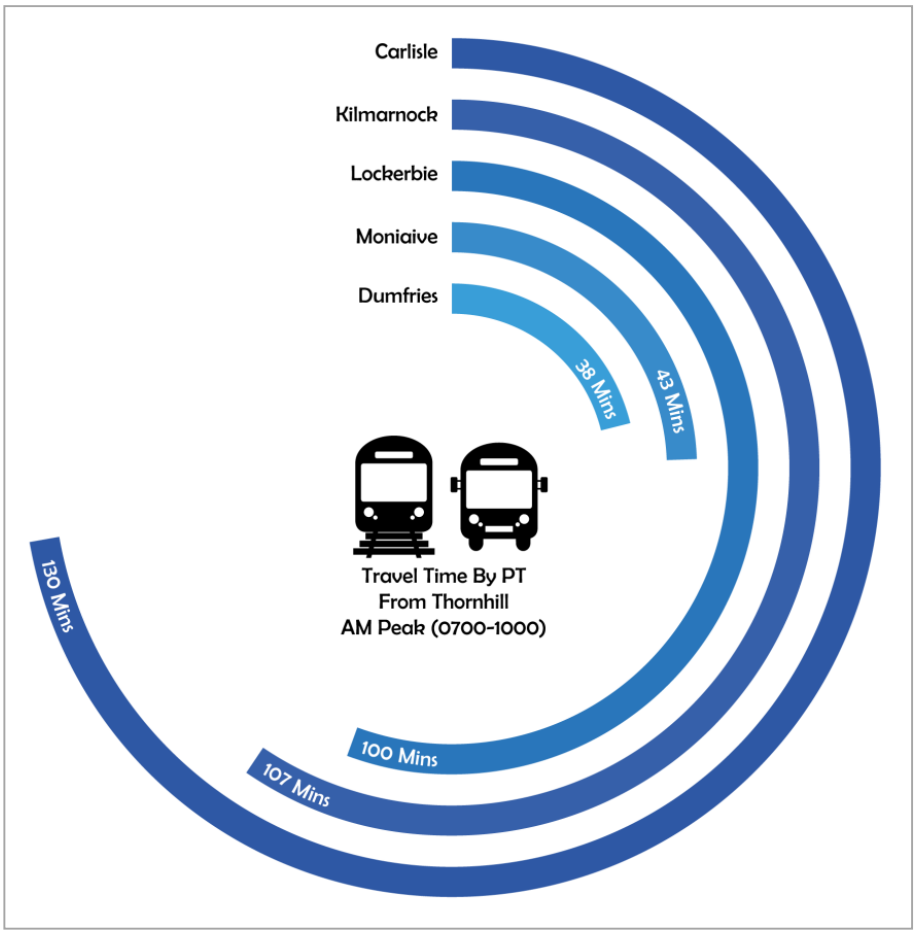

Figure C.4: Public Transport Accessibility – AM Peak - Travel times

C.2.6 Figure C.5 shows how far people can travel using the current public transport services to Thornhill in the PM Peak (1600-1900).

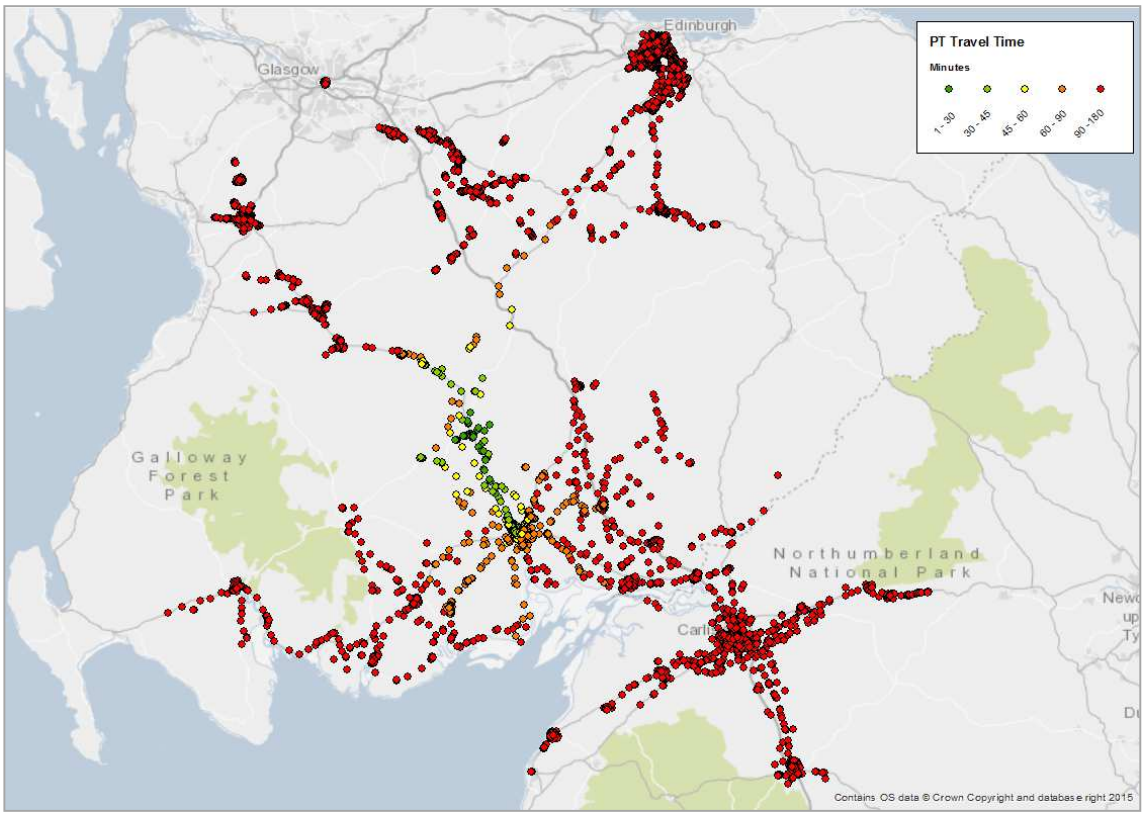

Figure C.5: Public Transport Accessibility - PM Peak

C.2.7 Figure C.5 demonstrates that:

- Thornhill can be reached in the PM peak from a much larger catchment of areas, such as Glasgow and Edinburgh. This is due to the timetable times of services for both rail for Glasgow and bus for Edinburgh. Although these areas can reach Thornhill within 3 hours, they require interchanges between rail and bus for Glasgow and bus and bus for Edinburgh.

- Travel from Motherwell to Thornhill can also be completed within 3 hours due to the Virgin rail services that stop both at Motherwell and Lockerbie.

C.2.8 Travel times in the PM Peak are further highlighted in Figure C.6 with the figure setting out the travel time by public transport to Thornhill in the PM Peak from the 5 main settlements in the local area. As can be seen in Figure C.6, travel times from these locations to Thornhill remain fairly consistent with AM travel times, with the exception of Kilmarnock and Carlisle which switch places.

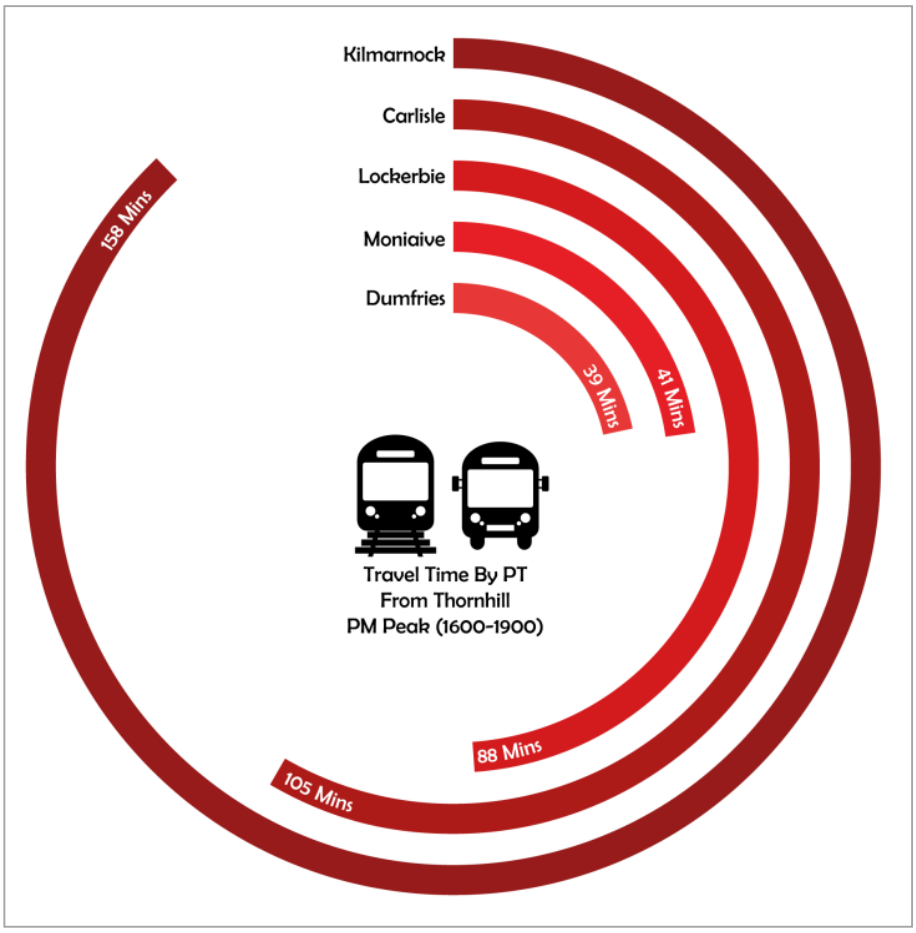

Figure C.6: Public Transport Accessibility – PM Peak - Travel times

C.3 Public Transport vs. Private Car Travel Times

C.3.1 Table C.1 shows a comparison of approximate public transport travel times compared to that of the private car and shows, in most cases, the much longer public transport times compared to travel time by car. Note that the travel times are taken in uncongested conditions for the car and for public transport takes the fastest journey time possible over the entire day without any inclusion of walk or wait time at bus/rail stops at journey origin.

Table C.1: Approximate Public Transport vs. Private Car Journey Times

	Travel Time To (minutes)							
	Dumfries		Cumnock		Edinburgh		Glasgow	
From	Car	Public Transport	Car	Public Transport	Car	Public Transport	Car	Public Transport
Thornhill	25	25	45	80	100	140	65	120
Moniaive	30	33	60	115	120	150	80	160

C.4 Access to Employment - Hansen Indicators

C.4.1 An important consideration is access to the jobs market. Fast, frequent and reliable connectivity to employment is of considerable importance to the study area. Such accessibility can be

modelled using what are known as 'Hansen Indicators', which provide a measure of accessibility from one datazone to all other datazones, weighted by the number of jobs in each, with high scores indicating good accessibility and low scores suggesting there is poor accessibility to jobs.

C.4.2 Figure C.7 shows the Hansen related accessibility indicators for Thornhill. In developing this indicator, accessibility was measured from the settlement to all datazones within the Dumfries and Galloway local authority boundary. Areas in dark red have the poorest accessibility to the jobs, progressively improving through to the green areas, which have the best accessibility.

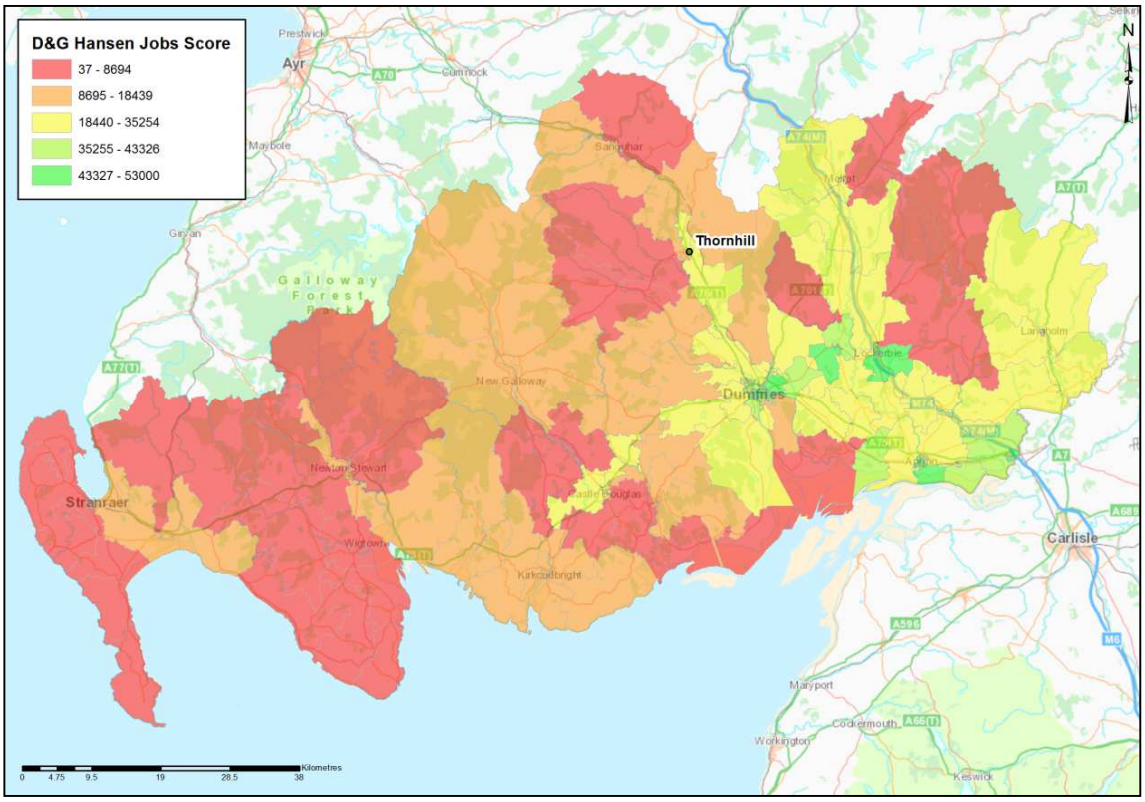

Figure C.7: Hansen Accessibility Indicators for the Thornhill Study Area

Appendix D Socio-Economic Data Analysis

D.1.1 To support the identification of problems and opportunities, and recognising that transport is a critical enabler of economic development and regeneration, a key step in the process of identifying problems and opportunities was to review the socio-economic profile of Thornhill. The review considered the socio-economic profile of the study area considering key issues such as population, the labour market, deprivation and property.

D.1.2 The guidance is clear that the resource invested in STAG appraisals should be proportionate to the size of the study area and schemes in question. The analysis undertaken has been based on a review of the relevant secondary data sources and attempts to draw out the main points of relevance rather than provide an exhaustive review of every area. The data for Thornhill is set against the local authority and national averages. In addition, for comparison purposes, data is also provided for Sanquhar, the closest town to Thornhill with an existing rail station.

Data Geography

D.1.3 Due to the need to provide complete anonymity when reporting socio-economic data, the various datasets used in this chapter are only made available at specific geographic levels, as shown in Figure D.1.

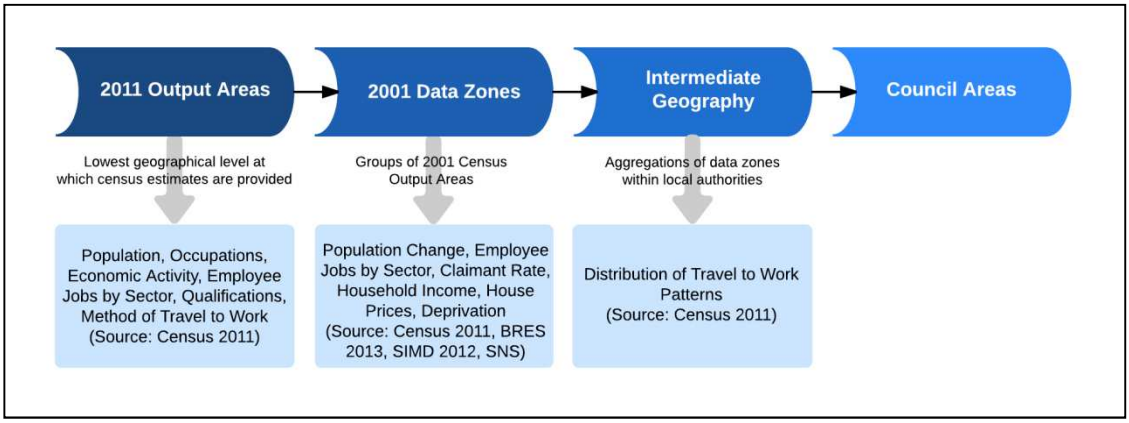

Figure D.1: Data Used for Analysis by Different Geographic Levels

D.1.4 Figure D.2, Figure D.3, and Figure D.4 show the geographic area covered by each of the above geographic levels for both the study area and Sanquhar. As shown, while the output area and datazone level boundaries are comparable, the intermediate zone level (the lowest level at which origin destination travel to work data is available), covers a much larger area, with one zone extending to Lamloch in the west and Springholm in the south. This will introduce a bias in the data which should be borne in mind when interpreting the results.

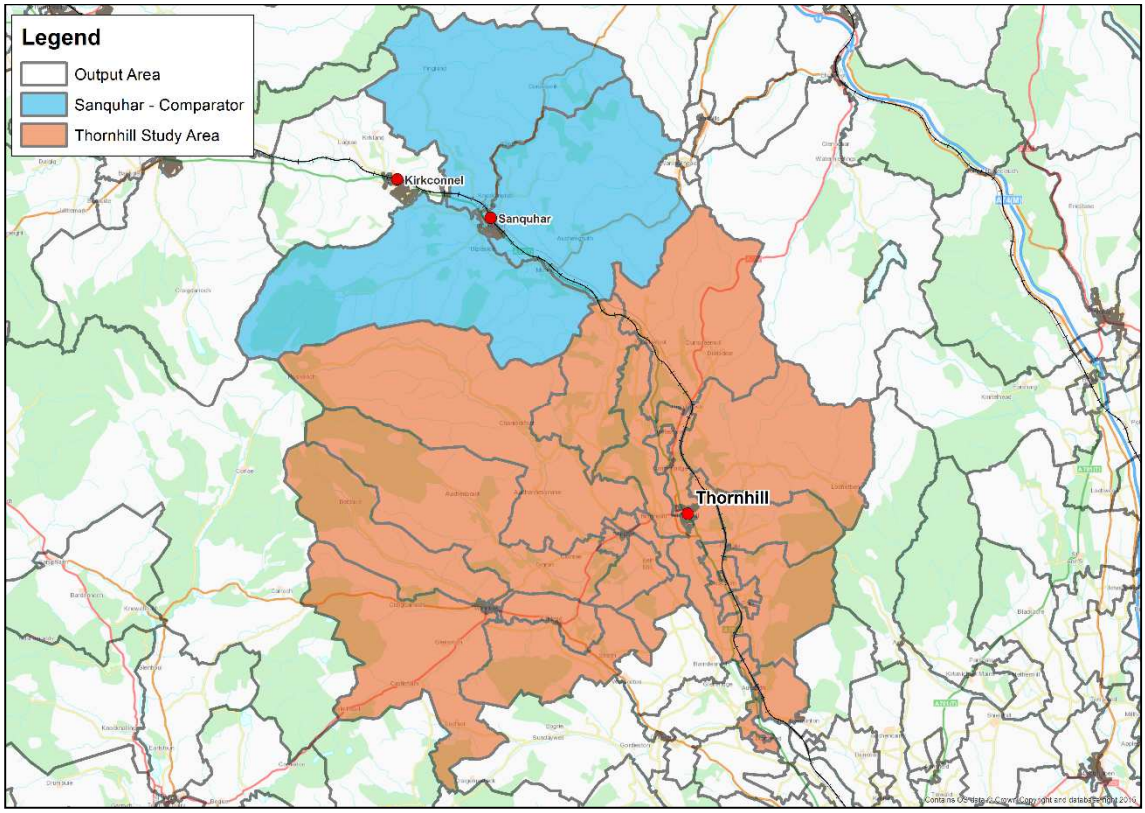

Figure D.2: Study Area and Sanquhar Output Area Boundaries

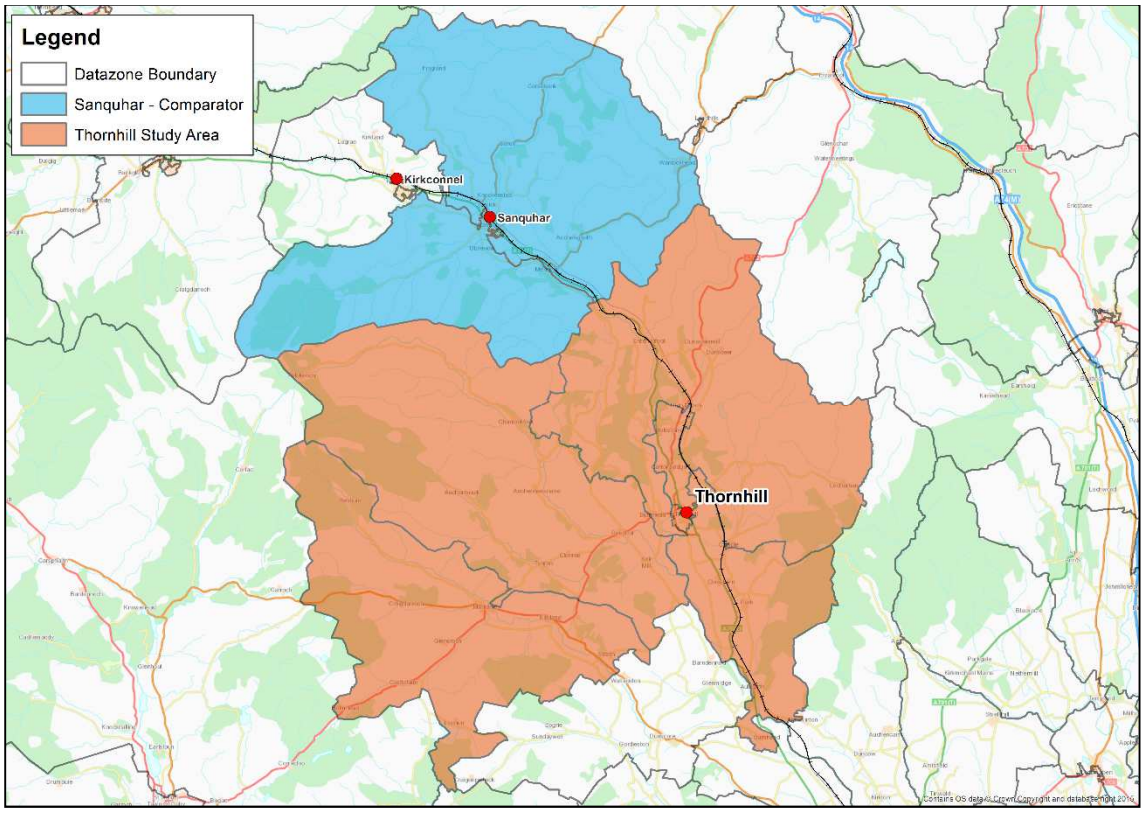

Figure D.3: Study Area and Sanquhar Datazone Boundaries

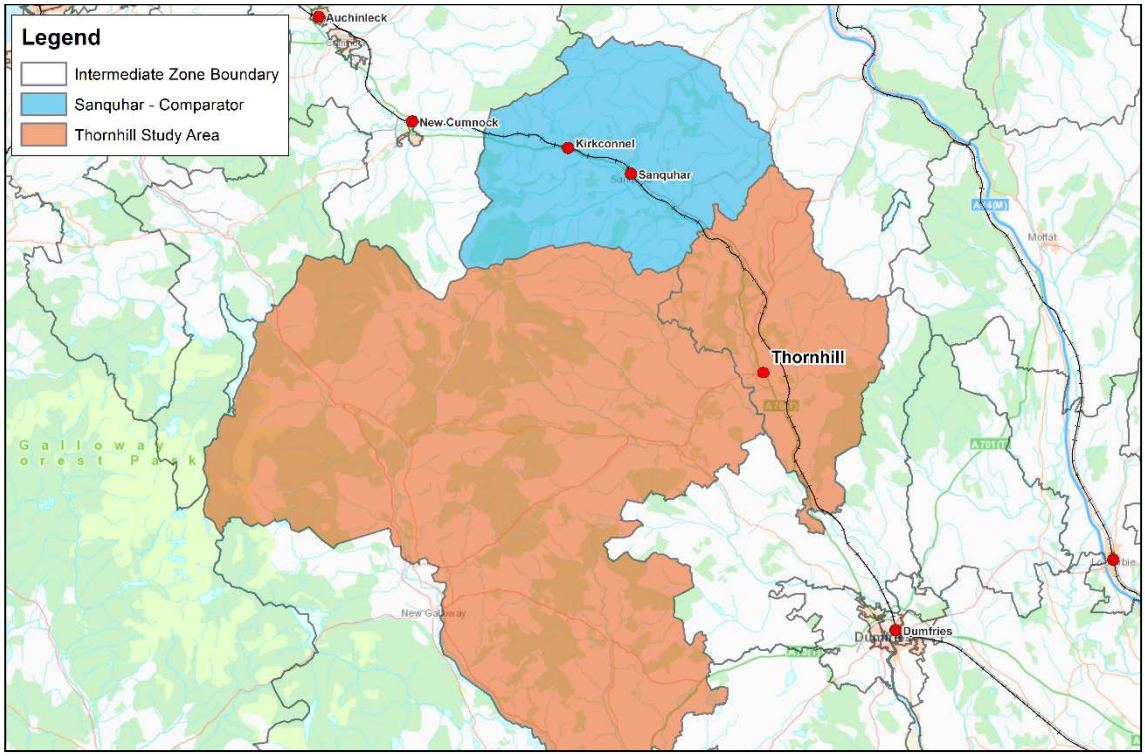

Figure D.4: Study Area and Sanquhar Intermediate Zone Boundaries

D.2 Population

D.2.1 Population trend is often seen as a barometer of the economic health and attractiveness of an area. Areas with a stable or growing working age population are often seen to be in better economic health than those with a declining and / or ageing populace.

Overall Population

D.2.2 The population of the Thornhill study area is 5,287 according to the 2011 Census, which represents 3.5% of the total population of the Dumfries and Galloway local authority area.

D.2.3 Figure D.5 shows the change in population of the Thornhill study area over the period 2002-2013 as well as that of Dumfries and Galloway and Scotland as a whole. Overall, the population of the study area increased by 3% over this period compared to a 2% increase in Dumfries and Galloway and a 5% increase across Scotland as a whole. However, as shown in Figure D.5, in line with a wider trend across the local authority area, there has been a slight levelling off of population in the most recent period.

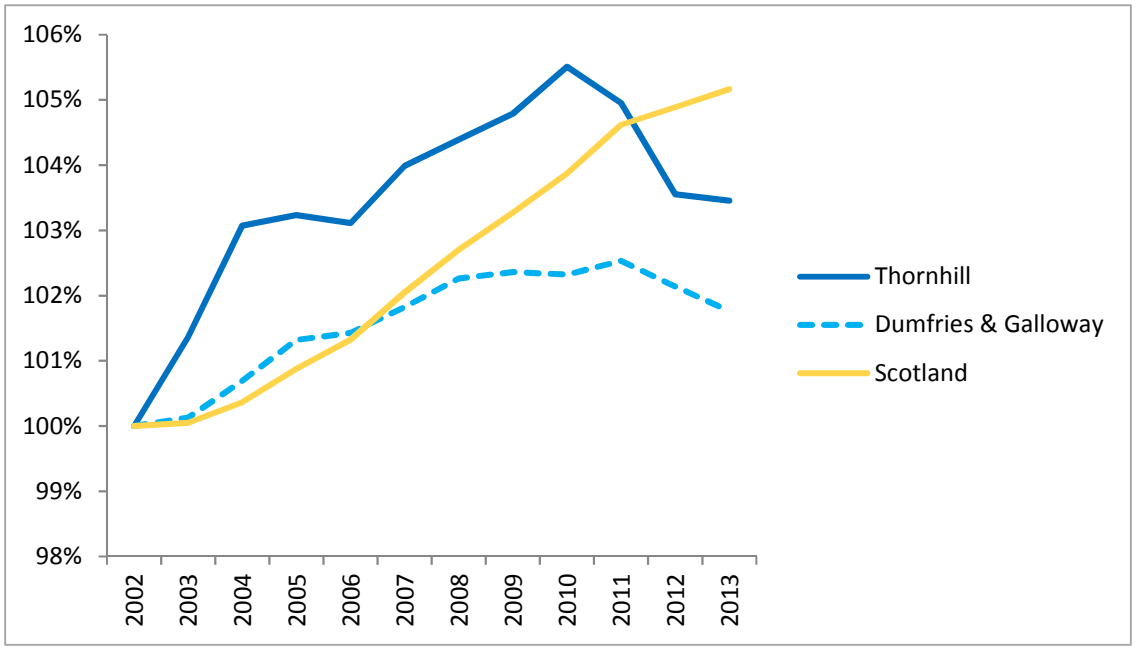

Figure D.5: Population Trend at Datazone Level 2002-2013 (Source: 2011 Census)

Key Point

There has been an overall increase in the population of the Thornhill study area since 2002, although there has been some levelling off of numbers in the most recent period.

Population Age Structure

D.2.4 Figure D.6 illustrates the age structure of the study area in 2011. As shown the study area has a slightly smaller proportion of people of working age and a slightly higher proportion of those aged 65 and above compared to Dumfries and Galloway and Scotland as a whole. This may be a consequence of people of working age and/or older people moving to the area.

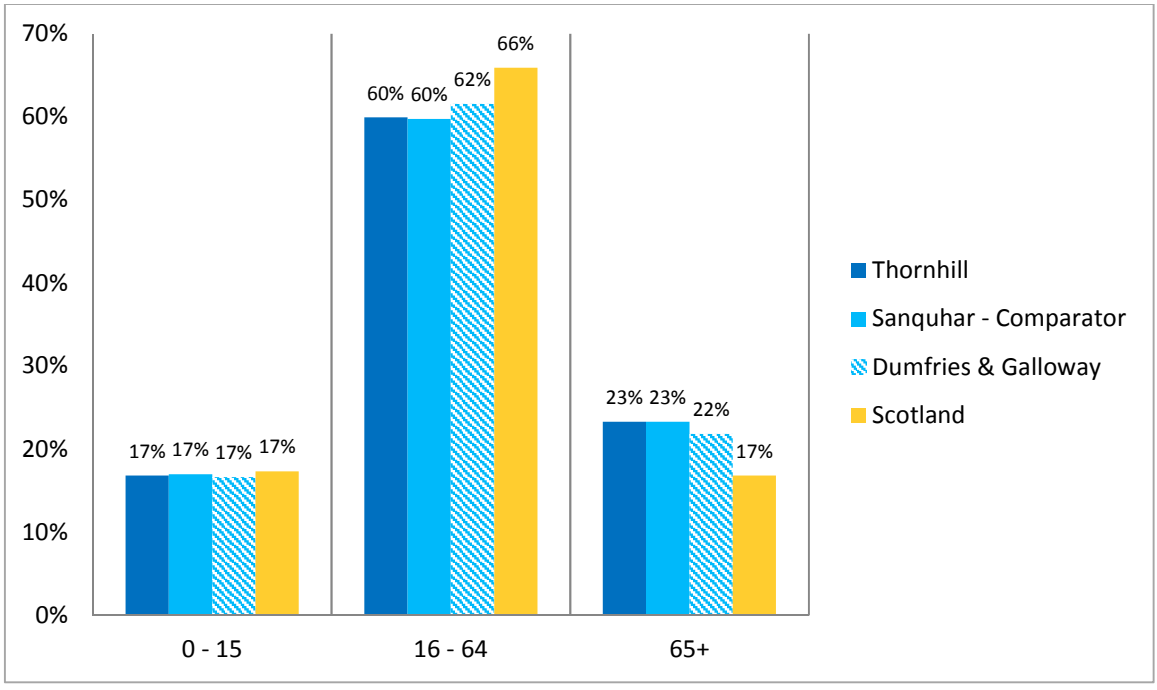

Figure D.6: Population Age Profile (Source: 2011 Census)

Key Point

Thornhill has a relatively favourable demographic mix, albeit with a slightly smaller proportion of younger people and a slightly higher proportion of those aged 65 and above compared to the local authority and Scottish average.

D.3 Labour Market

Occupations

D.3.1 Table D.2 below shows the range of occupations of residents aged 16 to 74 in employment in the study area against that of residents in Dumfries and Galloway and Scotland. It is useful to compare occupations across different locations as the occupations often reflect the range of skills in those locations. For instance, residents employed within the occupational categories of managers, and senior officials, professional occupations and associate professional and technical occupations are typically highly skilled and well-paid. Those employed within the occupational categories of elementary occupations and process, plant and machine operatives typically possess a lower skill level and receive lower wages.

Table D.2: Occupation Categories (Source: 2011 Census)

Occupation	Thornhill Study Area	Dumfries and Galloway	Scotland
Managers, directors and senior officials	9%	8%	8%
Professional occupations	15%	13%	17%
Associate professional and technical occupations	10%	9%	13%
Administrative and secretarial occupations	9%	10%	11%
Skilled trades occupations	19%	17%	13%
Caring, leisure and other service occupations	10%	11%	10%
Sales and customer service occupations	7%	8%	9%
Process, plant and machine operatives	8%	10%	8%
Elementary occupations	13%	13%	12%

D.3.2 As shown, the largest category of occupation in the Thornhill study area in 2011 was 'skilled trades' which employed 19% of all employed people aged 16 to 74. This compares to just 17% for Dumfries and Galloway and 13% for Scotland as a whole.

D.3.3 The study area also has a relatively high concentration of employees in the 'managers, directors and senior officials', 'professional' and 'technical' occupation categories (34%) compared to that of the local authority (30%), although numbers fall short of the Scottish averages.

Key Point

There is a relatively high proportion of employees in the higher occupational categories in the study area when compared to the local authority as a whole, however, proportions fall below that of the Scottish averages.

Economic Activity

D.3.4 The economic activity rate is a critical indicator of the economic wellbeing of an area. The economically active are those defined as in work or actively looking for work, whilst the

economically inactive are defined as those neither in work nor seeking employment (e.g. retirees, students, long-term sick, unpaid carers etc.). The usual measure of economic activity is based on the working age population (16-64) but the Census uses 16-74.

D.3.5 Of the 3,810 people in the Thornhill study area aged between 16 and 74, 66.8% were economically active (either in or looking for work) compared to 67.7% in Dumfries and Galloway and 69% in Scotland (Census 2011).

D.3.6 Figure D.7 shows the breakdown of usual residents aged 16 to 74 in Thornhill by economic status. As shown, while the number of residents in employment is comparable to that of Dumfries and Galloway and Scotland as a whole, there is a larger percentage of retirees within Thornhill (21%) compared to the local and national averages (20% and 15% respectively).

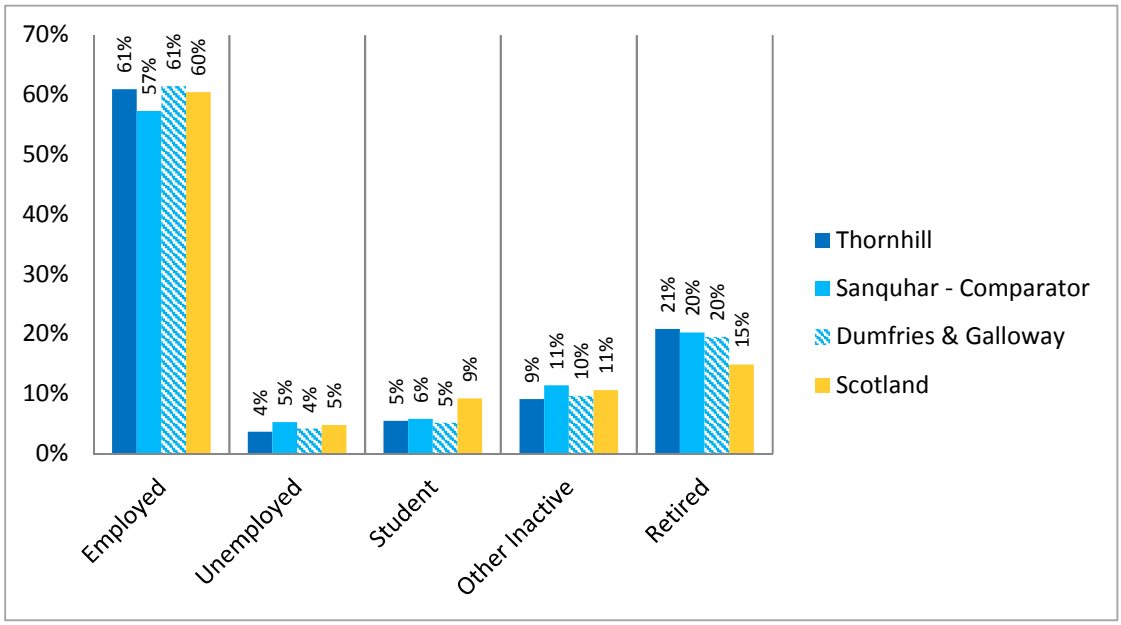

Figure D.7: Economic Status (Source: Census 2011)

Key Point

The economic activity rate in the study area is below that of the local and national averages, with a larger proportion of retirees in Thornhill study area, particularly when compared to the Scottish average. This is in keeping with the data on the age profile of the area, with a larger portion of people aged 65 and above.

Key Benefits and Job Seekers Allowance Claimant Rate

D.3.7 The proportion of the population aged 16-64 claiming Key Benefits[8] and/or Job Seekers Allowance (JSA) are important socio-economic indicators, with the former often used as a proxy measure for those on low incomes and the latter used as a measure of unemployment in an area[9].

[8] Job Seekers Allowance; Employment Support Allowance or Incapacity Benefit or Severe Disablement Allowance; Lone Parents Income support; Carers Allowance; Income Related Benefit or other income support (including IS Disability premium) or Pension Credit; Disabled Disability Living Allowance (DLA); Bereaved Widows Benefit, Bereavement Benefit or Industrial Death Benefit claimants.

[9] The figure for total unemployment tends to be underestimated by JSA claimant counts as JSA only counts those people who claim unemployment benefit and does not count those who are unemployed but do not claim JSA.

In the Thornhill study area, approximately 12% of the working age population received key benefits in 2012 according to Scottish Neighbourhood Statistics data. This was below that of Dumfries and Galloway (16%), Scotland as a whole (16%) as well as that of the comparator area (20%). The JSA claimant rate was also lower, with 2.6% of the working age population in Thornhill claiming JSA compared to 4% in the Sanquhar comparator area, 3.7% in Dumfries and Galloway and 3.9% in Scotland as a whole.

Key Point

The claimant rate for Thornhill is significantly lower than the regional and national rates and that of the comparator area of Sanquhar.

Employee Jobs by Sector

D.3.8 Table D.3 identifies approximate employee numbers by industry in the Thornhill study area. It makes use of two different measures of employment, as follows:

- **Resident Employment** – this measure considers the industry in which the settlements' residents are employed and is based on the 2011 Census.
- **Workplace Employment** – this measure considers the employment by industry of those who work in the settlements, irrespective of whether they are residents or otherwise, and is based on 2013 BRES data.

D.3.9 It is noted that due to the thresholds required to maintain anonymity, the workplace employment values have been rounded to the nearest 100. Figures of less than 50 therefore do not appear in the table below and are left blank.

Table D.3: Resident and Workplace Employee Numbers by Sector (Source: Census 2011 and BRES 2013)

Industry	Resident Employment 2011		Workplace Employment 2013	
	No. of Employees	%	No. of Employees	%
Agriculture, forestry and fishing	263	11%	0	0%
Mining, Manufacturing & Utilities	183	8%	100	8%
Construction	210	9%	100	8%
Wholesale and retail trade; repair of motor vehicles and motorcycles	319	13%	200	15%
Transportation and storage	106	4%	-	0%
Accommodation and food service activities	120	5%	200	15%
IT, finance and real estate	127	5%	100	8%
Professional, scientific and technical activities	101	4%	100	8%
Administration and defense	239	10%	-	0%
Education	225	9%	200	15%
Human health and social work activities	386	16%	200	15%
Other	104	4%	100	8%

Industry	Resident Employment 2011		Workplace Employment 2013	
	No. of Employees	%	No. of Employees	%
TOTAL	2,383	100%	1,300	100%

D.3.10 In terms of the resident employment, the largest category is human health and social work which accounts for 16% of employee's resident in the study area. Wholesale and retail is also relatively important, accounting for 13% of resident employees followed by agriculture, forestry and fishing with 11%.

D.3.11 The pattern for workplace employees was similar, with wholesale and retail and health and social work each reporting large proportions.

D.3.12 Figure D.8 compares the proportion of resident employees by sector in the Thornhill study area, Dumfries and Galloway and Scotland.

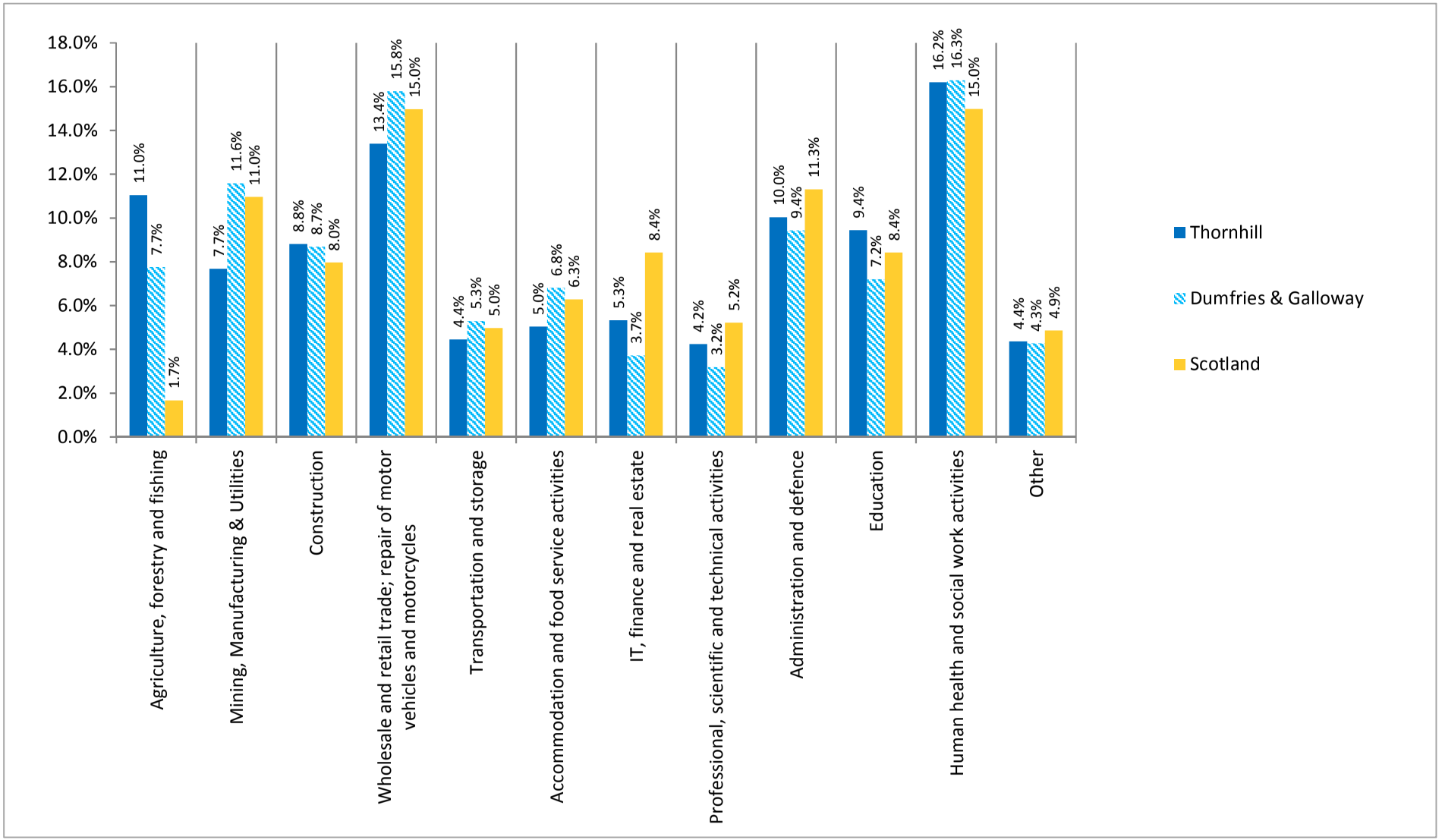

Figure D.8: Proportion of Resident Employees by Sector (Source: Census 2011)

D.3.13 The key points from the above figure are:

- There is a considerably higher concentration of employees in agriculture, forestry and fishing in Thornhill when compared to the local and / or national levels;
- Public sector employment, particularly health and social work, is relatively important in the Thornhill study area; and
- There is a higher concentration of employees in higher value sectors such as 'IT, finance and real estate' and 'professional, scientific and technical activities' in the study area compared to Dumfries and Galloway but proportions fall below that of the Scottish averages.

Key Points

The study area has a higher proportion of resident employees in agriculture, forestry and fishing and the public sector compared to the local and national averages. Relative to Dumfries and Galloway as a whole, the study area also has a higher proportion of residents employed in the higher employment categories including IT, finance, real estate and professional and technical activities, although figures lag behind the Scottish averages in this respect.

Residents

Qualifications

D.3.14 The level of qualifications held by the population of an area is seen to be an indicator of economic performance. Areas with a high proportion of well qualified people tend to perform comparatively better (in terms of occupational classification, average wages etc.) than areas characterised by low educational attainment.

D.3.15 Figure D.9 shows the highest level of qualification[10] attained by the population in the study area.

[10] The dataset is split across four levels as follows:

- Level 1: 0 Grade, Standard Grade, Access 3 Cluster, Intermediate 1 or 2, GCSE, CSE, Senior Certification or equivalent; GSVQ Foundation or Intermediate, SVQ level 1 or 2, SCOTVEC Module, City and Guilds Craft or equivalent; Other school qualifications not already mentioned (including foreign qualifications);
- Level 2: SCE Higher Grade, Higher, Advanced Higher, CSYS, A Level, AS Level, Advanced Senior Certificate or equivalent; GSVQ Advanced, SVQ level 3, ONC, OND, SCOTVEC National Diploma, City and Guilds Advanced Craft or equivalent;
- Level 3: HNC, HND, SVQ level 4 or equivalent; Other post-school but pre-Higher Education qualifications not already mentioned (including foreign qualifications); and
- Level 4 and above: Degree, Postgraduate qualifications, Masters, PhD, SVQ level 5 or equivalent; Professional qualifications (for example, teaching, nursing, accountancy); Other Higher Education qualifications not already mentioned (including foreign qualifications).

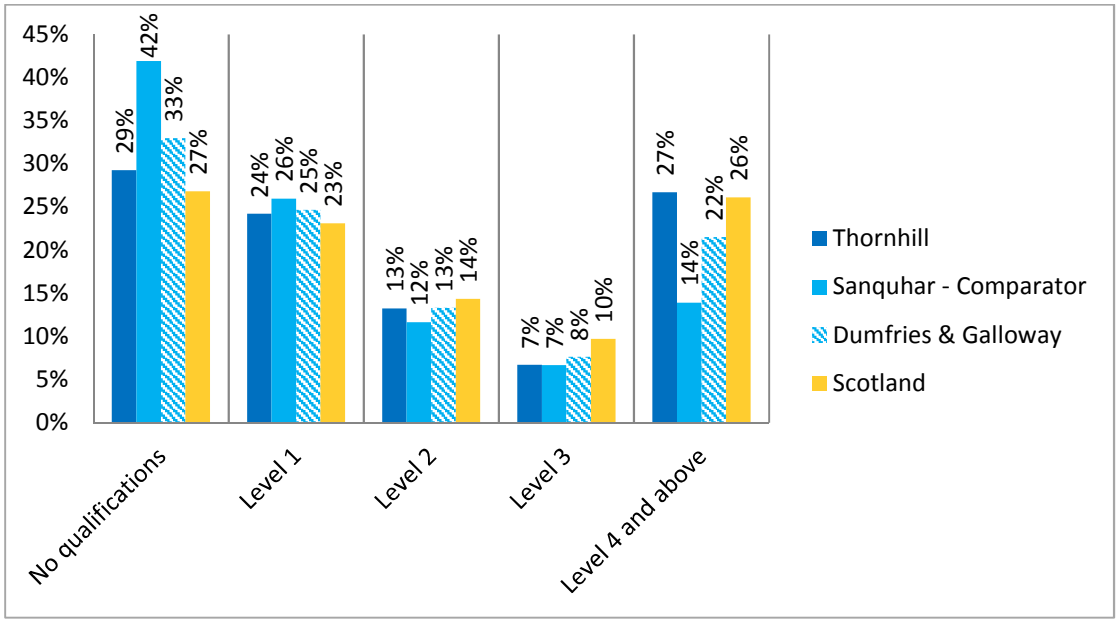

Figure D.9: Highest Level of Qualification (Source: Census 2011)

D.3.16 The figure demonstrates that the Thornhill study area performs comparably well with both the regional and national levels of educational attainment. Of the total number of residents aged 16 and over in the study area, just 29% hold no qualification, compared to 22% in Dumfries and Galloway and 27% in Scotland as a whole. Similarly, the study area has a higher proportion of residents with Level 4 and above qualifications (27%) compared with the local and national averages (22% and 26% respectively).

Key Point

The Thornhill study area performs comparatively well in terms of education attainment levels with relatively few residents with no qualifications and a large percentage with qualifications at Level 4 and above.

Household Income

D.3.17 Household income is a further barometer of the economic wellbeing of an area. The most recent data on household income available is for 2008. The median household weekly income in the study area at this time was £368, 3% higher than the Dumfries and Galloway household income and 6% lower than the national average.

Key Point

Average income in Thornhill is higher than the local average but lags behind the national average. This is in keeping with the data on resident employment. Once again, it may be that current transport connectivity is contributing to this differential.

House Prices

D.3.18 The price of property reflects the balance between the demand to live in an area and the supply of different types of property. Areas with lower than average house prices are generally seen as less 'in-demand' than those with higher average house prices (which in turn affects development viability). Transport connectivity is one of a number of factors which impact on house prices (although obtaining an empirical estimation of the extent of this influence has always been challenging).

D.3.19 In 2013, the mean house price in Thornhill was £159,009 which was 19% higher than the average house price in Dumfries and Galloway and 1% higher than the average price of houses in Scotland.

Key Point

House prices in the Thornhill study area are higher than both the local and national averages.

Deprivation

D.3.20 The Scottish Government regularly produces the Scottish Indices of Multiple Deprivation (SIMD), which "identifies small area concentrations of multiple deprivation across all of Scotland in a fair way. It allows effective targeting of policies and funding where the aim is to wholly or partly tackle or take account of area concentrations of multiple deprivation". SIMD combines 38 indicators across 7 domains, namely: income, employment, health, education, skills and training, housing, geographic access and crime. SIMD is essentially a social tool (i.e. it measures the performance of 'society') and it can act as a detailed statistical barometer of the social performance / social capital in a given area.

D.3.21 The generally accepted point at which an area is defined as deprived is when it is classified in the '20% most deprived'. Figure D.10 shows the levels of deprivation within the Thornhill study area and the surrounding area in 2012 by percentile.

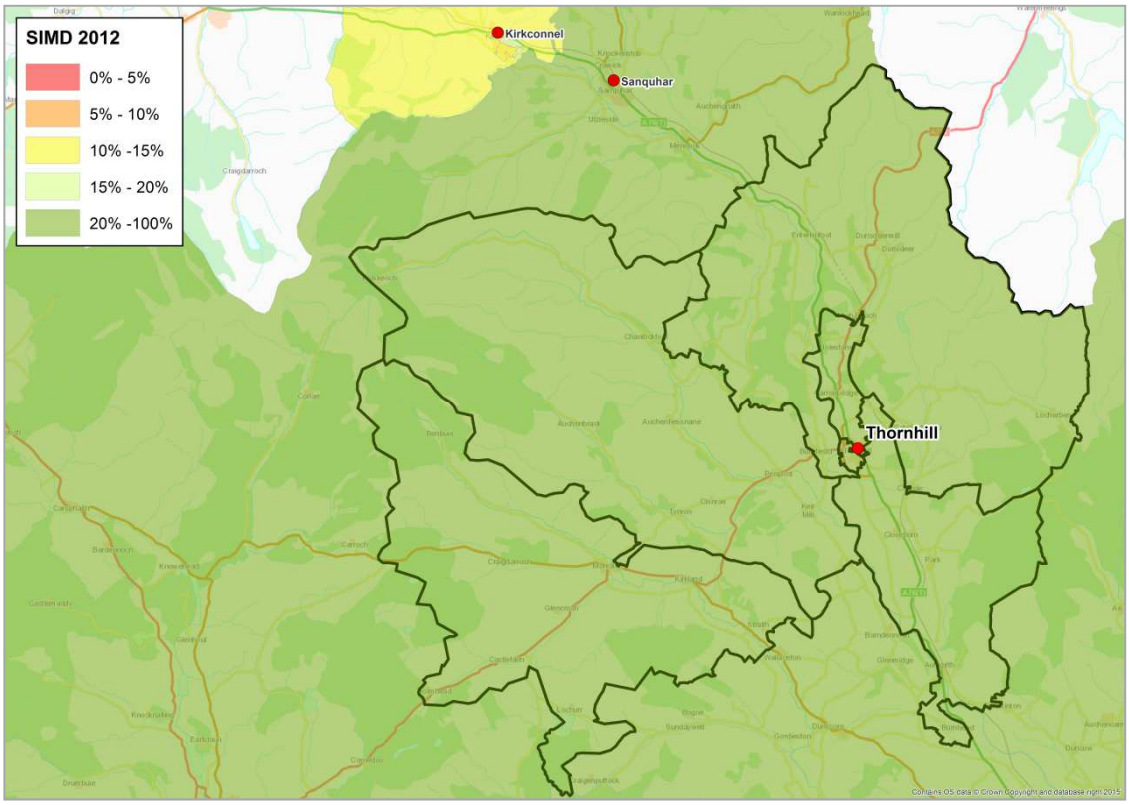

Figure D.10: Deprivation by percentile (Source: SIMD 2012)

D.3.22 As shown, none of the six datazones that cover the Thornhill study area are included within the 20% most deprived. In fact, all four zones rank in the 55% percentile and above.

D.3.23 Figure D.11 shows the change in deprivation in the Thornhill study area between 2006 and 2012 as the change in percentiles for the different Data Zones. Overall there has been a decline in

relative deprivation levels over this period, with each of the datazones experiencing a fall of between -4 and -15 percentile points.

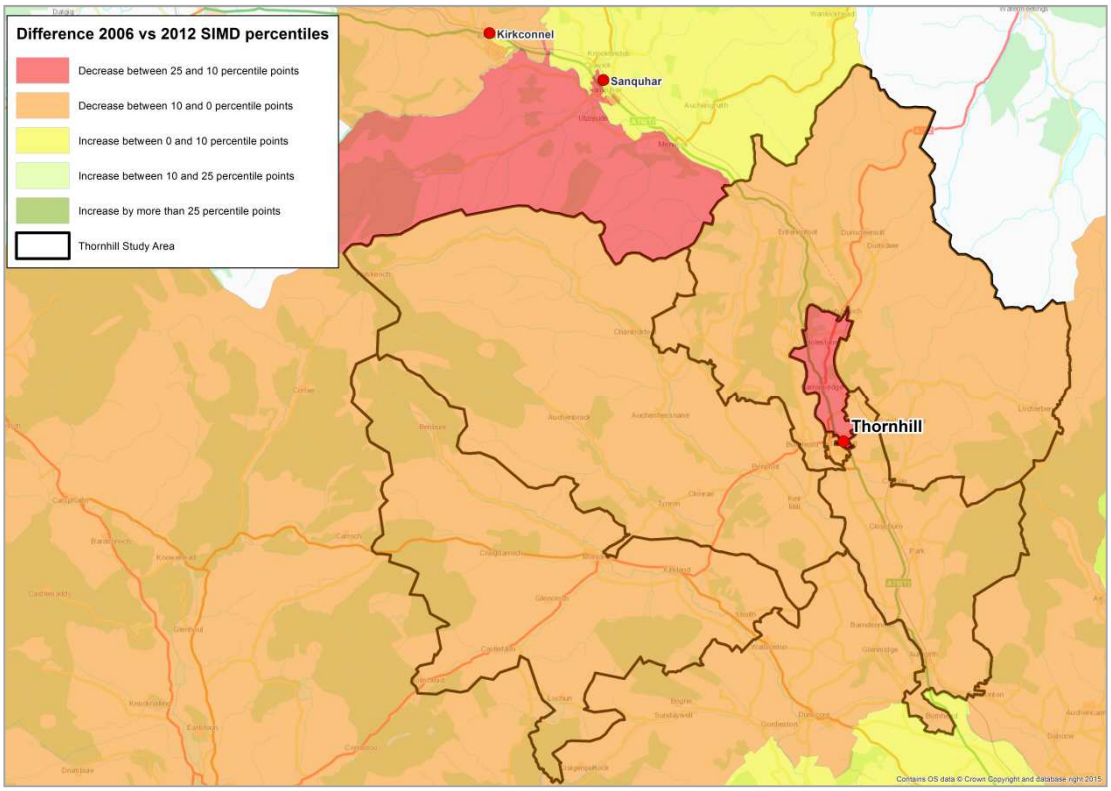

Figure D.11: Change in Deprivation between 2006 and 2012 (Source: SIMD 2006 and SIMD 2012)

Key Point

Thornhill has a relatively low level of deprivation with each of the data zones in the top half of the least deprived areas in Scotland. Furthermore, over time, the ranking of each of the zones has increased.

D.4 Housing and Employment Development

D.4.1 Table D.4 outlines the Local Development Plan (LDP) allocations and the Housing Land Audit (HLA) indicative build out rates for Thornhill.

Table D.4: Study Area Local Development Plan Allocation and Housing Land Audit Indicative Build Out Rates11

Location	Site	LDP Allocation up to 2024 (units)	LDP Allocation beyond 2024 (units)	Completions									
				2015 - 16	2016 - 17	2017 - 18	2018 - 19	2019 - 20	2020 - 21	2021 - 22	2022 - 23	2023 - 24	Post 2024
Thornhill	Wallace Hall	37	0	31	0	0	0	0	0	0	0	0	0
	Hospital Brae	112	0	0	0	12	12	12	12	12	1	0	0
	Boatbrae	64	0	0	0	12	12	12	12	12	4	0	0
	Queensberry Beeches	0	103	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Queensberry Park	0	122	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Gallows Knowe	47	0	0	0	0	24	23	0	0	0	0	0
	Corstorphine Road	n/a	n/a	0	1	1	0	0	0	0	0	0	0
	Gallamair, East Back	n/a	n/a	12	0	0	0	0	0	0	0	0	0
Penpont	West of Bogg Road	8	0	0	0	2	2	2	2	0	0	0	0
	Main Street	27	0	0	0	0	10	10	7	0	0	0	0
Closeburn	Woodend Way	33	0	5	5	0	0	0	0	0	0	0	0
Moniaive	Chapel Street	50	0	0	0	0	0	0	0	10	10	10	10
	Total	**378**	**225**	**48**	**6**	**27**	**60**	**59**	**33**	**34**	**15**	**10**	**10**

[11] Dumfries and Galloway Local Development Plan 2014 and Dumfries and Galloway Housing Land Audit 2015

D.4.2 Thornhill is identified as a District Centre within the Dumfries and Galloway Housing Market Area, while the surrounding villages of Closeburn, Moniaive and Penpont are identified as local centres. In total the study area is allocated for 378 housing units up to 2024 and 225 post-2024 as shown in the table below.

D.4.3 Table D.5 shows the allocated employment land in the Thornhill study area as well as the proportions which are immediately available (defined as marketable land that has planning permission, is serviced and has no other constraints to immediate development) and constrained (defined as land which is constrained due to issues with ownership, marketability, contamination, infrastructure or physical barriers). Overall, the area is allocated for 2.6ha of employment land all of which is classified as constrained although there is developer interest in the site.

Table D.5: Employment Land Supply12

Location	Site Name	Site Area (ha)	Immediately Available	Marketable (1-5 years)	Constrained (Beyond 5 years)	Comments
Thornhill	Gallows Knowe	2.6	0	0	2.6	Greenfield site under private ownership on the outskirts of settlement. Site is unserviced but is subject to a masterplan as part of all the proposed sites surrounding it and there is developer interest.

Key Point

There are both housing and employment land allocations within the Thornhill study area. Should these sites be built out, there would be an increase in population and transport demand within the local area.

[12] Dumfries and Galloway Local Development Plan Business and Industry Land Audit 2015

Appendix E Policy Overview

Level	Policy, Plan or Strategy	Purpose	Objectives
National	National Transport Strategy (Transport Scotland, 2016)	To act as an enabler of economic growth – to support businesses in achieving their local, national and international objectives and to improve the lives of individuals and communities by connecting them with their economic future.	• Improved journey times and connections, to tackle congestion and lack of integration and connections in transport; • Reduced emissions, to tackle climate change, air quality, health improvement; • Improved quality, accessibility and affordability, to give choice of public transport, better quality services and value for money, or alternative to car; • Promote economic growth by building, enhancing managing and maintaining transport services, infrastructure and networks to maximise their efficiency; • Promote social inclusion by connecting remote and disadvantaged communities and increasing the accessibility of the transport network; • Protect our environment and improve health by building and investing in public transport and other types of efficient and sustainable transport which minimise emissions and consumption of resources and energy; • Improve safety of journeys by reducing accidents and enhancing the personal safety of pedestrians, drivers, passengers and staff; and • Improve integration by making journey planning and ticketing easier and working to ensure smooth connection between different forms of transport.
	Scotland's Railways (Transport Scotland, 2006)	The document sets out Transport Scotland's plan over the next 20 years for potential intervention over the short, medium and longer term to ensure that Scotland's railway network continues to improve.	Objectives for Anglo-Scottish Routes: • Capacity enhancements on the Glasgow and South Western route to assist freight movements. Objectives for Rural Routes: •Revise train services in the light of changing travel patterns and markets including tourism developments. •Take advantage of synergies with upgrade of Glasgow and South Western (GSW) route to improve passenger service journey times to Carlisle. It is noted that promoting social inclusion is a driver in these areas as is economic growth through tourism.

Level	Policy, Plan or Strategy	Purpose	Objectives
	National Planning Framework 3 (Scottish Government, 2014)	The NPF3 sets out the long-term vision for the spatial development of Scotland and is the spatial expression of the Government Economic Strategy.	**Dumfries** recognised as a gateway town. "*Dumfries is the regional capital of the south west of Scotland. Demonstrating the potential of rural towns to make a unique and significant contribution to the national spatial strategy, regeneration of the Crichton Quarter and the Learning Town initiative are providing opportunities for local learning, skills development and innovation, including in carbon management and rural development. Tourism, food and drink and primary industries will continue to be important for Dumfries. A new hospital will be developed, strengthening the role of Dumfries as an important service centre. The Solway has significant opportunities for marine renewable energy generation, which could help to further diversify the local economy over the long-term. Wider opportunities for economic growth are also likely to be located along the A74 corridor.* ***The area has a close relationship with Carlisle, and connections, including by rail and via the A77 and A75, will continue to be important locally and for longer distance links to Ireland, England and Europe."*** *"**Stranraer** and Cairnryan are Scotland's gateway to Northern Ireland. Since relocation of the ferry terminal from the centre of Stranraer, regeneration plans for the waterfront have become of critical importance to the town and wider region.* *It is important that the momentum gained from designating Port Facilities at Loch Ryan as a national development in NPF2 is not lost – following opening of the new facilities in 2011,* ***targeted interventions are being made to improve the A77 and A75*** *and a new electric bus service is providing a low carbon transport link from the new port facilities to the town centre. The A75 is a Euroroute, providing a vital link from Northern Ireland across the region to the rest of Scotland, England and Europe."*
Regional	Regional Transport Strategy (SWestrans, 2008)	The purpose of this Strategy is to determine and deliver better transport solutions, both regionally and nationally, and to	To deliver genuine travel choices and improve connectivity internally between key locations and communities, and externally to Glasgow, Edinburgh, England and Northern Ireland. It is about providing access to jobs and public services, enabling goods to reach their markets and providing the links that promote social inclusion and support quality of life. The strategy vision is *"a transport system for the South West of Scotland that delivers the internal and external connectivity required to sustain and enhance the region's economy and communities whilst minimising the impact of transport on the environment."*

Level	Policy, Plan or Strategy	Purpose	Objectives
		act as a catalyst for regeneration of the region's economy.	Objectives: • Improve transport links within Dumfries and Galloway and provide fast, safe and reliable journey opportunities to significant markets, including the national economic centres of Edinburgh and Glasgow, as well as England and Northern Ireland; • Contribute to improved economic growth and social inclusion in the region whilst minimising the environmental impacts of transport; • Support the national transport target of road traffic stabilisation; • Add value to the broader Scottish economy and underpin increased sustainable national economic growth; • Assist in getting visitors/tourists to the region from other parts of Scotland, England, Ireland and beyond; • Making it possible for more people to do business in and from Dumfries and Galloway by providing sustainable connections to key business centres in the Central Belt and other locations such as Ayrshire and Cumbria; • Support vibrant places that provide employment, healthcare, educational and other services that people need and want, so that their quality of life is maximised; • Reduce the constraint of peripherality, both between the region's main settlements and its outlying areas, and between the region and its external markets; • Capitalise on improvements to critical long distance corridors to create new transport services, nodes and development opportunities for Dumfries and Galloway; • Pursue certain transport schemes in the context of local and national economic development, while at the same time recognising wider context of economic, social and environmental imperatives.
	Regional Economic Strategy (2015 - 2020)	The RES was developed to ensure that the strategic economic priorities for the region are clearly	The vision for the strategy is "*By 2020, Dumfries and Galloway will have a more diverse and resilient economy. One which is capable of taking advantage of opportunities by combining an appropriately skilled workforce and connected infrastructure to support more prosperous and inclusive communities where every member of every community has equality of access to that prosperity".* *The document includes six strategic objectives. Those of particular relevance are as follows:*

Level	Policy, Plan or Strategy	Purpose	Objectives
		identified and that interventions to support these are prioritised by all Partners involved. The Strategy is founded on the key principle of addressing inequality through economic growth.	• *Developing Places: Empower the region's communities to address their distinct economic challenges and opportunities;* • *Better Skills, Better Opportunities: Create a vibrant culture of opportunity in the region to retain and attract people of working age and improve the competitiveness of individual businesses;* • *Well Developed Infrastructure - Enhancing regional connectivity, removing barriers to business competitiveness and improving access to economic opportunities for individuals and businesses;* • *Investment Projects - Large investment projects that will make a significant impact on the regional economy; and*
	Dumfries and Galloway Regional Tourism Strategy (2011-2016)	The Regional Tourism Strategy outlines Dumfries and Galloway Council, Destination Dumfries, and Visit Scotland's strategy for developing tourism in the county.	The vision is "To establish Dumfries and Galloway as a world-class destination in which our visitors receive a superb quality of service, where our products and services exceed their expectations. This will maximise the long-term economic and social benefits which sustainable tourism can bring to the region". The document outlines 6 objectives including increasing the volume of Visitors to Dumfries and Galloway.
	Bus Action Plan (2009)	The Bus Action Plan provides an outline of the situation in terms of the bus network in Dumfries and Galloway.	The document includes information on the status (as of 2009) and planned improvements in each of the following areas: communication strategy; quality of buses; bus stop infrastructure; community transport; schools transport; and funding interventions. The document highlights the cost of bus travel as an issue. In addition, it notes that connections between Dumfries, Glasgow and Edinburgh are limited. The Dumfries to Glasgow service has a journey time of two hours but because of the high ticket cost demand is low. The Dumfries to Edinburgh service is supported by a number of authorities and has a running time of three hours as it is a series of joined up local bus services serving the main towns rather than a fast link to Edinburgh.

Level	Policy, Plan or Strategy	Purpose	Objectives
			The document notes that the South West of Scotland would benefit from a national long distance express coach operation, on say a 2 hourly headway, throughout the day, to improve connectivity with Glasgow and Edinburgh. The document also supports integrated ticketing, noting that there would be particular benefit if all the bus and train companies in the South West were included.
Local	Local Transport Strategy (Dumfries and Galloway Council, 2011-2016)	The Local Transport Strategy (LTS) sets out Dumfries and Galloway Council's Action Plan for transport in the area between 2011 and 2016. SWestrans and Dumfries and Galloway Council share the same boundary and the RTS and LTS consequently cover the same geographic area. However, the LTS is focussed upon local networks and services whilst the RTS focuses upon wider connectivity.	The Vision for the LTS is defined as: "To develop better transport systems where they are most needed to support an ambitious, prosperous and confident Dumfries and Galloway where people achieve their potential". Five strategic objectives are identified, as follows: • Assist Economic Growth through the provision of the best possible transport infrastructure and services; • Promote Social Inclusion through the provision of transport services suitable for all residents; • Protect our Environment by coordinating land use planning and transport and, where travel is necessary, encourage efficient and sustainable transport; • Improve Road Safety by reducing the likelihood of accidents through Engineering, Education and Enforcement initiatives; and • Improve Integration of Journeys through the encouragement of better transport. The document outlines a strategy which balances demand management and the promotion of alternative modes of transport and includes an action plan of key measures.

Level	Policy, Plan or Strategy	Purpose	Objectives
	Local Development Plan (Dumfries and Galloway Council, 2014)	The LDP sets out the strategy to guide future land use and development within Dumfries and Galloway until 2024	Vision includes: *"It will be a thriving region with a sustainable economy built on sustainable principles that safeguard the landscape, natural and historic environment, promote growth, maximise the use of existing infrastructure and enhance connectivity.* *It will have maximised its location to attract investment to create employment and investment opportunities which will in turn attract people of working age to the region.* *There will be opportunities in the rural area for economic development, housing and recreation."* *"A viable rural economy and community characterised by:* • *access to sustainable transport* • *ready access to higher education"* *"Vibrant towns and villages that have:* • *access to a wide range of sports, recreation and leisure activities"*
	Single Outcome Agreement (Dumfries and Galloway Council, 2013 - 2016)	The Single Outcome Agreement sets out Dumfries and Galloway Strategic Partnership's vision for Dumfries and Galloway and is the main partnership planning document for the region.	The overarching vision is *"working together to create an ambitious, prosperous and confident Dumfries and Galloway where people achieve their potential"*. Relevant aims include: • *Priority 4: We will support and stimulate our local economy - To do this we will provide the right type of physical infrastructure including strategic transport links with Northern Ireland, north of England and the rest of Scotland (particularly Ayrshire and the Scottish Borders)* • *Priority 6: We will protect and sustain our environment - We want people to choose active travel - our cycling and walking facilities - as that will bring us benefits in health improvement, tourism and carbon reduction and we want to have a fully integrated and accessible transport system including taxis, buses, trains and ferries.*

Level	Policy, Plan or Strategy	Purpose	Objectives
			It is noted that the over-65s population is likely to grow by 21% by 2020 and 46% by 2035 (20% for those aged 65-74 and 77% for those aged 75 and over) . There is therefore a growing requirement for suitable transport.
	Dumfries and Galloway Outdoor Access Strategy (2012-2017)	The Dumfries and Galloway Outdoor Access Strategy provides a vision for outdoor access and the strategic framework for planning, managing and developing access in Dumfries and Galloway	The vision for the document is that within the next five years: • barriers to access will be reduced following the enhancement and promotion of core paths; • communities will have developed a sense of responsibility for local paths; • residents will be leading more active lifestyles; • the countryside will be used to support and promote local enterprise; • developers will be contributing to enhancing and developing access; and • public bodies will be working in partnership to support communities, reduce health inequalities, promote the region and protect the environment. The strategy aims to help residents lead more active lifestyles and increase opportunities for outdoor recreation and sustainable travel.

Appendix F Part 1: Option 2 Development

F.1 Introduction

F.1.1 Option 2 relates to bus priority measures within Dumfries town centre.

F.1.2 Through discussion with council representatives it was established that:

- A Split Cycle Offset Optimisation Technique (SCOOT) system was implemented in Dumfries in 2000 with the system installed at just under 20 junctions in the town centre. As part of the implementation, selective vehicle detection loops were installed with all buses fitted with transponders to enable bus prioritisation at signals. However, there were issues with the reliability of the system and the varying and conflicting patterns of bus movements in the town centre meant the system was 'fighting itself' to give priority. As a consequence, the bus prioritisation capability was disabled at all but a bus gate on Glasgow Street.

- At some locations an alternative system was subsequently implemented which utilised loop detection of buses to provide a hurry call at signals. However, its implementation had a significantly detrimental impact on general traffic capacity and was subsequently removed. The only SVD system now operational is a video detection system at the Glasgow Street bus gate at the end of the related bus lane. This system utilises two virtual loops which requires both loops to be occupied in order to be triggered, and as a consequence, any large vehicle abusing the bus lane would be registered as a bus on the loops and activate the bus gate. In addition, there were issues with car headlights activating the system at night. The system is currently still operational despite these issues, operated by a TrafiCam video recorder.

- The SCOOT system is still operational, working to optimise the town centre signals. The system currently has thirteen junctions and four pedestrian crossings. A further junction just outwith the SCOOT area (Three Road Ends) was upgraded from VA control to MOVA control in October 2015, with the option to convert to SCOOT control should the need arise in the future. However, the majority of the existing SCOOT network has not undergone any form of detailed recalibration since its initial installation in 2000, something which is advised on an annual basis. The most recent re-evaluation of any part of the SCOOT network was Buccluech Street Bridge in 2011. This did not however involve any link validation or calibration. Congestion and delays on the network, and therefore delays to public transport, could be addressed by comprehensive examination and analysis of the operation of the existing SCOOT network and the implementation of improved SCOOT translation plans, an automatic plan selection strategy, improved standalone pedestrian crossing strategies within the network, and a robust incident management strategy to then be reviewed on a more regular basis. The recalibration of parameters is essentially a two stage process. The first, link validation, can be carried out at any time. The second more detailed part of the process is SCOOT parameter validation which could not be carried out until after the Dumfries and Galloway Royal Infirmary migration to the new site is complete and traffic patterns have settled. Investment in a recalibration of the system, while not providing prioritisation for bus movements, would likely provide an overall improvement in town centre traffic movements and as such would benefit bus movements as a consequence.

- Investment in smarter technology, with wireless detection would also provide a more intelligent system which could enable information to be feed directly back to bus companies on bus movements and journey times, providing an opportunity for service providers to understand bus performance across the network and identify any timetable alterations required. It would also enable the existing bus gate on Glasgow Street to operate more reliably.

- Investment in the SCOOT system with annual recalibration of parameters within the system would provide an adaptable traffic management system capable of adjustment when needed. This may be highly beneficial in instances where any significant traffic management change was implemented, or land-use change/development occurred. A key example of this is the upcoming move of the Dumfries and Galloway Royal Infirmary site to a new site to the west of the town – a move which is likely to alter transport access by both staff, patients and visitors. In addition, any traffic modelling work outcomes undertaken to support the relocation of the hospital could be fed into the system to improve overall network performance. In addition, the development of Dumfries Learning Town has the potential to impact on traffic movement due to the busing of students between the four secondary schools and to the new 'The Bridge' facility. Any changes to traffic flows as a result could also be taken account of in the SCOOT system.

F.1.3 As well as further investment in the existing SCOOT system, as buses from the Thornhill area enter Dumfries on the A76 (Glasgow Street), potential further elements of the option that have been considered are:

- Extension of the operating hours of the southbound bus lane on Glasgow Street to full day operation;
- Extension of the southbound bus lane on Glasgow Street such that it extends to the Cuckoo Bridge retail park roundabout and potentially further north to the A76/A75 roundabout;
- Implementation of a northbound bus lane on Glasgow Street between the Cuckoo Bridge retail park roundabout and the A75/A76 roundabout; and
- Implementation of a bus lane on Buccleuch Street between Glasgow Road and Whitesands,

F.2 Extending Bus Lane Operational Hours

F.2.1 The signalised junction of Buccleuch Street with Glasgow Street runs under SCOOT adaptive control, and signal timings adjust throughout the day based on demand. Review of data from the SCOOT system, as discussed below, indicates high saturation values and delay on the Glasgow Street approach during the interpeak period, suggesting that extension of bus lane hours may yield time savings for buses.

Background

F.2.2 There is presently a bus lane and bus gate on Glasgow Street, which provides bus priority from 07:00-09:30 and 16:00-18:30 on weekdays.

F.2.3 It is understood that the bus lane previously operated from 0700-18:30 inclusive; however, bus lane operation was reduced to peak times around five years ago due to political pressures, although journey times surveys undertaken at the time, showed that the bus lane did not have an adverse impact on car journey time during the interpeak.

F.2.4 Figure F.1 illustrates the road layout on Glasgow Street in the vicinity of its junction with Buccleuch Street, including the bus lane and bus gate.

F.2.5 There are also two SCOOT detectors on the Glasgow Street Approach:

- G1 sits in the outside lane
- G2 sits in the inside/bus lane.

F.2.6 During bus lane operation, SCOOT feedback is provided by G1 and outside these hours it is provided by G2.

F.2.7 Dumfries and Galloway Council provided PBA with ASTRID back-up files from the SCOOT system which provide hourly average data from every Friday over the last six months (July 20th 2016 – January 20th 2017). This Friday dataset was selected on the basis that local knowledge suggests that Fridays are typically a good indicator of network characteristics and SCOOT performance.

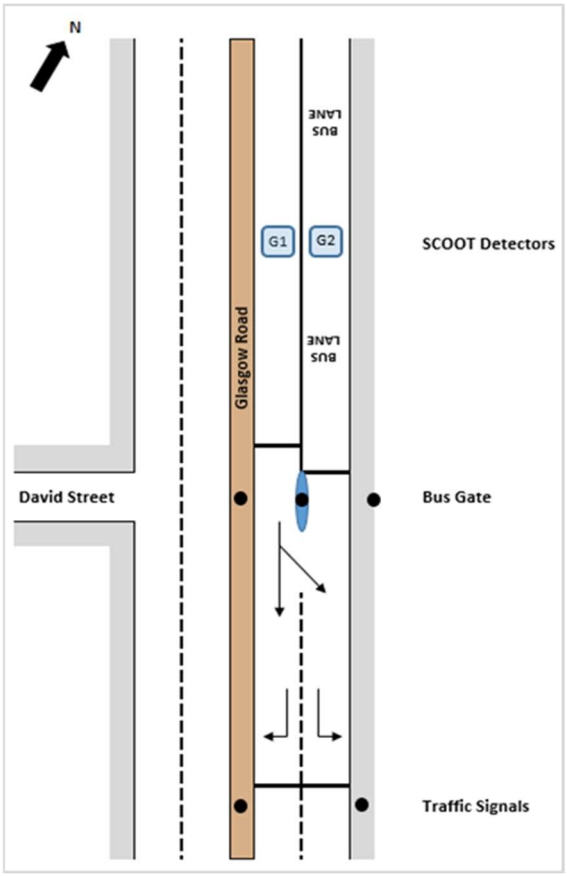

Figure F.1: Glasgow Street layout

Traffic Flow

F.2.8 Because of the proximity of both Glasgow Street and the Whitesands junctions SCOOT treats the junctions either side of Buccleuch Street Bridge as part of one large junction. This ensures the interaction between the two is properly catered for in the signal timings. SCOOT makes decisions based on traffic flow data from its detectors. As noted above there are two detectors on Glasgow Street, and SCOOT uses data from a single detector at a time. During peak periods SCOOT uses G1 and during the interpeak G2. The traffic profile shown in Figure F.2 combines data from both detectors.

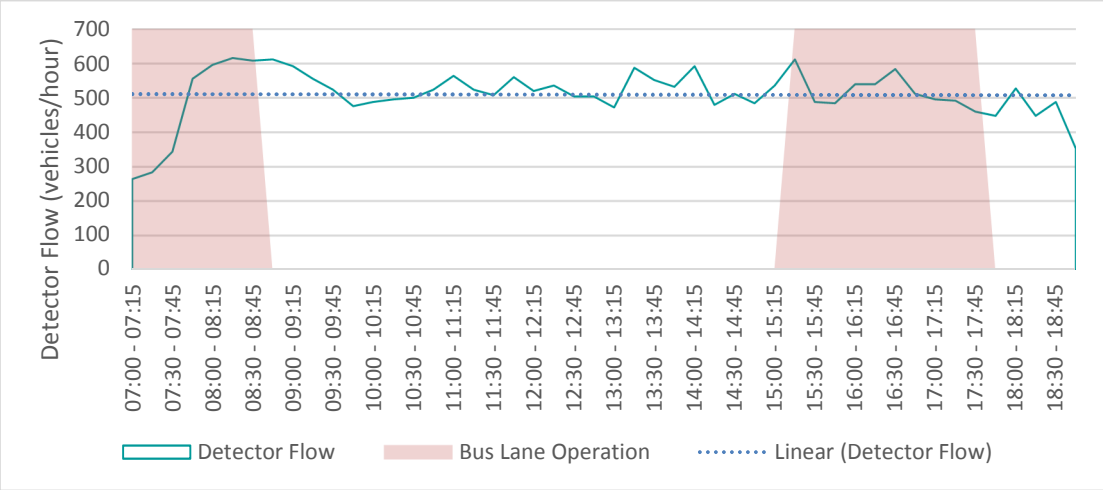

Figure F.2: Glasgow Street southbound traffic flow

F.2.9 Traffic flow is relatively flat throughout the day, typically fluctuating between 500 and 550 vehicles per hour over the period 09:00-17:00. A sustained peak is seen during the AM Peak (08:00-09:00) as commuters enter the city/town. A similar peak is not seen in the evening as this dataset only includes southbound flows on Glasgow Street.

Saturation

F.2.10 The Saturation statistic illustrates the level of demand relative to the maximum number of vehicles which can pass over the stop line during the allocated green time, and SCOOT aims to keep saturation at each node below 90%. Figure F.3 illustrates the how the level of saturation varies throughout the day.

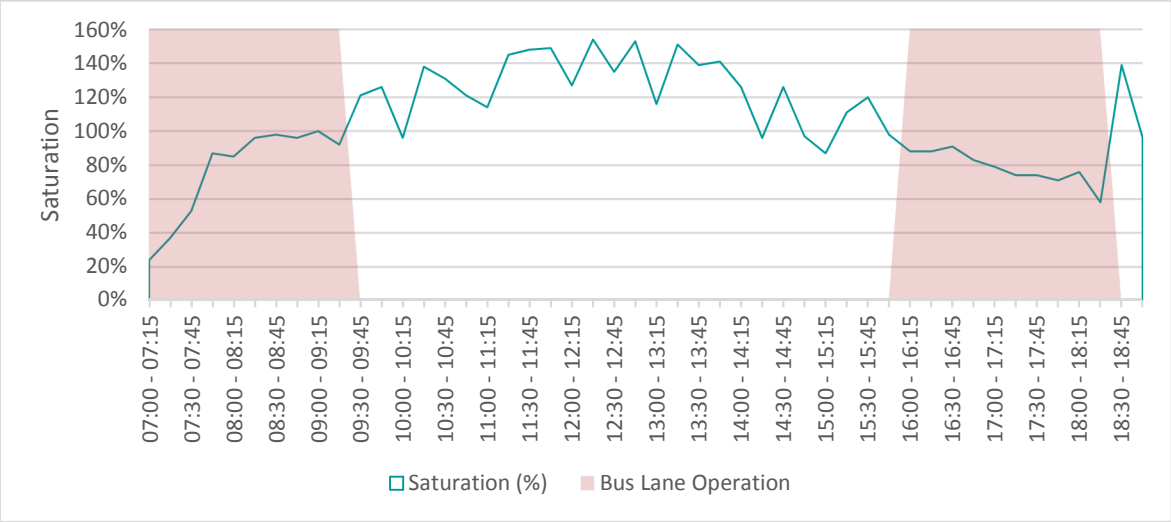

Figure F.3: Glasgow Street southbound saturation

F.2.11 Figure F.3 shows that saturation tends to be higher during the interpeak and exceeds the 90% threshold for all but 15 minutes of the period from 09:30-16:00. Although it may seem counter-intuitive that saturation is higher during the interpeak (when the traffic flow is lower), this results from the fact that SCOOT allocates green time to the junction approaches in line with the level of demand on each arm and the need for co-ordination. During the interpeak period other junction approaches are awarded greater green time through the SCOOT signal optimisation.

F.2.12 As the morning commuter peak subsides SCOOT adjusts and optimises the traffic signal timings across the road network. Traffic flows on Glasgow Street reduce and SCOOT reallocates green

time from Glasgow Street to Galloway Street. Also, the SCOOT detector on Whitesands (for right turners onto Buccleuch Street) increases the length of the green signal for this traffic, which then restricts the traffic coming off the bridge. As such, during the inter-peak when the flow northbound on Whitesands increases, and greater green time is awarded to the movement to Buccleuch Street, this begins to limit the available green time to traffic from Galloway Street and southbound traffic on Glasgow Street. As such, the saturation statistic and level of delay increase during the interpeak on Glasgow Street.

Delay

F.2.13 During the interpeak as the green time allocated to Glasgow Street has reduced, despite the reduced vehicle flow, the delay per vehicle increases. As such a greater number of vehicles must wait more than one cycle to exit Glasgow Street, delaying journeys (as shown in Figure F.4) where it can be seen that delay at the junction averages 80 seconds during the interpeak and approaches 120 seconds around noon.

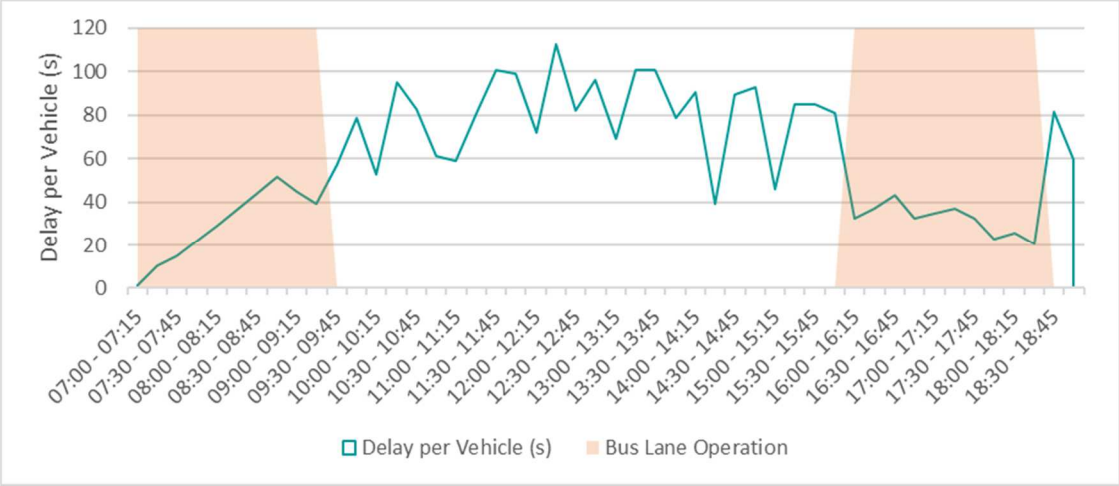

Figure F.4: Glasgow Street Delay per vehicle

Summary

F.2.14 During the interpeak period, SCOOT optimises and co-ordinates traffic signals to reduce overall delay in such a way that it allocates green time to other arms and movements conflicting those from Glasgow Street. As a result, during the interpeak period, traffic southbound on Glasgow Street is delayed and queues are not completely cleared during every signal cycle. Because of the traffic demand on Glasgow Street during the peak periods, this is also the case when the bus lane is operational, however buses get the benefit of a clear bus lane. Extending the operational hours of the bus lane to cover the full day (0700-1800 inclusive) would allow buses to reach the traffic signal stopline without queuing delay, improving bus journey times and reliability.

F.2.15 The queue length on Glasgow Street either comprises right and left turning traffic but not buses (bus lane operational) or only left turning traffic including buses (bus lane not operational). These two queuing scenarios result in very similar queue lengths and as such it doesn't matter operationally which lane the traffic queues in. Accordingly, bus delays in the interpeak period can be improved by extending the hours of operation of the bus lane with little material impact on general queuing traffic.

F.3 Bus Lane Extensions/New Bus Lanes on Glasgow Street

F.3.1 High level consideration of the indicative feasibility and costs for implementing the potential extension of the existing bus lane on the southbound Glasgow Street carriageway and a new bus lane on the northbound carriageway, on the approach to the A76/A75 roundabout has been undertaken, and is shown in Table F.1 and Table F.2.

Table F.1: Option 2 Bus Lanes – Feasibility

Option Element	Feasibility
Extension of the southbound bus lane on Glasgow Street such that it extends to the Cuckoo Bridge retail park roundabout and potentially further north to the A76/A75 roundabout	Extension of the southbound bus lane between Glasgow Street/Sunderries Road and the Cuckoo Bridge Roundabout, would likely require road widening over 200m, new bus shelters at two stops, signs and lining, wall and fence replacement, adjustments to street lighting. In addition, third party land will also be required from the Cuckoo Bridge retail park in order to accommodate the road widening and an associated retaining wall would be required. Extension of the southbound bus lane between the Cuckoo Bridge roundabout and the A75/A76 roundabout was felt to be unfeasible due to the bridge widening over the old railway line that would be required and the limited distance on the approach to the Cuckoo Bridge Roundabout (if no widening were undertaken) that would reduce any potential benefit to buses. However, planning permission for the Tesco Extra store (in Cuckoo Bridge retail park) required the bridge to be widened to four lanes – but with three built in the meantime. The extra space was future proofing for a southbound bus lane from the A75 - so in the longer term there is some potential for bus lane implementation. However, this is not considered further in this option.
Implementation of a northbound bus lane on Glasgow Street between the Cuckoo Bridge retail park roundabout and the A75/A76 roundabout	A bus lane would be provided within the existing carriageway space. It is assumed that a bus gate (similar to that operating on the southbound bus lane on the Glasgow Street approach to Buccleuch Street) would be provided approximately 60m back from the roundabout. It should be noted that this would reduce the road capacity for general traffic and the implications of this should be considered. Buses approaching the junction from the south and heading straight on at the roundabout currently do so from the middle approach lane (as per the road markings). The current traffic distribution by lane on the approach to the roundabout would require adjustment if a bus lane were to be implemented such that the inside lane could be utilised for both left-turning and straight-ahead traffic.
Implementation of a bus lane on Buccleuch Street between Glasgow Road and Whitesands	Implementation of a bus lane on Buccleuch Street between Glasgow Road and Whitesands would require detailed design work to understand its feasibility, especially given the bridge over the River Nith. While Buccleuch Street is currently 3 lanes wide and could accommodate a bus lane with two general traffic lanes - detailed traffic modelling of the proposal would need to be undertaken to determine the impacts to traffic of a reduction in capacity for general traffic.

Option Element	Feasibility
	The benefit that might be felt by buses over such a short section of carriageway is potentially unlikely to merit its implementation and this part of the option is therefore not being taken further.

Table F.2: Option 2 Bus Lanes – Affordability

Option Element	Estimated Cost (£)
Extension of the southbound bus lane on Glasgow Street such that it extends to the Cuckoo Bridge retail park roundabout and potentially further north to the A76/A75 roundabout	Approximately £200k (plus any land purchase cost). This allows for road widening (200m), new bus shelters at two stops, signs and lining, wall and fence replacement, adjustments to street lighting. This cost does NOT include for the extension of the bus lane north of the Cuckoo Bridge roundabout (which is stipulated as part of the planning permission for the Tesco Extra store). However, local knowledge of queuing at this location suggests that existing traffic delay would likely not justify the cost or implementation of the bus lane. As such this element of the options has not been considered further in this appraisal.
Implementation of a northbound bus lane on Glasgow Street between the Cuckoo Bridge retail park roundabout and the A75/A76 roundabout	Approximately £40k for signals, signs and lining (assuming no road widening required). However, local knowledge of queuing at this location suggests that existing traffic delay would likely not justify the cost or implementation of the bus lane. As such this element of the options has not been considered further in this appraisal.
Implementation of a bus lane on Buccleuch Street between Glasgow Road and Whitesands	Costs not considered as bus lane implementation ruled out on the grounds of feasibility and likely small benefit given the limited distance involved (see Table F.1).

Appendix G Part 1: Feasibility - Option 6

G.1 Introduction

G.1.1 This appendix develops an understanding of the following in light of a potential railway station in Thornhill:

- How an extension of High Speed Rail 2 (HS2) into Scotland may impact on the GSWL, the opportunities that would enable and the steps which might be required to engage;
- The potential impact of the Scotland Route Study proposals on both the WCML and GSWL line in relation to both passenger and freight services;
- The role of the Glasgow South West Line;
- Existing and potential future capacity on the rail routes;
- The effects of providing any new station(s) on the wider rail network;
- The potential impacts of more than one new station re-opening on the GSWL; and
- The potential use of the stations as rail freight hubs (as well as passenger stations).

G.2 HS2 Extension into Scotland Impacts

G.2.1 A review of the HS2 publication *"Broad options for upgraded and high speed railways to the North of England and Scotland"*, jointly commissioned by DfT and Transport Scotland, and published in March 2016 has been undertaken to understand if and/or how the potential impacts of HS2 could support the case for a Railway Station at Thornhill.

G.2.2 The review has highlighted that:

- Any future extension of an HS2 route into Scotland is unlikely to have any significant impact on services on the GSWL (Carlisle – Dumfries – Kilmarnock – Glasgow route);
- Implementation of HS2 may free up capacity on the existing WCML which in turn may take pressure off the GSWL to act as a diversionary route in the longer term;
- Provision of significant new HS2 infrastructure in Scotland may reduce the pressure for the GSWL to become a freight route, as freight should be able to be accommodated on the WCML where the line is bypassed by the HS2 route; and
- During the HS2 construction phase, the GSWL may be needed as a diversionary route whilst construction work is carried out. This might require an upgrade to the infrastructure (line speeds to 90/100 mph, extra signalling sections to deliver more capacity and complete redoubling of the Kilmarnock – Barrhead section) to provide for the diverted WCML services. If GSWL infrastructure is upgraded this will provide a long term opportunity to improve the local services offered. Infrastructure upgrades for freight are now becoming part of rail industry thinking in Scotland.

Conclusion

Any future extension of an HS2 route into Scotland is unlikely to have any significant impact on services on the GSWL although it may offer an opportunity to upgrade the infrastructure on the route if it is required as a diversionary route during HS2 construction works.

G.3 Scotland Route Study Review

G.3.1 A review has been undertaken of the Scotland Route Study which was published on 14th July 2016 and was the culmination of extensive work within the Scottish rail industry and consultation with wider stakeholders. The review of the study has been undertaken to identify if/how the study outcomes could support the case for a Railway Station at Thornhill.

G.3.2 The review highlighted:

- The Scotland Route Study has relatively little to offer the rural routes of which the GSWL route is probably the busiest;
- Bespoke analysis was limited, with growth to 2023 suggested as 4.4%, and longer term growth rates ranging from 0.3% to 2.4%, dependent on the scenario;
- Suggested infrastructure upgrades are limited and restricted to freight – gauge clearance for W10, possibly W12, as a diversionary route for the WCML, and electrification. This is outlined in the "Choices for Funders in CP6 and CP7 (2019 – 2029)" Section, where it is mentioned under Item 5 - Gauge enhancement;
- There are some significant suggested enhancements at the north end of the route, with East Kilbride and Barrhead/Kilmarnock electrification being proposed, coupled with redoubling some or all of the Barrhead to Kilmarnock section. **Redoubling would relieve a major constraint on timetabling over the whole route**;
- There are no proposals to change any infrastructure south of Kilmarnock, other than the potential freight gauge enhancement.

G.3.3 However, the 2043 Indicative Train Service Specification (ITSS) suggests that an hourly Glasgow – Kilmarnock – Dumfries – Carlisle service should be provided, plus an additional hourly Glasgow – New Cumnock service, creating a half hourly service frequency between Glasgow and New Cumnock.

G.3.4 This compares with the current somewhat randomly structured, timetable which offers an approximately two hourly end to end frequency but with bigger and smaller gaps. Peak time services into and out of Glasgow are broadly hourly.

G.3.5 The apparently random timetable is partly driven by the need to make as many class 156 diesel units as possible available for Glasgow peak services including East Kilbride. This will change if East Kilbride is electrified as the Glasgow area peak services will need to be resourced from a dedicated local electric fleet. **This presents an opportunity to revise the GSWL services to make full use of a captive diesel fleet more suited to long distance rural operation.**

G.4 Investing in the Future Choices for Scotland's Railways 2019 and beyond – Review

G.4.1 The Rail Delivery Group (RDG) published "Investing in the Future Choices for Scotland's Railways 2019 and beyond[13]" on 23rd September 2016.

G.4.2 It follows on from the Scotland Route Study and makes specific recommendations for possible investment in Scotland's railway in the medium term. There are no major surprises or changes of direction from the options considered and developed in the Scotland Route Study.

G.4.3 However, it does set the agenda for the funding discussions which will take place with Scottish Government through Transport Scotland over the next two years and set the course for the

[13] *http://www.raildeliverygroup.com/media-centre/press-releases/2016/469762882-2016-09-23.html*

railway well into the 2020s. For this reason, it is important. Key points in the context of the GSWL are:

- A more detailed "Industry Advice to Ministers" will be published in early 2017;
- It uses the Borders Railway as a Case Study as part of a regeneration package;
- There is a section (Chapter 4) linking the railway into the Scottish Government's Economic Strategy, which includes specific reference to Rural Policy;
- It recognises the possible trade-offs including journey times vs connectivity, although in the context of "Key corridors", not the rural routes;
- A long-term rolling stock strategy is raised – something of importance for the GSWL;
- Glasgow Central Capacity issues are presented as a Case Study which might present an opportunity for the GSWL;
- The approach to delivery is set out and offers a template for future work on the GSWL;
- The most important section is "A connected Scotland" which sets out the priorities.

G.4.4 The "A connected Scotland" section includes reference to potential projects that will or could impact on the GSWL. These include:

- **Gauge enhancements** – Glasgow to Carlisle via Dumfries

G.4.5 This is suggested to offer benefits for freight capacity and reliability – "Upgrading gauges to key alternative routes into Scotland such as the Glasgow and South Western line will improve railway resilience by enabling trains to be diverted during disruption". It is suggested to be in the cost range £100m - £300m.

G.4.6 However as witnessed during the service disruption to local services during the Lamington diversions, there is a need to do more than just gauge enhancement. In particular, there is a need to reduce the headways by increasing the number of signal sections and remove the capacity constraints caused by the single line sections between Kilmarnock and Barrhead. Ideally raising the line speed to 75 mph for multi-modal freight and if the route is required for passenger train diversions raising the speeds to 90/100mph for passenger trains should be on the agenda as well. Re-signalling Mauchline – Newton-on-Ayr could assist with freight diversions at the north end but will not help with passenger services.

- **Carstairs Area Enhancement**

G.4.7 Whilst not immediately impacting on the GSWL this major work will be highly disruptive and could potentially lead to disruption on the GSWL. This creates pressure to bring forward some aspects of the GSWL gauge enhancement work and especially with regards creating capacity for diverted passenger trains.

- **High Speed Enabling Projects**

G.4.8 This is for development work, not delivery, with delivery likely to be in the later 2020s. However, it is a time to start to engage actively with Network Rail to press the case for avoiding disruption to the GSWL services.

- **Greater Glasgow Improvements**

G.4.9 This includes reference to Glasgow Central High Level station enhancement which may include timetable changes to reduce the time trains occupy platforms at Central, transferring longer dwell times to outer stations.

G.4.10 Additional capacity is proposed on the Barrhead and East Kilbride routes by "providing additional infrastructure – potentially including electrification – to deliver additional services with more seats as well as optimising operations at Glasgow Central."

G.4.11 Electrification and enhancement to Kilmarnock/Barassie route is also proposed – "Making best use of the available capacity and providing a more resilient network delivering greater connectivity."

G.4.12 These proposals come with significant price tags.

G.4.13 There are proposals to continue with the "Ring Fenced Funds" which include the Stations Fund, the Level Crossing Fund and the Network Improvement Fund all of which may prove of value to the GSWL to create capacity for Thornhill Railway Station as well as provide part funding for the station, although the station fund will only provide a maximum of 50%.

G.4.14 There is, however, nothing in this document specifically for any of the rural routes, although there are a number of proposals for the major routes and suburban areas.

Conclusion

At first sight, the "Investing in the Future Choices for Scotland's Railways 2019 and beyond" document offers little for the GSWL. It does not propose any new stations or routes. However, it does create an opportunity for dialogue on a more integrated approach to developing the GSWL and to providing benefit which should enable Thornhill station to be considered further.

G.5 The Role of the Glasgow South West line

G.5.1 The Scotland Route Study and RDG's "Investing in the Future Choices for Scotland's Railways 2019 and beyond" publications discussed above are complimentary in respect to the GSWL.

G.5.2 It is clear from these documents that:

- **The rail industry considers that the GSWL has a role as a diversionary route for freight** that uses the WCML, but nothing has is suggested about the lines use for passenger service diversions.

  There is a need to develop the freight diversionary capability to ensure that rail freight can continue to offer a reliable service and remain a viable transport option. The potential disruption arising from the condition driven work at Carstairs lends some urgency to this. In addition, the diversionary route could be viewed as timeous advance works for longer term HS2 works, but that is not stated.

  What is not stated is how these additional trains might impact on the current train service on the GSWL. The Lamington passenger diversions in early 2016 resulted is a curtailment of the local service on the Barrhead – Kilmarnock section of line, to the detriment of the smaller communities. This cannot be an acceptable long term outcome. Some freight was routed via Mauchline – Ayr – Paisley, but this is a very long and time consuming route. Both documents are silent on any intention to provide sufficient route capacity for these diverted trains.

- **The passenger capability proposals are all in the Glasgow suburban area**. They fall into two broad groups: relatively minor infrastructure alterations to enable more trains to run and also potentially to release capacity at Glasgow Central and electrification of parts of or all of the East Kilbride and Barrhead/Kilmarnock/Barassie routes. The implication is that

there is going to be no major work to reduce the impact of the single line sections between Barrhead and Kilmarnock. This needs to happen prior to any electrification if it is to happen at all.

- **Outwith the Glasgow suburban area, the status of the rest of the GSWL is seen as part of the "Rural railway" as opposed to the Interurban railway** – which is branded "Seven Cities Connectivity" in the Investing in the Future Choices for Scotland's Railways 2019 and beyond" publication. The implication of the "Rural railway" designation is that **investment for enhancement is going to be more difficult to secure**. But conversely, the potential to open new stations to improve connectivity is probably greater as journey time is not seen as so critical.

G.5.3 **A key opportunity is potentially how this move to becoming the WCML freight (possibly passenger) diversionary route presents an opportunity to secure upgrades and improved services for the Dumfries and Galloway area**.

G.5.4 Key points are:

- The railway industry only looks at the current network, not new stations or routes;
- The industry is silent on the role of the GSWL as a passenger diversionary route;
- The industry is only considering the Glasgow suburban services in its thinking north of Kilmarnock;
- The freight route upgrade is only stated as considering freight gauge with no apparent view on the capacity required;
- The long term (2043) rural passenger service proposals are attractive, but they are a long time away;
- The current fleet of class 156 diesel units are approaching 30 years old. Their replacement will be an issue for the next franchise (post 2025);
- The issues for Dumfries and Galloway are intimately bound up with the issues for East Ayrshire, south of Kilmarnock.

G.5.5 This is the biggest focus on the GSWL since the Hunterston – Yorkshire coal route upgrade over ten years ago. However, that was a "panic measure" whereas the current focus is part of a wider strategic view of the whole of the railway in Scotland.

Conclusion

There is a current opportunity for Dumfries and Galloway Council and SWestrans to enter into dialogue with the railway industry as there is a need for both the local authorities and the railway to work together to achieve their individual outcomes. This offers a more balanced dialogue than is often the case.

G.6 Existing Capacity of the Glasgow South West Line

7.4.2 The GSWL can be divided into four sections for the purposes of considering the capacity available:

- Glasgow – Kilmarnock;
- Kilmarnock – Mauchline;
- Mauchline – Dumfries; and

- Dumfries – Gretna Junction/Carlisle.

Glasgow – Kilmarnock

G.6.1 This section of the route is currently operating at 100% of its effective capacity; with two Glasgow – Kilmarnock (and beyond) trains per hour in each direction passing on the Lugton – Stewarton double track, dynamic loop. Any additional train service is likely to require additional double track to permit two trains to run in each direction and to be able to pass one of two trains in the other direction on an extended dynamic loop. Full redoubling would be preferable as this would not link the times of the trains in opposite directions and would allow greater flexibility in managing other pinch points or connections. Redoubling should ideally be carried out prior to any electrification works, but if it is not, the electrification works should be designed to accommodate redoubling in the future.

Kilmarnock – Mauchline

G.6.2 This is the least used section of the route as much of the remaining coal traffic comes from Hunterston via Ayr and bypasses this section of the route, so it only accommodates one train an hour in each direction, which for a section that only takes a passenger train 12 minutes to traverse is a low use of capacity.

G.6.3 Mauchline Junction can be a constraint, as “up” freight trains (i.e. from the Ayr direction) have to restart on a gradient, having stopped to give up the single line token. This means that the “down” line is blocked for some five minute taking into account the published junction margins.

Mauchline – Dumfries

G.6.4 This is a long section of the route (49 miles) with only four intermediate signal boxes; New Cumnock, Kirkconnel, Thornhill and Holywell, thus creating, on average, ten-mile-long signal sections. The longest section is Kirkconnel to Thornhill at 15 miles and takes a passenger train 17 minutes to traverse, including a stop at Sanquhar, and 19.5 minutes for a loaded coal train in the southbound direction.

G.6.5 The addition of a station at Thornhill will extend the running time by at least two minutes, but the extra time will be spread over the two sections, one either side of Thornhill. Thornhill signal box is common to two signal sections, one in either direction. Both the Kirkconnel to Thornhill and Thornhill to Holywood rail journey time will therefore increase by a minute in each direction.

Dumfries - Gretna Junction - (Carlisle)

G.6.6 The GSWL section (Dumfries to Gretna Junction) is 24.5 miles with an additional almost 9 miles from Gretna Junction to Carlisle on the WCML. The 8 mile Annan - Gretna Junction section was redoubled in 2008 to provide capacity for the then burgeoning coal traffic between Hunterston port and English power stations especially in the Aire Valley. This removed a traditional bottleneck and, now the coal traffic has diminished to a trickle, there is spare capacity along this section of the route.

G.6.7 Capacity along the WCML is more constrained, especially for the one-mile southbound twin track section between Gretna Junction and Mossband, where the “up” freight lines diverge to go through Kingmoor Yards. The single “down” line is longer (2.5 miles) stretching from Floriston to Gretna Junction. Gretna Junction - Carlisle is provided with 4 aspect signalling and will provide a three-minute headway.

G.6.8 Gretna Junction is a single lead junction because of the need to provide as high a speed as possible on the WCML. This is currently less of a constraint with the low volume of freight traffic using the GSWL route, but it does restrict the timetabling options.

G.6.9 Additionally, there is a short (0.5 mile) twin track section just to the north of Carlisle station to Caldew Junction – the access to the south end of Kingmoor Yards.

G.6.10 The headways here are dominated by the Annan - Dumfries section where passenger trains take around 15 minutes, stopping at both stations. The running time is 19 minutes for a loaded coal train (south bound), which is limited to 60 mph (and has to accelerate from the 40 mph speed restriction through Dumfries station), but only 14 minutes for an empty coal train running in the opposite direction which is permitted to run at 75mph.

G.6.11 This section **will be operating at close to 100% of capacity if a half hourly frequency passenger service is operated as suggested in the Scotland Route Study for 2043**.

G.7 Future Potential Capacity of the Glasgow South West Line

G.7.1 The future capacity of the GSWL is difficult to predict as it depends of the future use of the route and investment or dis-investment in capacity.

Carlisle – Gretna Junction – Dumfries

G.7.2 The 2043 view in the Scotland Route Study would result in two passenger trains per hour on the Gretna Junction – Dumfries section and up to (depending on the wider cross-border freight routing strategy adopted) one class 4 (75 mph) or class 6 (60 mph) freight train in each hour in each direction.

G.7.3 In addition, the Gretna Junction – Carlisle route section would see a total six freight trains per hour (including those to/from the GSWL) plus potentially up to eight passenger trains an hour (including the GSWL services) in each direction.

G.7.4 This level of train service with eleven WCML trains and three GSWL trains per hour in each direction is likely to be in excess of the capacity of Gretna Junction or the short twin track section between Gretna Junction and Mossband and into Carlisle station. However, these major strategic issues and solutions will be driven by strategic decisions on cross border freight and passenger operations including HS2. Consequently, they will not be considered further in this report.

G.7.5 On the GSWL itself the Gretna Junction – Dumfries section will be operating at virtually full capacity with the half hourly train service suggested for 2043. This will not permit the operation of the additional freight trains. The solution is relatively simple – to provide additional intermediate signals (probably two sets, giving a seven or eight-minute headway from Gretna Junction as far as Holywood (3.5 miles north of Dumfries) to break up the long Annan to Dumfries section. This is possible using the same technology as was originally proposed or could be introduced if the route is to be re-signalled with modern radio based cab signalling – European Train Control System (ETCS) sometimes known as ERTMS (European Rail Traffic Management System).

G.7.6 The coal route upgrade project had included the provision of intermediate block signals to break up the long sections in addition to the Annan - Gretna Junction redoubling. However, a large part of the funding was used to achieve the required approvals, through the Network Rail Approvals process, for the equipment chosen. Consequently, these extra signals were not installed on the GSWL, although intermediate signals were provided to break up key long sections on the Settle - Carlisle route in Cumbria and North Yorkshire.

Dumfries – Kilmarnock

G.7.7 North of Dumfries there is capacity for the proposed two trains per hour (one each passenger and freight) over the Dumfries to New Cumnock section. North of New Cumnock to Kilmarnock, two passenger trains per hour are suggested by the Scotland Route Study, with the additional hourly Glasgow to New Cumnock service. This is unlikely to require much extra signalling, as

the section lengths are around 10 to 12 minutes. There should therefore be sufficient capacity to operate the half hourly passenger train service and still run freight trains in between them, especially if some are only running south of Mauchline, making use of the freight line to Ayr, rather than the route to Kilmarnock.

G.7.8 However, it may be necessary to provide intermediate signals between New Cumnock and Thornhill to provide more flexibility in timetabling by reducing the minimum interval between trains.

Kilmarnock - Glasgow

G.7.9 North of Kilmarnock, the current part single track infrastructure is unable to support the operation of more trains. However, the key driver for change here will be electrification and the provision of more capacity will be driven by this, so it will not be considered in this report.

G.8 Impacts of Re-opening Thornhill Station on the Wider Rail Network

G.8.1 The addition of an extra station call into the timetable for Thornhill will add additional time to a train compared with running non-stop. The current timetable is obviously planned running between Sanquhar and Dumfries non-stop. Section G.6 suggests that the minimum addition of two minutes to non-stop running times would allow time for a station call. This time extension has been used in this report to illustrate the issues that will arise from the extra station call.

G.8.2 The extension of journey time means that trains will arrive later and/or start earlier compared with the current timetable so that the general integrity of the timetable is maintained. The GSWL only has two major points of interaction with the wider railway:

- At the northern end: north of Kilmarnock; and
- At the southern end: Gretna Junction.

G.8.3 **At Gretna Junction the interaction is with the WCML where it is necessary to thread the GSWL services between the long distance cross border passenger and freight services. These services are planned around numerous network constraints and pinch points so the times that trains cross Gretna Junction may not be easily moveable**.

North-end re-timing

G.8.4 At the north end, the two single line sections between Kilmarnock and Barrhead are a major constraint as they limit the number of trains that can be operated (two per hour in each direction) and also tie together the times of trains in opposite directions because of the need to cross on the double track sections; north of Barrhead and between Lugton and Stewarton. This limits the degree of flexibility in timetabling, especially as adding a station south of Kilmarnock could result, for example, in a northbound train being two minutes later in this area and a southbound train being two minutes earlier. Appendix H shows the effect over a representative afternoon period and shows:

- There is generally only one train to or from Carlisle in every hour and in some hours there are currently none, as the Glasgow - Dumfries/Carlisle service is less than hourly;
- The critical factors are that many of the trains cross in or very close to Barrhead station and the addition of an extra call at Thornhill, which adds two minutes to the running time, is likely to result in a potential clash on the Lugton – Barrhead single line to the south of Barrhead. This will delay the southbound train, although it does not impact on the crossing on the longer loop (with two stations) between Lugton and Stewarton (Lockridge Junction);

- In the southbound direction a Carlisle bound train will not be able to leave Barrhead two minutes earlier as it will clash with a northbound train which is still on the single line from Lugton; and

G.8.5 As a consequence, there is a potential need to retime one Glasgow - Kilmarnock train for every Glasgow – Carlisle train that is retimed in each direction. No attempt has been made to assess the timetabling consequences at Barrhead, Busby Junction, or on the approaches to Glasgow Central, where there are numerous other trains and thus potential conflicts.

G.8.6 This illustrates that **what appears to be a relatively simple re-timing becomes complex when the wider network is considered**. **Any significant re-timing at the north end of the route could require a comprehensive re-planning of all the services on this route, including the Barrhead and East Kilbride suburban services and the impact would be right into Glasgow Central station.**

G.8.7 Realistically this is unlikely to be an option unless, as suggested in the Scotland Route Study and the RDG's "Investing in the Future Choices for Scotland's Railways 2019 and beyond", these routes are proposed for additional infrastructure and/or electrification, which would drive a re-timing to take advantage of the faster acceleration offered by electric trains.

Conclusion

Re-timing issues are apparent at the northern end of the GSWL. If a new stop were to be provided at Thornhill, the re-timing required to cater for the new station might best be accommodated by re-timing at the southern (Gretna/Carlisle) end of the route.

South-end re-timing

G.8.8 Gretna Junction is a "Single Lead Junction" where the twin tracks of the GSWL (the southbound (up) & northbound (down) lines) come together into a short section of single line which then joins the northbound (down) WCML. There is a trailing crossover immediately to the south of this connection which permits southbound trains from the GSWL to reach the southbound WCML and run into Carlisle. Therefore, the southbound GSWL trains occupy the northbound line for a short time and prevent northbound trains running. These southbound GSWL trains are therefore a potential constraint on the 'flexing' of the northbound GSWL train operations. (The single lead junction is a constraint, but it is designed to deliver higher WCML speeds than would be possible with a double junction where this conflict would not occur).

G.8.9 The two tables in Appendix I show, simplistically, train operations in the Gretna to Carlisle area as it impacts on the GSWL passenger services.

G.8.10 Table I.1 shows the northbound train times for trains operating on the WCML and GSWL and indicates where there is potential conflict with southbound GSWL services.

G.8.11 Table I.2 shows similar information for southbound trains on the WCML and GSWL and indicates where there is potential conflict with northbound GSWL and WCML services. In this table, the times shown are the arrival times of trains into Carlisle. The reference to 'departing 2 minutes later' applies only to WCML trains passing through Carlisle (and not to the GSWL trains). This is shown so that the *connectional allowance* can be seen. The *connectional allowance* is the time required between the public arrival time of a train and the public departure of a following train to generate connections in timetable engines. The *connectional allowance* at Carlisle is 8 minutes. If the connection time from a train from the GSWL onto a WCML train going south is currently 8 or 9 minutes, then adding 2 minutes for a call at Thornhill will reduce these times to 6 or 7 minutes respectively and thus break that published connection.

G.8.12 The tables demonstrate that merely extending the journey times of GSWL trains by two minutes (at the southern end) will cause interaction with trains running on the WCML. There is the potential to destroy a number of currently published connections which are already, in some

cases, substandard. It is clear that there is no generic solution to this issue and that each train would need to be considered on its merits.

Conclusion

Extending train journey times by two minutes at the southern end of the route will cause interaction with trains running on the WCML with the potential to destroy a number of currently published connections. There is no generic solution to this issue and each train would need to be considered on its merits.

Other potential solutions

G.8.13 Other than north or south end re-timing of GSWL services to accommodate the additional time required for a rail stop at Thornhill, there are a number of other possible options to consider:

- **Reduction in engineering or pathing allowance:** Some trains have pathing time which is likely to be unnecessary and thus can be removed as use of the GSWL for coal diminishes - but it is unevenly spread about the route and between trains depending on the specific circumstances of each conflict. The level of engineering allowance is considerable – a total of six minutes spread along the route: two minutes south of Dumfries, two minutes between Dumfries and Kilmarnock and two minutes north of Kilmarnock. This may be excessive with the cessation of heavy coal traffic, especially once any remedial track work required as a consequence of the coal traffic has been completed;

- **Changes in line speed:**

  - A potential generic upgrade would be to raise the generally blanket line speed of 70 mph (there are some 80 mph sections) to 75 mph - the maximum speed for the class 156 units currently used on the route. This was considered and rejected in the past, but a new station may offer more justification;

  - A differential line speed for diesel multiple units might be appropriate, especially with the reduction in heavy freight traffic;

  - Longer term the provision of more modern 90 or 100 mph diesel units and the use of the GSWL as a diversionary route for the WCML during HS2 or other WCML capacity driven upgrades might suggest a wholesale upgrade in line speeds. Some of this potential journey time improvement could then be traded for a call at Thornhill.

- **Reduced calls at other stations:** If there is a move to introduce the half hourly frequency Glasgow to New Cumnock service (as is suggested in the Scotland Route Study), then Thornhill might be served by calls in existing longer distance Glasgow - Dumfries - Carlisle trains with a call at one of the smaller stations between Thornhill and Kilmarnock removed from these trains and only served by the new Glasgow to New Cumnock trains. As this will require a decision to forgo a large increase in the service at the chosen station it is likely to have to be one of the two stations within the Dumfries and Galloway Council area (similar to the outcome at Stow on the new Borders Railway):

  - Kirkconnel (20,650 users per year[14]); or

  - Sanquhar (27,472 users per year[15]).

[14] Figure 2014/15 data from ORR website

[15] Figure 2014/15 data from ORR website

- **Abellio ScotRail Franchise Agreement**: The Abellio ScotRail franchise agreement includes some service upgrades on the GSWL route. Section 15.11 of the agreement sets out the agreed changes:
  - 3 additional through passenger services, two of which are new and one an extension of an existing passenger service;
  - 2 further extensions of passenger services to provide better through connectivity and consistency of service pattern;
  - 1 additional Dumfries and Carlisle shuttle;
  - A reduction in the longest and average interval between passenger services. The longest interval to reduce from 3 hours to 2 hours and the average time between passenger services on this route will be reduced by a little over about half an hour; and
  - A greater number of daytime connections.

G.8.14 All this is required to happen by December 2017.

G.8.15 None of the detail of what this means is currently in the public domain. But it will require at least one additional class 156 multiple unit to be allocated to the route.

G.8.16 The rail industry timetable process will require detailed timetabling to be available by March 2017. It is expected that ScotRail will consult with SWestrans and SPT over the new timetable, but this has tended to happen after the March date. Transport Scotland will be aware of the proposed timetable prior to that date.

G.8.17 The key point about this service improvement, which is the first major upgrade since the introduction of the class 156s in the late 1980s, is that it **will significantly reduce the generalised journey times as a result of the increased numbers of trains run, hence the reduction in the service interval. This could permit the introduction of calls at Thornhill with a much reduced adverse impact on other journeys currently being made. As a major service re-timing and resource plan will be required this gives the opportunity to add the time for a call at Thornhill into the timetable to future proof it**, as happened with Conon Bridge on the Inverness – Wick/Thurso route.

Conclusion

The re-timing of existing services, at either the northern or southern end of the GSWL route to allow for a call at Thornhill station presents clashes with other train paths and would require a comprehensive re-planning of all the services on the route, and at the southern end has the potential to destroy a number of published connections. However, a potential reduction in unnecessary pathing time, increases in the generic line speed, the potential for reduced calls at other stations or improvements made as part of the Abellio ScotRail franchise agreement offer alternative opportunities for the introduction of a stop at Thornhill.

G.9 Impacts of re-opening two stations

G.9.1 In terms of the Railway Station re-opening at Thornhill, this option is considering the re-opening of the station in isolation. However, a similar study is being undertaken for the Eastriggs area, for which a Railway Station re-opening option is also being considered. As both stations are on the same rail line, if both were to be built there are potential interactions to be considered, which are discussed here.

Demand

G.9.2 The provision of both Thornhill and Eastriggs Railway Stations would not have a great impact on the commercial aspects of the route as they are 38 miles apart and either side of Dumfries - the key passenger station at the south end of the route.

G.9.3 The only journeys that would have their journey time impacted are Gretna Green and Annan to Kilmarnock and Glasgow, and Kilmarnock and the Cumnock Valley stations to Carlisle.

Train Service

G.9.4 Of more importance is the impact on the train service: timetable and potentially resourcing.

G.9.5 It is suggested that it may be possible to introduce either of the two new stations with some adjustments to the existing timetables, as the impact of one station call is about two minutes. However, the combined effect of introducing two calls and adding four minutes to the end-to-end running times is likely to require a more comprehensive recast of the timetable.

G.9.6 The addition of four minutes additional running time in each direction will reduce the turn round time at one end of the route by eight minutes. This may have a material impact on operation of the timetable as there are instances where trains will not arrive early enough to be available to make their next journey. In such circumstances a comprehensive re-timetabling exercise will need to take place, and this may require additional rolling stock and/or train crew. Note that this has not been explored further but is flagged as a potential issue depending on the outcome of the initial individual station appraisals.

G.9.7 In summary - **should both Thornhill and Eastriggs Railway stations be promoted, then additional, more detailed, timetabling work will be required to assess the impact of opening both stations on the operation of the whole GSWL route.**

Consequences

G.9.8 If both stations were considered as suitable for funding, and the delivery of one station is an early priority, then there may need to be a choice made through a prioritisation process. This could be the one that was least disruptive to the timetable to deliver.

Other potential new stations on the GSWL

G.9.9 There are potentially four communities in East Ayrshire between Kilmarnock and New Cumnock which might also benefit from the provision of a station.

G.9.10 These are (listed in order south from Kilmarnock and with approximate populations):

- Hurlford: pop. 5,000;
- Catrine: pop. 2,500;
- Mauchline: pop. 4,000; and
- Cumnock: pop. 13,000.

G.9.11 Clearly any new stations on this stretch of line will be for East Ayrshire Council and/or Strathclyde Passenger Transport (SPT) to consider and promote. However, should they do this, there will be an impact on the train service into the Dumfries and Galloway Council area and an impact on the train service that is being considered to serve potential new stations at Thornhill and Eastriggs.

G.9.12 It is possible that the provision of new stations at some or all of these new stations would happen at the same time as the suggested Glasgow - New Cumnock hourly train service, which would become a service completely focused on this northern section of the route. In these circumstances, calls on the longer distance trains serving Dumfries and Galloway stations would not have any additional calls added, although there may be a desire for redistribution of the current calls within the new suite of East Ayrshire stations.

G.9.13 However, if only one new station is proposed with the existing service it would, in timetable terms, have the same impact as a station at Thornhill and effectively be in competition with Thornhill for the space in the timetable.

G.9.14 This suggests that **there is a need to consider the strategic role of the GSWL in this part of Scotland and the potential implications of additional stations and train services.**

G.10 Rail Freight Hub Potential

G.10.1 The potential for a re-opened Thornhill Railway Station to operate as a dual use passenger-freight station has been explored and is discussed here.

G.10.2 Traditionally there has been some overlap between passenger and freight station activities in the era of labour-intensive railway operation. On today's capital-intensive railway – although common *route* infrastructure is routinely involved – these are now highly separate activities in terms of local demand and supply, with different locational requirements for stations / terminals (both macro and micro), site footprints, site infrastructure, staffing and neighbour impacts.

G.10.3 On occasions, there may be conflicts between passenger and freight requirements, for example where a new passenger station might encroach on sidings or loop lines otherwise used by, or potentially usable for, rail freight traffic.

G.10.4 The inherent technical characteristics of rail operation (guided track, steel wheel on steel rail, and a segregated and signalled right of way) give rail freight particular strengths for transits which involve:

- Large regular volumes – ideally trainloads of typically 500+ tonnes payload;
- Long hauls – particularly important when both ends of the transit are not directly rail-connected; and
- Direct rail connection at one end of the transit at least – saving the cost of rail to road transfer and local road collection/delivery.

G.10.5 Until very recently, coal had long been the dominant commodity on Britain's freight railway – particularly electricity supply industry coal from mine to power station, but also industrial coal to large processing plants such as cement and steel works. In recent decades, with the major decline in deep mining, the pattern of rail movement in Scotland changed significantly – substantially switching away from short hauls from local deep mine to power station, to long hauls, typified by Anglo-Scottish movements of imported (via Hunterston) coal and domestic opencast (largely Ayrshire) coal to English power stations.

G.10.6 In the regional context, in recent years, the coal market has moved into severe decline, and this has had a particular impact on the GSWL line from Ayrshire through Thornhill, Dumfries and Eastriggs to Carlisle – along which infrastructure capacity was substantially enhanced 5-10 years ago, but whose coal traffic levels are now substantially reduced.

G.10.7 In the case of traditional bulk rail traffics – such as coal, cement, oil, aggregates, etc. – rail's high-volume movement, direct from private siding to private siding (with no road legs involved) can be very competitive with road haulage, even over relatively short distances. Currently there

are no bulk rail freight terminals in the SWestrans area, although timber from the south of Scotland is loaded to rail at a railhead in Carlisle.

G.10.8 The non-bulk (or 'unitised') rail freight business in Scotland is overwhelmingly dominated by the intermodal load-carrying method, i.e. in containers – typically through multi-user hub or regional railheads, with local collection / delivery by road from the traffic origin / destination. Currently there are no intermodal railheads in the SWestrans area, the nearest being within Central Scotland at Coatbridge, Grangemouth and Mossend. A small railhead in Carlisle handles bulk and non-bulk traffics on an irregular basis, but not in containers.

G.10.9 Over the past twenty years there have been a range of studies / initiatives to develop rail freight facilities in the SWestrans area. The majority involved rail linkage of sites with specific existing or planned manufacturing / processing activities on site, playing to rail strengths where a road collection is not required. None have been realised, demonstrating the difficulty of turning rail potential into reality, even when relatively large volumes of traffic are on offer on site or in the immediate catchment area. Those sites known to have been investigated are:

- **Maxwelltown (1):** handling wood chip from local saw mills for rail transport to the Shotton Paper mill in north east Wales. The project was abandoned when Shotton Paper moved to 100% recycled fibre rather than virgin material;

- **Maxwelltown (2):** In the late 1990s it was planned to reinstate the rail connection to the BP oil distribution depot on the short branch line from Dumfries to Maxwelltown, as part of a Freight Facilities Grant-assisted project encompassing rail handling facilities at the Grangemouth refinery and various railheads across Scotland and near Carlisle. This element of the rail project was not pursued, and the track has been removed and the solum converted into a walkway and cycle path;

- **Steven's Croft (Lockerbie):** The forest industry development site here was designed specifically so that rail connection to the WCML could be provided. The key players on site established the Lockerbie Railfreight Company, and between 2000 and 2003 various consultancy studies were undertaken in preparation for the submission of a Freight Facilities Grant application to the Scottish Executive.

  In 2002, following difficulties in generating a positive response from the rail industry, initial feasibility work began on a wood and waste fired power station which would occupy part of the site of the proposed intermodal railhead and would have a major impact on the balance of transport demand on site. In early 2003, the rail project was put on hold, pending the outcome of a full feasibility study of the power station concept. The latter subsequently was given the go-ahead, the Lockerbie Railfreight Company was wound up, and the access embankment from the WCML was removed. A significant proportion of the proposed railhead site is now occupied by the power station, with most of the remaining land used for timber storage and related activities. Rail prospects almost certainly now depend on any future Phase 2 Steven's Croft development, with rail access built in;

- **Beattock:** rail connection to the East West Haulage freight depot adjacent to (and east of) the WCML, to handle timber and other commodities. The scheme did not proceed;

- **Chapelcross:** handling organic waste material from various cities for conversion to energy pellets to supply power stations. The site development did not proceed;

- **Quintinshill:** railhead / rail access from West Coast Main Line for proposed nearby Canonbie coking coal mine. The mine project is in abeyance following the drop in world coal prices; and

- **Eastriggs (Ministry of Defence sidings):** potential rail-served spoil destination for mined material from the proposed Canonbie coking coal mine near Quintinshill. The mine project is in abeyance following the drop in world coal prices.

G.10.10 The above illustrate the difficulty in establishing rail freight facilities in a rural area, both where speculative or pre-existing on-site, traffic-generating, developments are involved. A fundamental lesson which can be drawn is that on-site, traffic-generating sources are a necessary – but not sufficient – condition for the realisation of rail freight opportunities. Substantial volumes, and often lengthy hauls, are also key.

G.10.11 With regard to demand, it is understood that there are no existing or planned major manufacturing or processing activities at or close to the potential passenger station at Thornhill. The concept of a timber railhead at Thornhill serving a wider catchment is undermined by the scattered nature of demand, the general absence of long hauls to market which would suit rail economics, and the general lack of direct rail connections to board, paper and saw mills which would be the customers (with a few notable exceptions).

G.10.12 No timber currently moves by rail in Scotland, although timber from Galloway forests is understood to be amongst that loaded to rail at the Carlisle timber railhead, which draws in supplies from a wide road-served catchment to support the regular trainload operation to the rail-connected major Kronospan mill in north east Wales.

G.10.13 Thornhill is not attractive from a *supply* perspective, the station site being located on a minor road, which would require HGVs to pass through the centre of Thornhill village. Any future rail haulage of timber from the wider catchment would be more cost-effectively handled from existing / mothballed coal railheads to the north in East Ayrshire (such as New Cumnock) or from any future rail-connected Steven's Croft Phase 2 development (with baseload rail business on site facilitating the rail economics for timber).

Conclusion

In light of the specific locational issues above, and the wider generic mis-match between passenger station and freight railheads on the modern railway, it is recommended that no further analysis should be undertaken into a potential dual-use facility at Thornhill.

G.11 Summary

G.11.1 The key points to note are:

- The Scotland Route Study and Rail Delivery Group's '*Investing in the Future Choices for Scotland's Railways 2019 and beyond*' publications, in line with established policy, do not propose any new stations or routes. However, they do create an opportunity for dialogue on a more integrated approach to developing the GSWL and to providing benefits which will enable Thornhill station to be delivered.

- In terms of the role of the GSWL, it is clear from the documents that:

  - The rail industry considers that the GSWL has a role as a diversionary route for freight;

  - The passenger capability proposals are all in the Glasgow suburban area;

  - Outwith the Glasgow suburban area, the status of the rest of the GSWL is seen as part of the "Rural railway".

- In terms of the addition of a new station stop at Thornhill, the re-timing of trains at both the northern or southern end of the GSWL route to accommodate the additional stop has been considered. At the northern end, re-timing issues are apparent and what appears to be a relatively simple re-timing becomes complex when the wider network is considered. Any significant re-timing at the north end of the route could require a comprehensive re-planning of all the services on this route, including the Barrhead and East Kilbride suburban services and the impact would continue to Glasgow Central station. Extending train journey times at the southern end of the route to provide the additional stop would cause interaction with

trains running on the WCML due to the 'single lead' Gretna junction (where the twin tracks of the GSWL route come together into a short section of single line which then joins the northbound WCML). The re-timing of trains at the southern end of the GSWL line to accommodate the additional stop at Thornhill has the potential to affect a number of currently published connections. As such, there is no generic solution to this issue and each train would need to be considered on its merits.

- An additional stop at Thornhill may be possible if there were a potential reduction in unnecessary pathing time, increases in the generic line speed, or the potential for reduced calls at other stations - if there is a move to introduce the half hourly frequency Glasgow to New Cumnock service (as is suggested in the Scotland Route Study). A reduction in calls at another station would require a decision to forgo a large increase in the service at the chosen station and therefore the chosen station is likely to have to be one of the two stations within Dumfries and Galloway Council area (similar to the outcome at Stow on the new Borders Railway) namely Kirkconnel or Sanquhar. Improvements being made as part of the Abellio ScotRail franchise agreement may also offer alternative opportunities for the introduction of a stop at Thornhill Railway Station.

- A similar study is being undertaken for the Eastriggs area, for which a Railway Station re-opening option is also being considered. As both stations are on the same line, consideration has been made of the impact if both were to be re-opened. It is clear that should both stations be promoted, then additional, more detailed, timetabling work will be required to assess the impact of opening both stations on the operation of the whole GSWL route.

- The wider generic mis-match between passenger station and freight railheads on the modern railway means there is limited potential for a dual-use freight-passenger facility at Thornhill. It is therefore recommended that no further analysis should be undertaken into a potential dual-use facility at Thornhill.

Appendix H Part 1: Feasibility - Option 6 - North End Re-timing Impacts

Table H.1: Effect of additional stop at Thornhill on Carlisle trains

					From Carlisle							To Carlisle		
			Nthbd	Sthbd	Nthbd	Sthbd	Nthbd	Sthbd	Nthbd	Sthbd	Nthbd	Sthbd	Nthbd	Sthbd
	Existing Timetable	Kilmarnock	13 57	14 49	14 58	15 21	15 28	15 49	15 57	16 20	16 27	16 50	16 57	17 20
		Lochridge Jn	14 05	14 40.5	15 06	15 12	15 36	15 40.5	16 05	16 11.5	16 35	16 41.5	17 05	17 11.5
		Lugton	14 14	14 32	15 15	15 03	15 45	15 32	16 14	16 03	16 44	16 33	17 14	17 03
		Barrhead	13 21.5	14 24.5	15 23	14 54	15 52	15 24	16 21	15 54	16 52	16 24	17 21.5	16 54
Timetable with additional station call in Carlisle trains. Trains 2min later coming north, 2min earlier going south.	**Timetable** with additional call in Carlisle trains	Kilmarnock	13 57	14 49	15 00	15 21	15 28	15 49	15 57	16 20	16 27	16 48	16 57	17 20
		Lochridge Jn	14 05	14 40.5	15 08	15 12	15 36	15 40.5	16 05	16 11.5	16 35	16 39.5	17 05	17 11.5
		Lugton	14 14	14 32	15 17	15 03	15 45	15 32	16 14	16 03	16 44	16 31	17 14	17 03
		Barrhead	13 21.5	14 24.5	**15 25***	14 54	15 52	**15 24***	**16 21***	15 54	16 52	**16 22***	17 21.5	16 54
	Timetable re-timing for additional call in Carlisle trains***	Kilmarnock	13 57	14 49	15 00	15 21	15 28	15 51	15 55	16 20	16 27	16 48	16 57	17 20
		Lochridge Jn	14 05	14 40.5	15 08	15 12	15 36	15 42.5	16 03	16 11.5	16 35	16 39.5	17 05	17 11.5
		Lugton	14 14	14 32	15 17	15 03	15 45	15 34	16 12	16 03	16 44	16 31	17 14	17 03
		Barrhead	13 21.5	14 24.5	**15 25**	14 54	15 52	**15 26 ****	**16 19****	15 54	16 52	**16 22**	17 21.5	16 54

Yellow and green shaded cells show the pairs of trains crossing on the "Lugton" loop

**clashes at Barrhead*

***Re-timed trains to remove clashes at Barrhead*

****The consequence of retiming two Carlisle trains (one in each direction) is a need to retime two Glasgow - Kilmarnock trains due to a clash at Barrhead. Note that no attempt has been made to assess the consequences of these retimings at Barrhead, Busby Jn or on the approaches to Glasgow Central*

Appendix I Part 1: Feasibility - Option 6 - South End Re-timing Impacts

Table I.1: Existing timetable and conflicts at Gretna Junction – Down (Northbound) trains

		WCML	GSW	WCML	GSW	WCML	GSW	WCML	GSW	WCML	GSW
DOWN (Northbound) Trains		1S26		6S99		1S32		1S49		1S51	
Carlisle	arr	**05 14**				**08 10**[1]		**11 09.5**		**13 06.5**	
	dep	**05 16**	**05 31**		**06 08**	**08 12**	**08 15**[2]	**11 11.5**	**11 15**	**13 08.5**	**13 12**
Gretna Jn		05 25	*05 41*	*06 07*	*06 17*	*08 19*	*08 24*	*11 18*	*11 24*	*13 15*	*13 21*
Gretna			**05 43**		**06 19**		**08 26**	**11 20.5**	**11 26**		**13 23**
UP (Southbound) conflicts at Gretna Jn GSW trains			***05 26***				***08 13***		***11 11***		***13 10.5***

		WCML	GSW	WCML	GSW	WCML	GSW	WCML	GSW	WCML	GSW
DOWN (Northbound) Trains		1S61		1S66		1S72		1S81		9S93	
Carlisle	arr	**15 07**[1]		**16 10.5**[4]		**17 49.5**[1]		**19.10.5**[5]		**21 00**	
	dep	**15 09**	**15 12**[3]	**16 12.5**	**16 17**	**17 52**	**17 57**	**19 12**	**19 17.5**	**21 02**	**21 12**
Gretna Jn		15 15.5	*15 21*	*16 19.5*	*16 26*	*17 59*	*18 06*	*19 19*	*19 26.5*	*21 09*	*21 21*
Gretna			**15 23**		**16 28**		**18 08**		**19 28.5**		**21 23**
UP (Southbound) conflicts at Gretna Jn GSW trains		**15 11**	***15 25***		***16 43***	***17 55***	***18 22***		***19 31***		***21 30.5***

		WCML	GSW
DOWN (Northbound) Trains		1S06	
Carlisle	arr	**22 50.5**	
	dep	**22 52.5**	**23 10**
Gretna Jn		*22 59*	*23 19*
Gretna			**23 21**
UP (Southbound) conflicts at Gretna Jn GSW trains		***23 13.5***	***23 28***

[1] *Not a published connection*
[2] *Public time 2 mins earlier*
[3] *Public time 6.5 mins earlier*
[4] *Public time 1 min earlier to create a connection*
[5] *Public arrival time 1 min earlier to create a connection*

Table I.2: Existing timetable and conflicts at Gretna Junction – Up (Southbound) trains

	GSW	WCML	WCML	GSW	WCML	WCML	GSW	WCML	WCML	GSW	WCML
UP (Southbound) Trains		1R20	1M06			9M50		1M92	1M93		1M09
Gretna	**05 22**			06 41			**08 07**			**09 25**	
Gretna Jn	05 26	05 35.5	06 41	06 45	06 54.5	07 58.5	08 11	08 23	09 24	09 32	09 41
Carlisle arrive (Depart 2mins later)	**05 35**	**05 42**	06 47	06 54	07 00.5	**08 04**	**08 20**	**08 31.5**	**09 31**	**09 41**	**09 47**
DOWN (Northbound) conflicts at Gretna Jn - GSW trains	05 32			07 04			08 24			09 19	
DOWN (Northbound) conflicts at Gretna Jn - WCML trains	05 25			06 59			08 19			09 17	09 29.5
			WCML	**GSW**	**WCML**	**WCML**	**GSW**	**WCML**	**WCML**	**GSW**	**WCML**
UP (Southbound) Trains			1M10		9M53	1M96		1M12	1M98		1M14
Gretna				**10 49**[1]			**12 22**			**14 21.5**	
Gretna Jn			**10 41**	10 51	**11 03**	12 21	12 26	12 41.5	**14 21.5**	14 25.5	**14 40**
Carlisle arrive (Depart 2mins later)			**10 47**	**11 02**	**11 09**	**12 28**	**12 35**	**12 47.5**	**14 28.5**	**14 34.5**	**14 46**
DOWN (Northbound) conflicts at Gretna Jn - GSW trains							12 30				
DOWN (Northbound) conflicts at Gretna Jn - WCML trains				1055			12 13	12 36		14 20.5	
			GSW	**WCML**	**WCML**	**WCML**	**GSW**	**WCML**	**WCML**	**GSW**	**WCML**
UP (Southbound) Trains				1M99	1M15	1M91		1M17	1M92		1M18
Gretna			**15 21**				**17 31**			**18 22**	
Gretna Jn			15 25	15 30	15 40	17 23	17 33	17 44	18 21	18 26	18 38
Carlisle arrive (Depart 2mins later)			**15 34**	**15 37**	**15 47**	**17 30**	**17 44**	**17 51**	**18 28**	**18 35**	**18 44**
DOWN (Northbound) conflicts at Gretna Jn - GSW trains			15 21				17 29			18 06	
DOWN (Northbound) conflicts at Gretna Jn - WCML trains			15 29			17 18	17 25	17 44		18 19.5	

[1] *Published 11 04. No published connection into 9M53*

Appendix J Part 1: Affordability - Option 6 – Station Costs and Patronage

J.1 Station Costs

Table J.1: Costs for recently constructed or soon to be built stations

Station	Status	No. of platforms and length	Electrified	Footbridge	Car Park	Estimated Cost	Outturn Cost	Comment
New Court	Opened June 2015	One 124m	No	No	No (4 disabled)	£1.44m	£2.2m	Cost increase due to extra signaling work
Lea Bridge	Opens May 2016	Two	Yes	Yes, lifts	No	£6.5m	£11.6m	Re-opening – existing platforms used
Ilkeston	To open autumn 2016	Two	No	Yes, ramps	Yes 90 spaces	£6.5m	C£9.6m	Much delayed by Great Crested Newts and flooding issues
Pye Corner	Opened Dec 2014	One 145m	No	No	Yes 62 spaces	£3.5m		Built (not by Network Rail) in 8 months so assume prices as budget. Provision for 2nd platform
Apperley Bridge	Opened Dec 2015	Two 100m	Yes	Existing new steps / ramps	Yes 297 spaces	£16m for the two	£16.9 max	Park & Ride
Kirkstall Forge	Opened June 2016	Two 100m	Yes	Yes, lifts	Yes 120 Spaces	£16m for the two	£16.9 max	Regeneration site
Low Moor	Planned for May 2017	Two 96m	No	Yes, lifts	Yes 128 spaces	£10.5m		Ground conditions, due to mining have created costs
Kenilworth	Planned in CP5	Two 100m	No			£11m	N/A	
Bermuda Park	Jan 2016	Two 75m	No	Underpass, ramps	Yes 30 Spaces	£13.6m package	£19.2m	Package included Bedworth platform lengthening (to 77m) & new platform at Coventry

Station	Status	No. of platforms and length	Electrified	Footbridge	Car Park	Estimated Cost	Outturn Cost	Comment
Coventry Arena	Jan 2016	Two: 1 x 76m, 1 x 149m	No		Yes 80 spaces	£13.6m package	£19.2m	Package included Bedworth platform lengthening (to 77m) & new platform at Coventry
East Linton and Reston	No date planned	Two, Probably 150m	Yes	Yes	Yes	£21.8m for the pair	N/A	GRIP3 Costs April 2016
Robroyston	No date given	Two At least 120m	Yes	Yes	Yes	Over £14m	N/A	Scottish Station Fund announcement - which will provide 50% of the costs (over £7m), suggesting a cost in excess of £14m.

Data Sources:

Newcourt, Devon: *https://www.gov.uk/government/news/new-144-million-railway-station-to-be-built-in-devon, http://www.bbc.co.uk/news/uk-england-devon-33007069, https://www.google.co.uk/search?q=new+court+station&ie=utf-8&oe=utf-8&gws_rd=cr&ei=EUwhV6T2E-uVgAbF_4awDg#q=new+court+station+planning+application*

Lea Bridge, London: *https://www.gov.uk/government/news/new-65-million-railway-station-to-be-built-in-waltham-forest*

https://branding.walthamforest.gov.uk/Documents/ke134-lea-bridge-station-re-opening.pdf

Ilkeston: *http://www.derbyshire.gov.uk/transport_roads/public_transport/news_notices/ilkeston_rail_station/default.asp?VD=ilkestonstation*

Pye Corner: *http://www.bbc.co.uk/news/uk-wales-south-east-wales-25962533, https://en.wikipedia.org/wiki/Pye_Corner_railway_station http://www.southwalesargus.co.uk/news/11666021.Newport_s___3_5m_Pye_Corner_rail_station_opened_in_record_time/#comments-anchor https://www.gov.uk/government/news/new-35-million-railway-station-to-be-built-in-the-ebbw-valley*

Apperley Bridge: *http://www.wymetro.com/ApperleyBridge/, http://www.wymetro.com/news/projects/projectdetails/kirkstallforgerail/*

Kirkstall Forge: *http://www.wymetro.com/news/projects/projectdetails/kirkstallforgerail/, http://www.wymetro.com/uploadedFiles/WYMetro/Content/news/projects/projectdetails/Local%20Authority%20Major%20Schemes%20-%20Revised%20Full%20Approval%20Form%281%29.pdf*

Low Moor: *http://www.wymetro.com/news/projects/projectdetails/lowmoor/ http://www.thetelegraphandargus.co.uk/news/11434077.New_railway_station_at_Low_Moor_remains_on_track_as_land_deal_about_to_be_struck/#comments-anchor*

Kenilworth: *https://www.gov.uk/government/news/kenilworth-new-station*

Coventry Arena and Bermuda Park: *http://www.bbc.co.uk/news/uk-england-coventry-warwickshire-35341487, http://www.bbc.co.uk/news/mobile/uk-england-coventry-warwickshire-16180361, https://en.wikipedia.org/wiki/Bermuda_Park_railway_station*

Laurencekirk: *http://news.bbc.co.uk/1/hi/scotland/north_east/8055093.stm*

Conon Bridge: *http://www.railtechnologymagazine.com/Rail-News/conan-bridge-station-open-after-50-years?utm_medium=email&utm_source=Rail+Technology+Magazine&utm_campaign=2163488_thedailyrailnews+February+2013+Week+3&dm_i=IJS%2c1ADCW%2c4DF2LV%2c4D29L%2c1*

Reston and East Linton: *https://www.transportxtra.com/publications/local-transport-today/news/48842/cost-of-new-scots-rail-stations-trebles*

Robroyston: *http://www.spt.co.uk/documents/RTP090514_agenda14.pdf, http://news.scotland.gov.uk/News/Funding-boost-for-proposed-station-at-Robroyston-2b9d.aspx*

J.1.1 It can be seen that there are a range of costs for the recently built or soon to be built new stations.

J.1.2 There are a number of stations that are close in design/specification to Thornhill:

- Two twin-platform stations on electrified lines in West Yorkshire: **Apperley Bridge** and **Kirkstall Forge**, each costing about £8.5m each. (The published information is £16.9m for both of them.). Both stations have large car parks, but they are also linked into wider development sites;
- The two platform station at **Low Moor**, which is not on an electrified line, is more expensive at £10.5m, and had ground issues due to mining;
- **Ilkeston**, with an outturn cost of approximately £9.6m and has had well-publicised difficulties with Great Crested Newts and flooding issues; and

J.1.3 **Robroyston** was announced at the end of September 2016 with no final cost, but a Scottish Stations Funds award of over £7m which was for 50% of the cost. This station includes considerable alteration to OLE, with the new OLE standards making their impact.

Station Costs

J.1.4 Table J.1 suggests outturn costs for these stations in the range **£8m - £14m**.

J.1.5 It should be noted that:

- The two single platform stations noted in the table at **Pye Bridge** (£3.5m) and **New Court** (£2.2m) are both under half the cost of the two platform stations, but that is reasonable, as not only do they have half the platforms, but they do not require a footbridge.
- **Pye Bridge** was not built by Network Rail;
- **New Court** looks good value compared with all the other stations listed, and is more in line with recent Scottish experience, such as:
  - **Laurencekirk** (two 150m platforms, footbridge with steps and ramps) re-opened in May 2009 at a cost of £3m; and
  - **Conon Bridge** (single 15m platform, no footbridge and minimal car parking) which re-opened in February 2013 at a cost of £600k (£0.6m).

Appendix K Part 1: Accessibility Analysis

K.1 Introduction

K.1.1 A lack of direct public transport travel routes was identified as a key problem during the Pre-Appraisal stage of the study. Options 1a, 1b and 1c all consider improved direct access from Thornhill to the railway network, seeking to address the problem. Existing journey times from Thornhill to key destinations on the railway network (Lockerbie, Carlisle, Edinburgh and Glasgow) have been considered alongside estimated journey times to these key destinations with the options in place. Appendix K shows the analysis for the options for:

- An AM trip (made at approximately 08:00);
- A PM trip (made at approximately 17:00); and
- An evening trip (made at approximately 20:00).

K.1.2 For the existing travel time, the travel time has been considered by car, bus only, and by a combination of bus and train.

K.1.3 Analysis of the change in public transport to car travel time differential (i.e. the difference in journey time between a trip by public transport and the same trip by car, in both the existing and option situation) has also been undertaken which considers by how much the options reduce the public transport travel time compared to the car i.e. how much more 'competitive' does the option make public transport. This analysis is also presented in Appendix K.

K.2 Options 1a, 1b and 1c – Existing vs. Option Estimated Journey Times

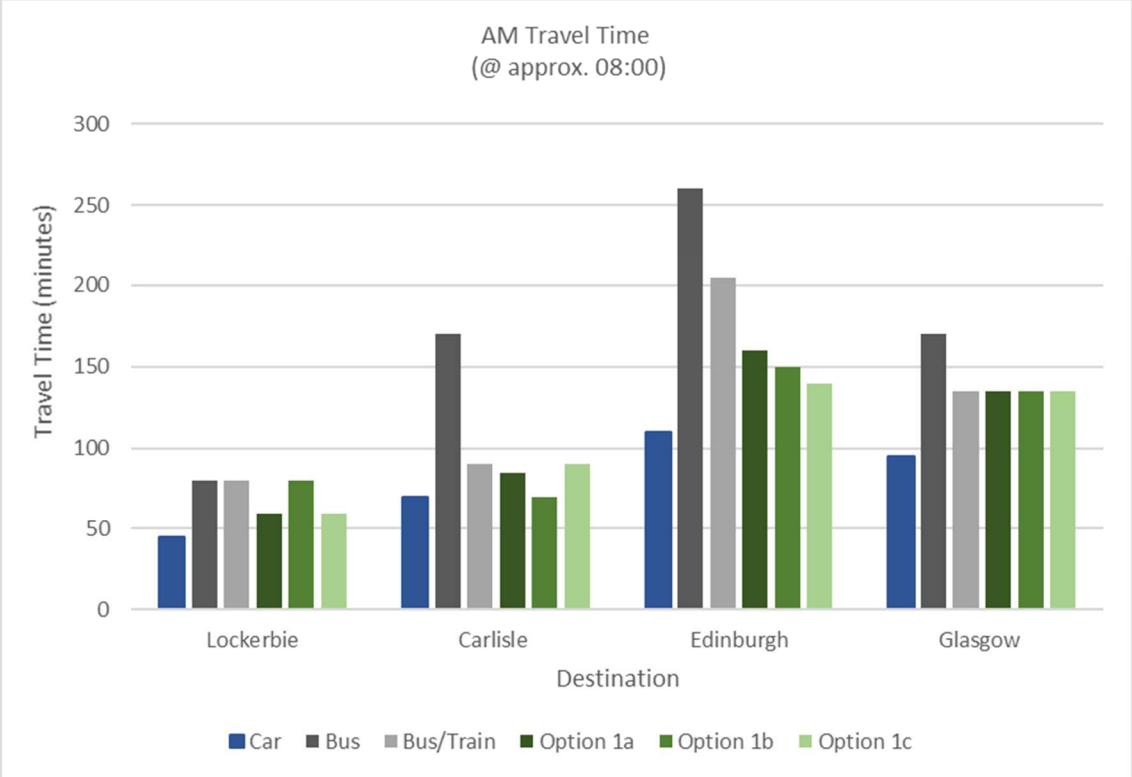

Figure K.1: Options 1a, 1b and 1c – Existing vs. option Journey Times - AM

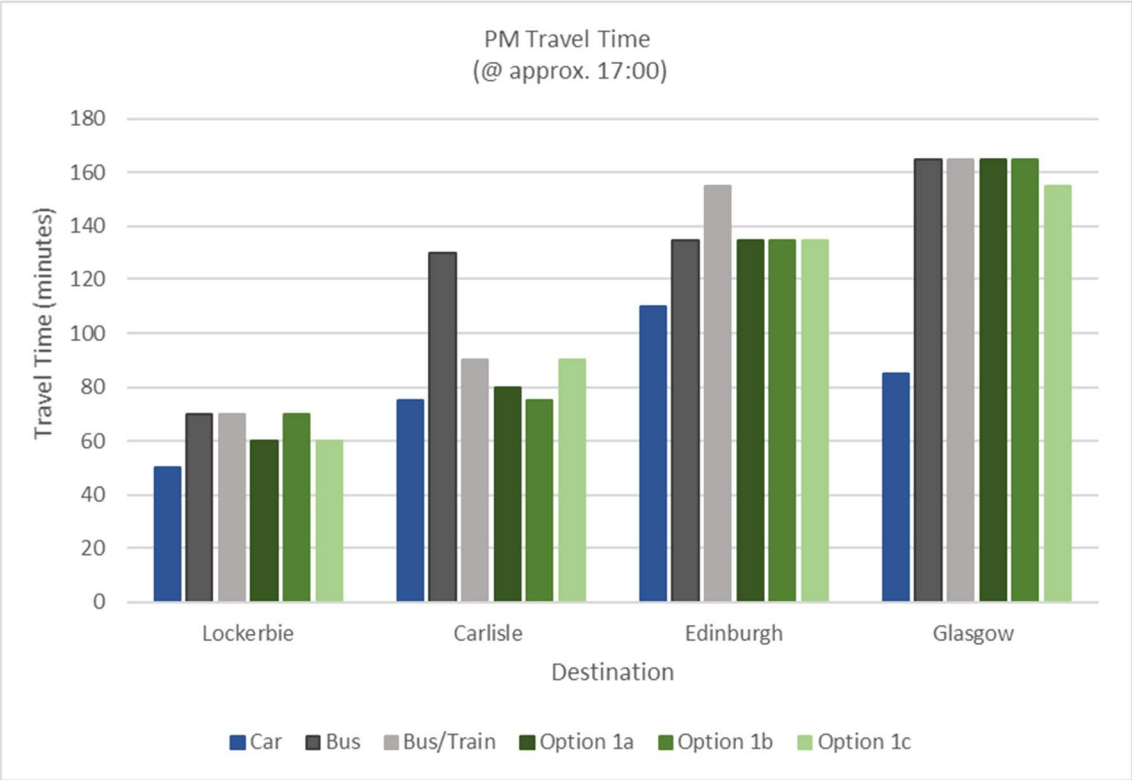

Figure K.2: Options 1a, 1b and 1c – Existing vs. option Journey Times - PM

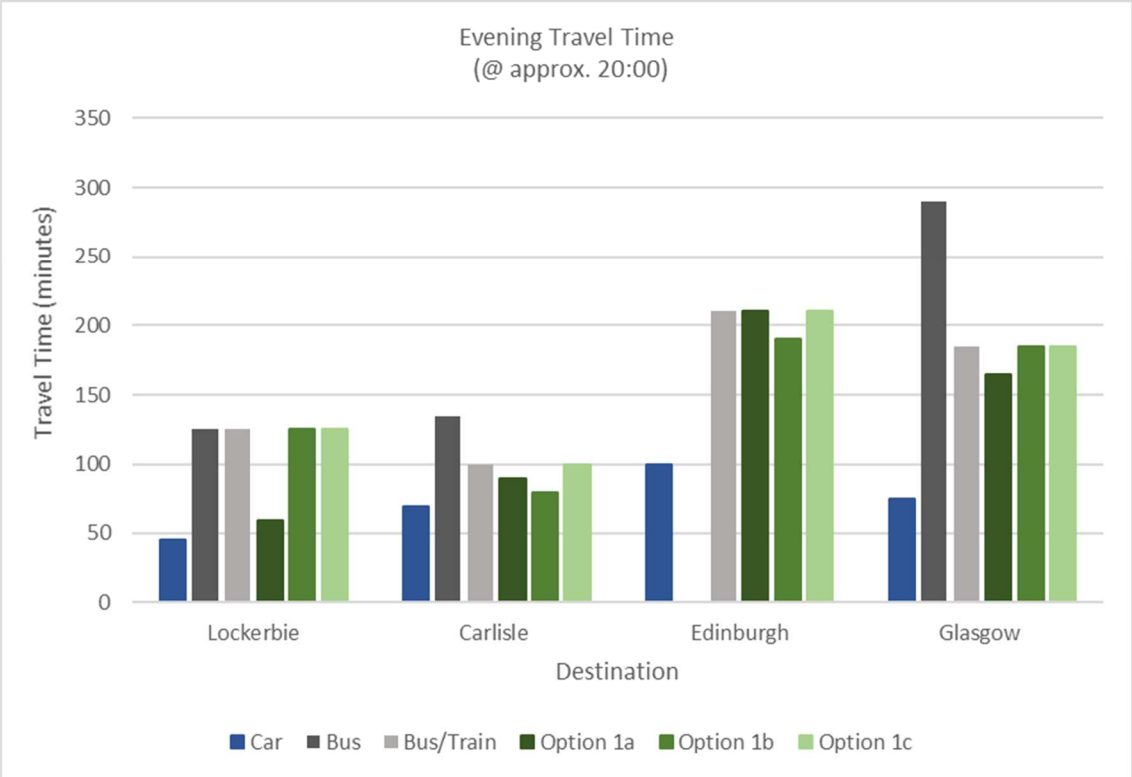

Figure K.3: Options 1a, 1b and 1c – Existing vs. option Journey Times - Evening

Table K.2: Options 1a, 1b and 1c – Public Transport vs. Car travel Time Differential

		Public Transport - Car Travel Time Differential (minutes)				Public Transport - Car % Travel Time Differential Reduction			
	Scenario	Lockerbie	Carlisle	Edinburgh	Glasgow	Lockerbie	Carlisle	Edinburgh	Glasgow
AM	Existing	35	20	95	40	-			
	Option 1a	15	15	50	40	-57%	-25%	-47%	0%
	Option 1b	35	0	40	40	0%	-100%	-58%	0%
	Option 1c	15	20	35	40	-57%	0%	-63%	0%
PM	Existing	20	15	25	80	-			
	Option 1a	10	5	25	80	-50%	-67%	0%	0%
	Option 1b	20	0	25	80	0%	-100%	0%	0%
	Option 1c	10	15	25	80	-50%	0%	0%	0%
Evening	Existing	80	30	110	110	-			
	Option 1a	15	20	110	90	-81%	-33%	0%	-18%
	Option 1b	80	10	90	110	0%	-67%	-18%	0%
	Option 1c	80	30	110	110	0%	0%	0%	0%

K.2.1 The analysis shows:

- Reductions in the public transport to car journey time differential, specifically for:
  - Option 1a for travel to Lockerbie and Edinburgh;
  - Option 1b for travel to Carlisle (at all times considered), and Edinburgh (in the AM and evening periods); and
  - Option 1c for travel to Lockerbie (in the AM and PM periods), and Edinburgh in the AM period).
  - Travel in general to Edinburgh for all options in the AM period when a reduction in travel time by public transport of around 40 minutes is achieved.
- No benefit over the existing situation for travel to Lockerbie for Option 1b. This is as expected given the option only improves access to Dumfries Railway Station;
- No benefit in travel to Glasgow in the AM or PM period when the options are implemented. This is to be expected given the options focus on connecting Thornhill to the railway network at Dumfries and Lockerbie and not to Sanquhar to the north of Thornhill which is likely to be the most appropriate place to join the rail network if heading northbound to Glasgow. A benefit is however seen for Option 1a in the evening period, as a bus to rail connection can be made at Lockerbie onto a high speed WCML service to Glasgow.

K.3 Option 6 – Existing vs. Option Estimated Journey Times

K.3.1 Car travel times, existing public transport travel times and estimated public transport travel times if Thornhill Railway Station were to be re-opened have been compared for trips from Thornhill to:

- Dumfries;
- Carlisle;
- Edinburgh; and
- Glasgow.

K.3.2 The results of the analysis are shown in Figure K.4 to Figure K.7 travel across the day from 07:00 to 22:00.

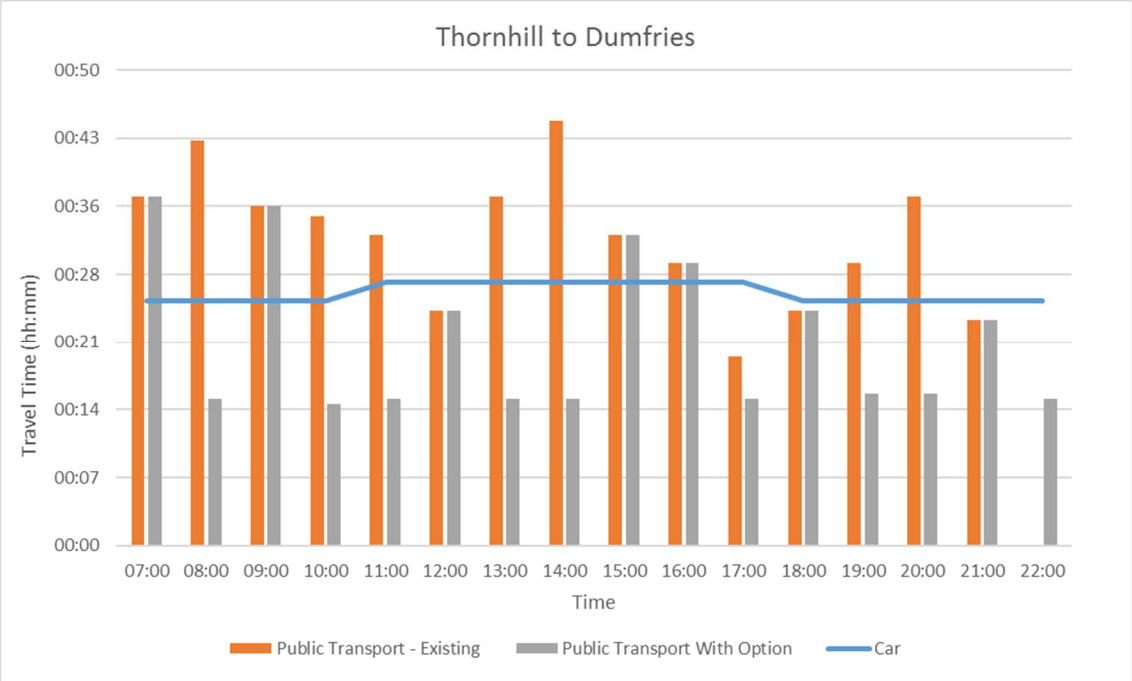

Figure K.4: Options 6 – Existing vs. Option 6 Journey Times – Thornhill to Dumfries

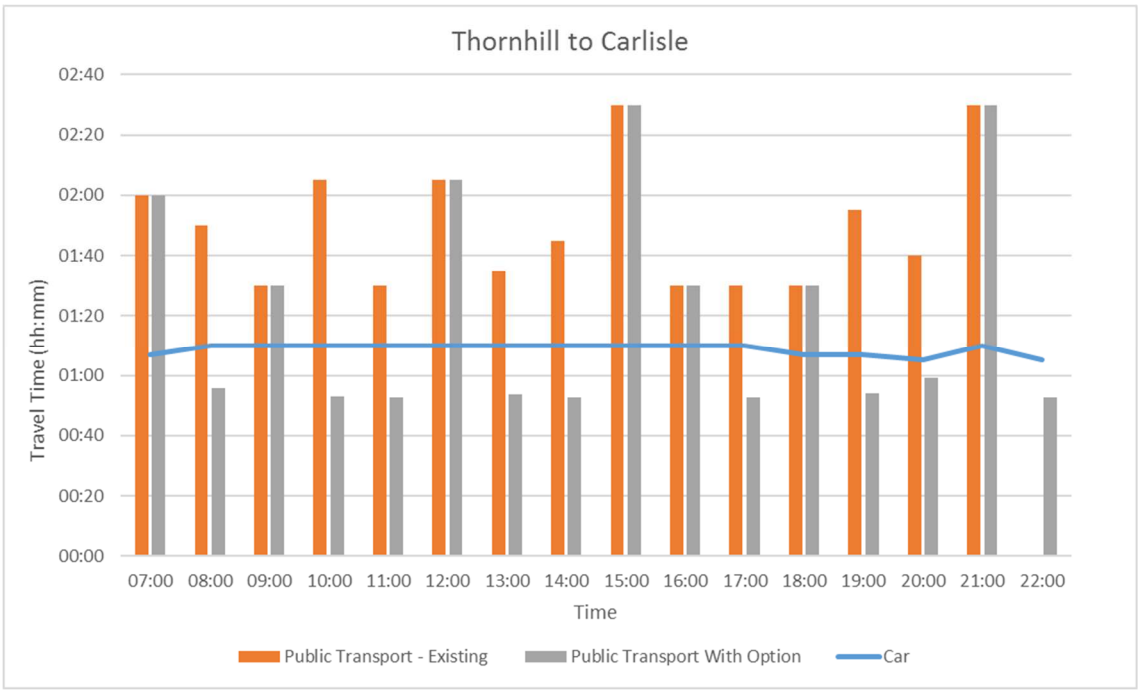

Figure K.5: Options 6 – Existing vs Option 6 Journey Times – Thornhill to Carlisle

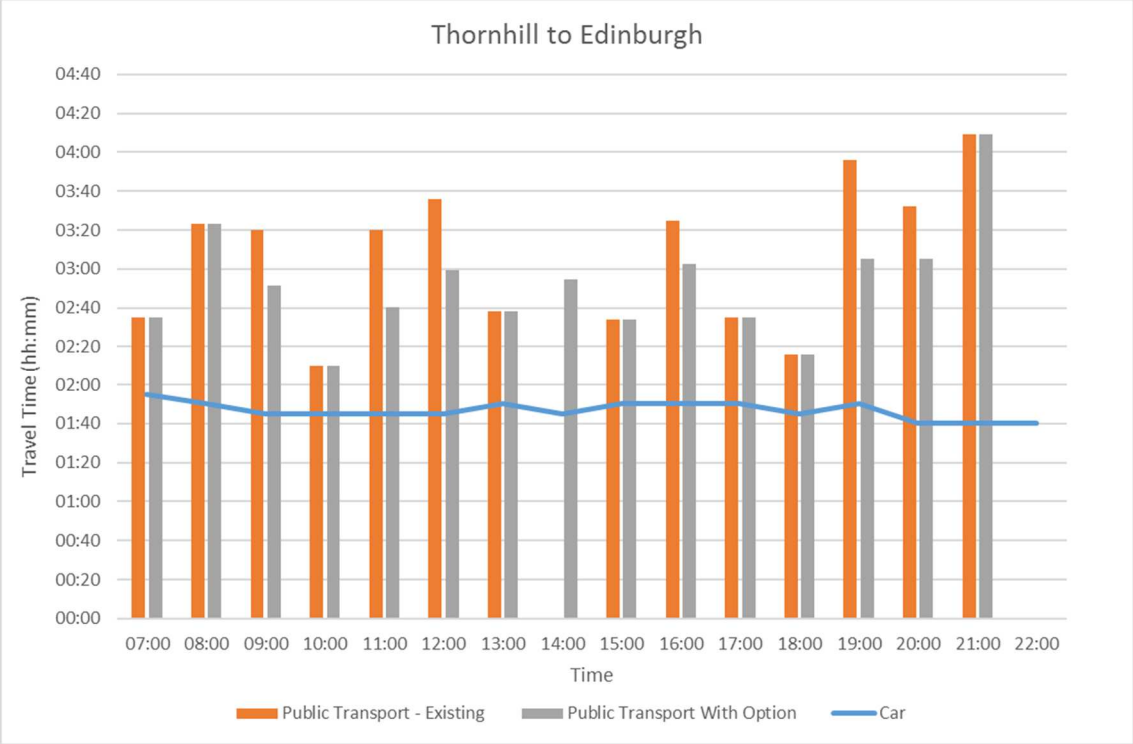

Figure K.6: Options 6 – Existing vs. Option 6 Journey Times – Thornhill to Edinburgh

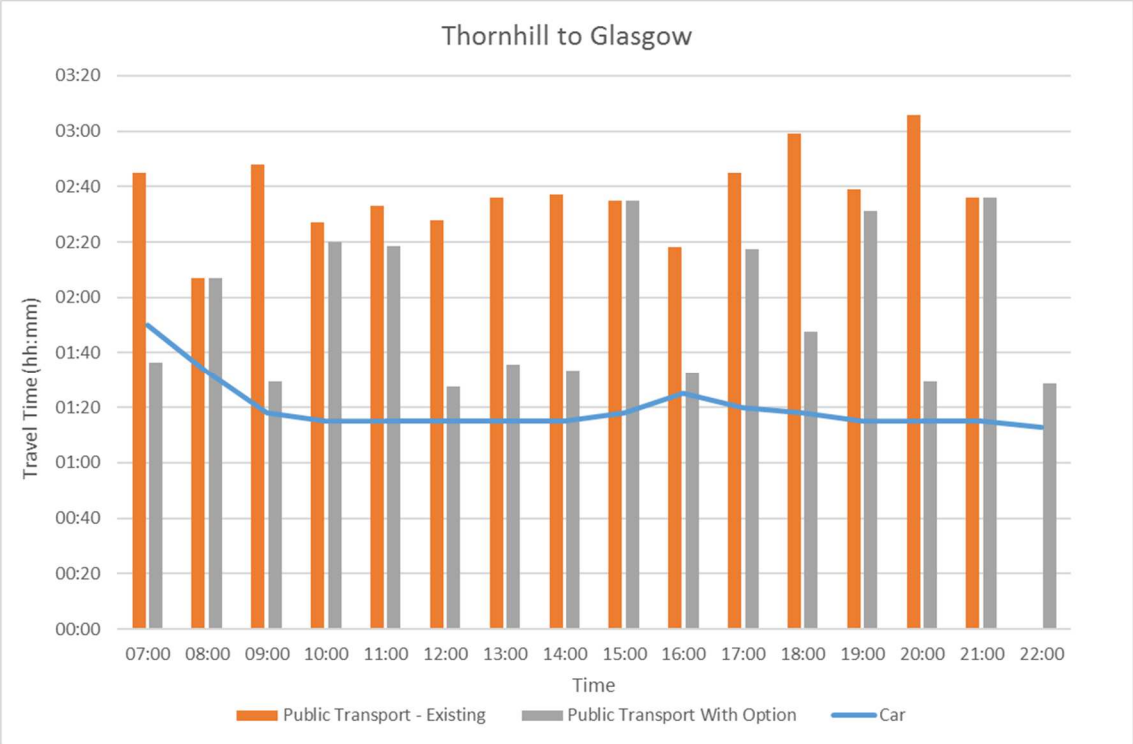

Figure K.7: Options 6 – Existing vs. Option 6 Journey Times – Thornhill to Glasgow

K.3.3 The results show, with the option in place, trips to Carlisle experience up to a 60% reduction in public transport travel time, with the largest reduction in time equating over 1 hour 10 minutes in public transport travel time reduction. Trips by public transport are quicker than the private car in 9 of the 16 hours considered when the trip by public transport can be up to around 15 minutes quicker. Trips to Glasgow experience up to around a 50% reduction in public transport

travel time, with the largest reduction in time equating over 90 minutes in public transport travel time reduction. Trips by public transport are never quicker than the private car with the quickest travel time by public transport still 15 minutes slower than the private car. The option also provides a new opportunity to travel to Glasgow after 22:00. Journey times to Ayr also reduce by around 20 minutes in the morning period and around 15 minutes for return journeys in the evening period. This differences open up opportunities for more effective day trips to the strategic locations, especially Carlisle. This could have a positive benefit in helping the community feel less remote and better connected, with the same opportunities as other parts of Scotland.

K.3.4 Travel times to Edinburgh are unaffected and as such the option does not provide benefit in enabling an effective day trip to the capital.

Appendix L Part 1: Integration Analysis

L.1 Introduction

L.1.1 Analysis to inform the appraisal against the Integration criteria, has focused on transport integration (as opposed to land-use or policy integration) including:

- Potential transport integration benefits between bus and rail modes; and
- The impact of reduced interchange time on journey times by sustainable transport.

L.1.2 Only Options 1a, 1b and 1c seek to directly provide integration benefits between bus and rail modes. As such, the integration analysis has focussed on these three options.

L.1.3 Options 1a, 1b and 1c

L.1.4 Option 1 comprises three sub-options:

- Option 1a: Provision of a dedicated direct bus service operating between Thornhill, Dumfries Railway Station and Lockerbie Railway Station, integrated to reduce interchange times between bus and rail;
- Option 1b: Extension of the existing Service 246 to include a stop at Dumfries Railway Station – with adjustment of the bus timetable to reduce interchange time between bus and rail arrival/departure times; and
- Option 1c: Extension of the existing Service 81 / 381 to Thornhill. No adjustment to service times.

L.1.5 A dedicated Railbus linking Thornhill with Dumfries and Lockerbie Railway Stations would remove the required walk time (in Dumfries) and reduce wait times.

L.1.6 It is not currently possible to travel directly from Thornhill to Lockerbie by bus – passengers must interchange between Services 246 and 81 / 381 in Dumfries to make the connection.

L.2 Existing Situation

L.2.1 In order to understand the integration benefits that may be generated in terms of improved integration between bus and rail modes, current bus and rail timetables have been examined to establish current interchange times at both Dumfries and Lockerbie railway stations for both departing and arriving passengers on the railway network.

L.2.2 Interchange has been considered for:

- Passengers arriving by bus from Thornhill and interchanging to rail at Dumfries / Lockerbie Railway Station onto southbound trains;
- Passengers travelling from the south by rail, alighting at Dumfries / Lockerbie Railway Station and then travelling onwards by bus to Thornhill.

L.2.3 The analysis considers ‘access time’ i.e. the total travel time from Thornhill to a departing train (i.e. an outbound trip), or from an arriving train back to Thornhill (an inbound trip) and considers bus travel time, any walk time required between bus stop and railway station and any wait time (either at the station for outbound trips) or at the appropriate bus stop (for inbound trips).

L.2.4 It is assumed that Thornhill residents joining the rail network to head north would do so at Sanquhar Railway Station to the north of Thornhill and therefore interchange times at Dumfries and Lockerbie Railway Stations for trains travelling northbound have not been examined.

L.2.5 Figure L.1 to Figure L.4, show how **existing** bus services to and from Thornhill tie in with rail departure times from Dumfries and Lockerbie Railway Stations. For each rail departure the figures indicate time spent on the bus, walk time between the bus stop and station, and additionally time spent waiting at the station. For example, for arrivals by rail (when the trip being considered is from the railway station back to Thornhill), the figures include the walk time from the station to the required bus stop, wait time at the bus stop, and the journey time by bus back to Thornhill.

L.2.6 Figure L.1 and Figure L.2 illustrate that at present, in the **outbound** direction:

- Bus services from Thornhill do not allow access to the first two southbound rail departures from Dumfries or first three from Lockerbie;
- Approximately 12 minutes' walk from the existing 246 bus stop in Dumfries to the railway station;
- Overall, interchange time makes up circa 50% of total 'access' journey time for outbound trips via Dumfries Railway Station and 30% via Lockerbie Railway Station;
- Total 'access' journey times, from Thornhill to boarding a train at Dumfries, range from 41 minutes to nearly 2 hours; and
- Total 'access' journey times, from Thornhill to boarding the train at Lockerbie, range from one hour 10 minutes to nearly 2 hours and 20 minutes.

L.2.7 Figure L.3 and Figure L.4 illustrate that at present, in the **inbound** direction:

- No available bus service to Thornhill if alighting from the last two northbound train arrivals at Dumfries or the last four into Lockerbie;
- Wait times at the bus stop in Dumfries range from six minutes to nearly 1hour 45 minutes;
- Overall interchange time makes up circa 55% of total 'access' journey time for inbound trips via Dumfries Railway Station and 35% via Lockerbie Railway Station; and
- Total 'access' journey times from Dumfries Railway Station range from around 50 minutes to nearly 2 hours 30 minutes; and
- Overall 'access' journey times, from Lockerbie Railway Station range from around one hour 10 minutes to nearly 2 hours 30 minutes.

L.2.8 Integration between bus services to/from Thornhill and rail services from Dumfries and Lockerbie is therefore considered to be presently poor.

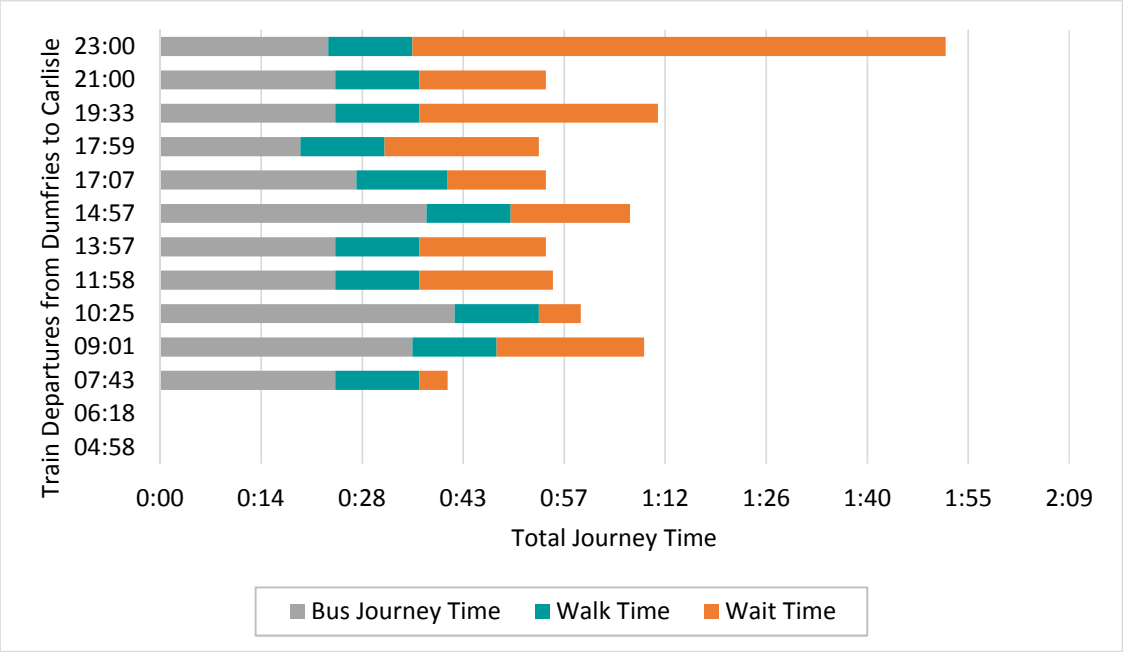

Figure L.1: Total Journey Time from Thornhill to Dumfries Rail Departure (Current)

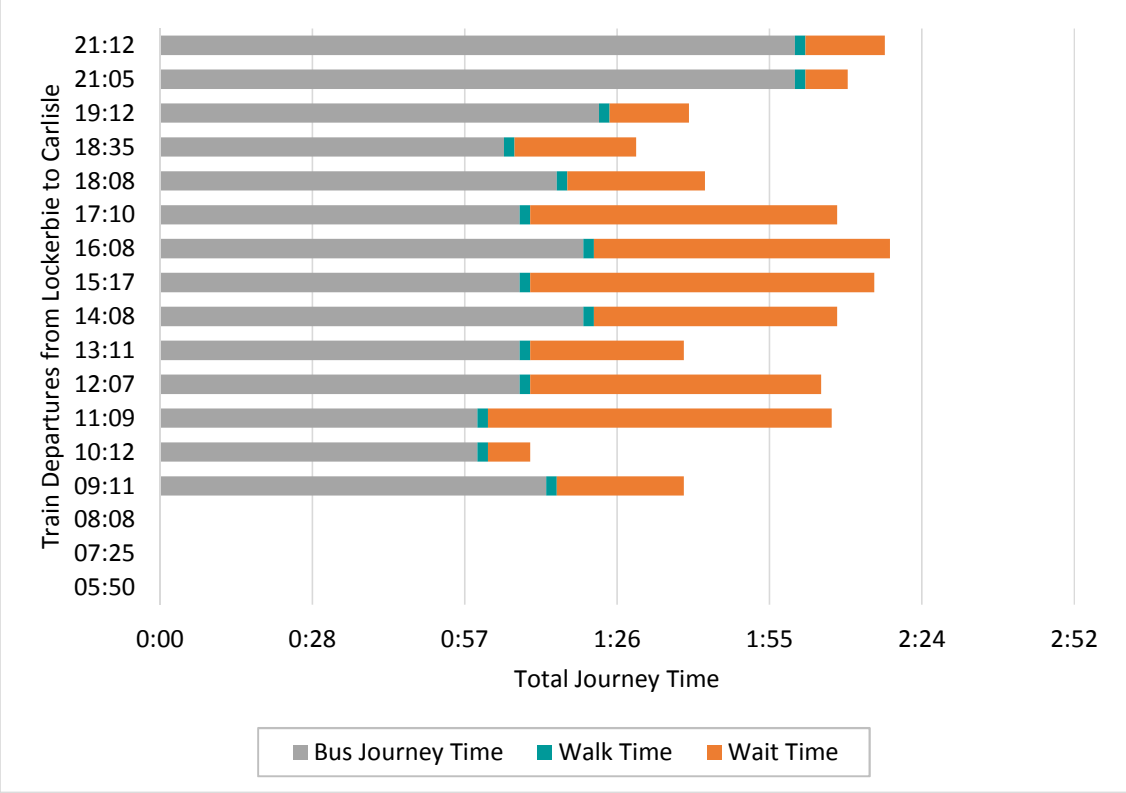

Figure L.2: Total Journey Time from Thornhill to Lockerbie Railway Station (Current)

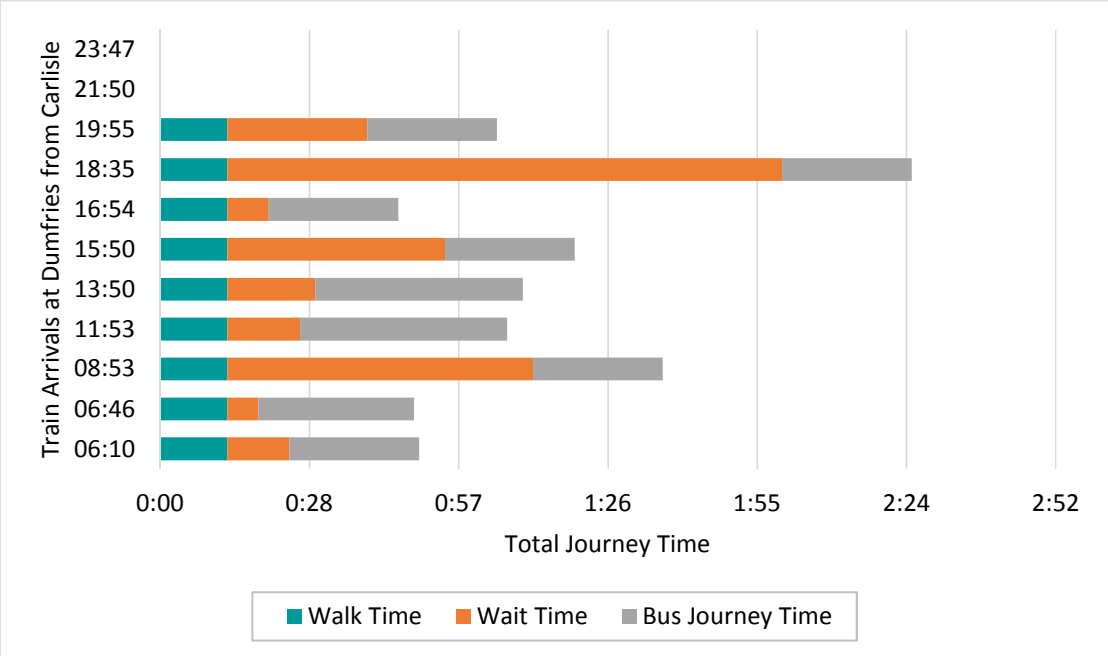

Figure L.3: Total Journey Time from Dumfries Railway Station to Thornhill (Current)

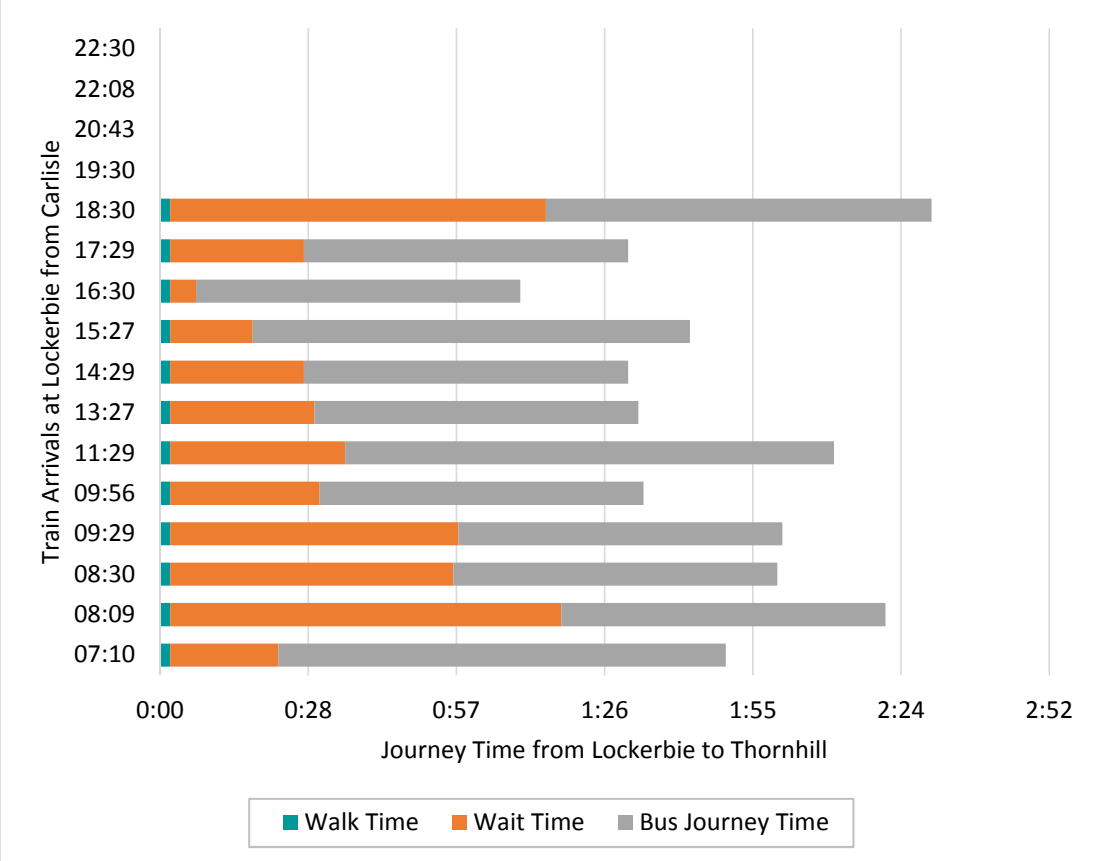

Figure L.4: Total Journey Time from Lockerbie Railway Station to Thornhill (Current)

L.3 Impact of the Options – Methodology

L.3.1 New bus timetables were produced for each of Options 1a, 1b and 1c, aimed at better connecting Thornhill residents with rail services at Dumfries and Lockerbie. In the production of these timetables for the proposed options it has been necessary to prioritise connections to specific stations at specific times of day. This means that implementation of an option may have a positive or negative impact on the integration of bus and rail services at a particular time of day.

L.3.2 The success of the various options in integration terms has also been assessed against three key metrics:

- Access to additional services to which there was previously no connecting bus service;
- Total 'access' journey time; and
- Interchange (wait and walk) time.

L.4 Impact of Option 1a

L.4.1 Option 1a involves the provision of a new bus service between Thornhill and Lockerbie, and this option appears to deliver greatest integration benefits. The figures below illustrate the change in total journey times between Thornhill and Dumfries/Lockerbie Railway station and show how the proposed options will affect wait, walk and bus components of this trip.

L.4.2 For outbound trips from Thornhill to Dumfries Railway Station, Option 1a will:

- Increase interchange and journey times associated with the 07:43 and 11:58 rail departures by 5 minutes or less;
- Reduce journey times for all other services by between 0% and 55%. The greatest time savings are expected on the 10:25 and 19:33 services where journey times will be reduced by 25 and 39 minutes respectively;
- Reduce average trip length from circa one hour to 50 minutes.

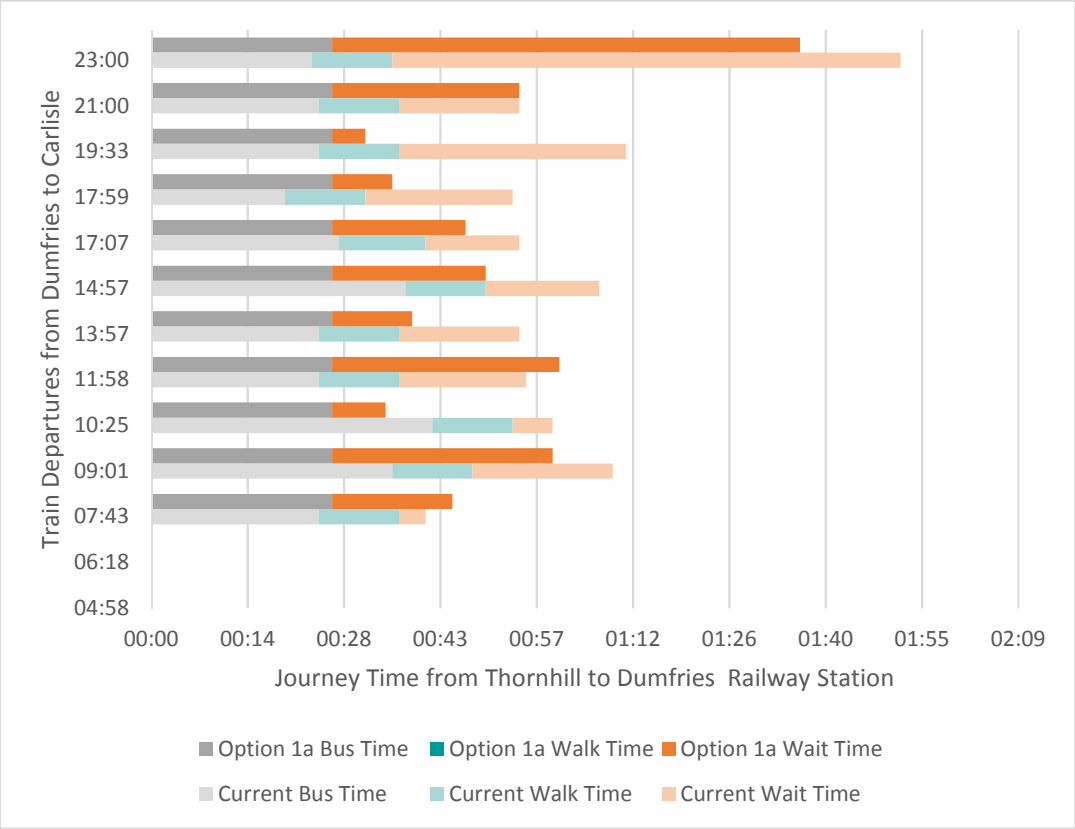

Figure L.5: Total Journey Time from Thornhill to Dumfries Railway Station (Option 1a against Current)

L.4.3 For outbound trips from Thornhill to Lockerbie Railway Station, Option 1a will:

- Provide a means of accessing the first three rail departures from Lockerbie Railway Station, which was previously impossible by public transport;
- Reduce journey times for all services but one: journey time will actually increase by circa 15 minutes to the 10:12 rail departure from Lockerbie;
- For all other services, journey times will reduce by an average of circa 45 minutes, with greatest resulting from:
  - A reduction in the long bus journey time from Thornhill to Dumfries to meet the 21:05 and 21:12 rail services – a decrease of approximately one hour;
  - A reduction in waiting time at Dumfries Railway Station of over 45 minutes to access the 11:09, 12:07, 15:17, 16:08 and 17:10 rail services.

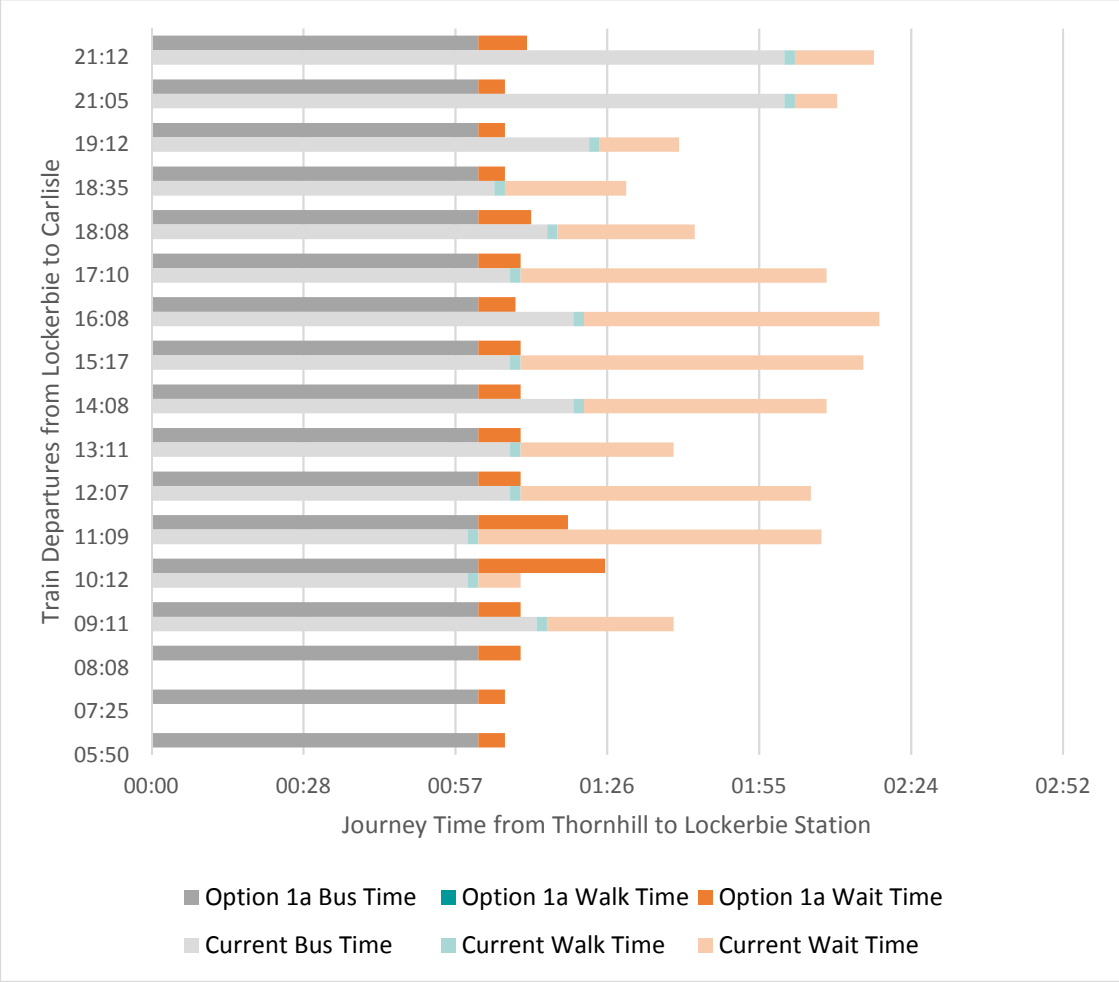

Figure L.6: Total Journey Time from Thornhill to Lockerbie Railway Station (Option 1a against Current)

L.4.4 For inbound trips from Dumfries Railway Station to Thornhill, Option 1a will:

- Provide a connecting bus service to Thornhill for one additional rail arrival at Dumfries Railway Station;
- Substantially reduce total journey times from Dumfries to Thornhill by an average of 30 minutes;
- Remove the need to walk 15 minutes to access onward bus services;
- Cut waiting times associated with the 18:35 and 08:53 services, reducing these by 1.5 hours and 40 minutes respectively.

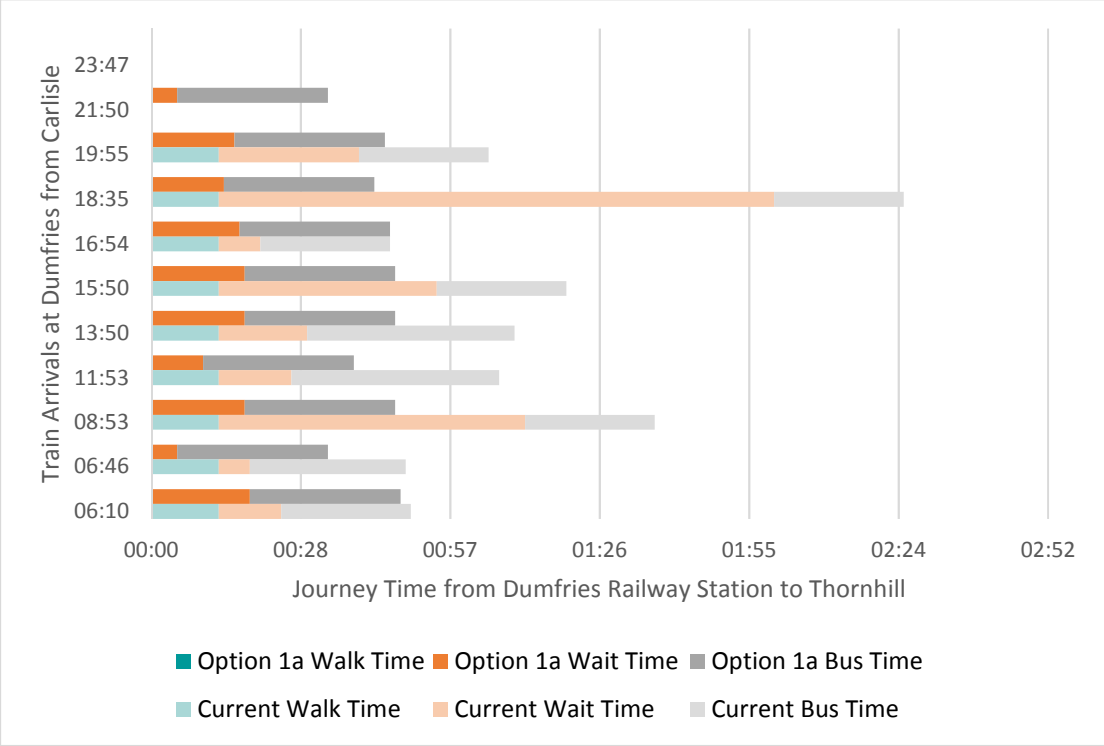

Figure L.7: Total Journey Time from Dumfries Railway Station to Thornhill (Option 1a against Current)

L.4.5 For inbound trips from Lockerbie Railway Station to Thornhill, Option 1a will:

- Provide a connecting bus service to Thornhill for four additional rail arrivals at Lockerbie Railway Station;
- Substantially reduce total journey times from Lockerbie to Thornhill by an average of 35 minutes;
- Cut waiting times to 5 minutes for all services prior to 18:00.

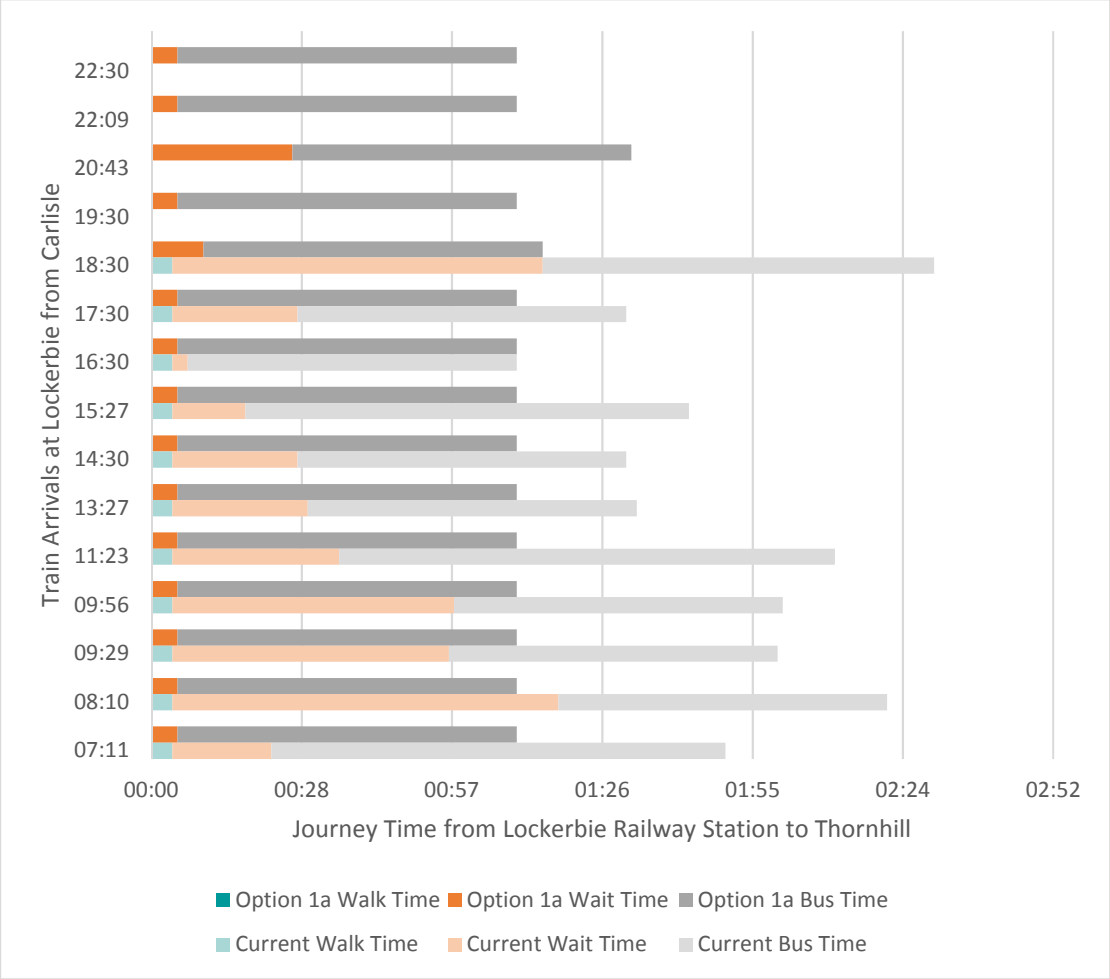

Figure L.8: Total Journey Time from Lockerbie Railway Station to Thornhill (Option 1a against Current)

L.5 Impact of Option 1b

L.5.1 Option 1b involves the extension of the existing 246 bus service to Dumfries Railway Station, and the adjustment of service times to better integrate with train departures from Dumfries. Option 1b also delivers notable integration improvements compared to the existing situation, although of a lesser magnitude than Option 1a.

L.5.2 For outbound trips from Thornhill to Dumfries Railway Station, Option 1b will:

- Reduce journey times from Dumfries Railway Station by an average of circa 10 minutes, but again cause an increase in journey times for those arriving on 09:01, 14:57 and 17:07 rail services (increase of circa 25 to 60 minutes);
- Significantly ease access to the 23:00 rail service from Dumfries, where waiting times will reduce from circa 75 minutes to 15 minutes.
- Have a varying impact on average interchange time (negligible overall) – large improvements in evening services are offset by the adverse impacts on the above noted day-time services, which are arguably more important.

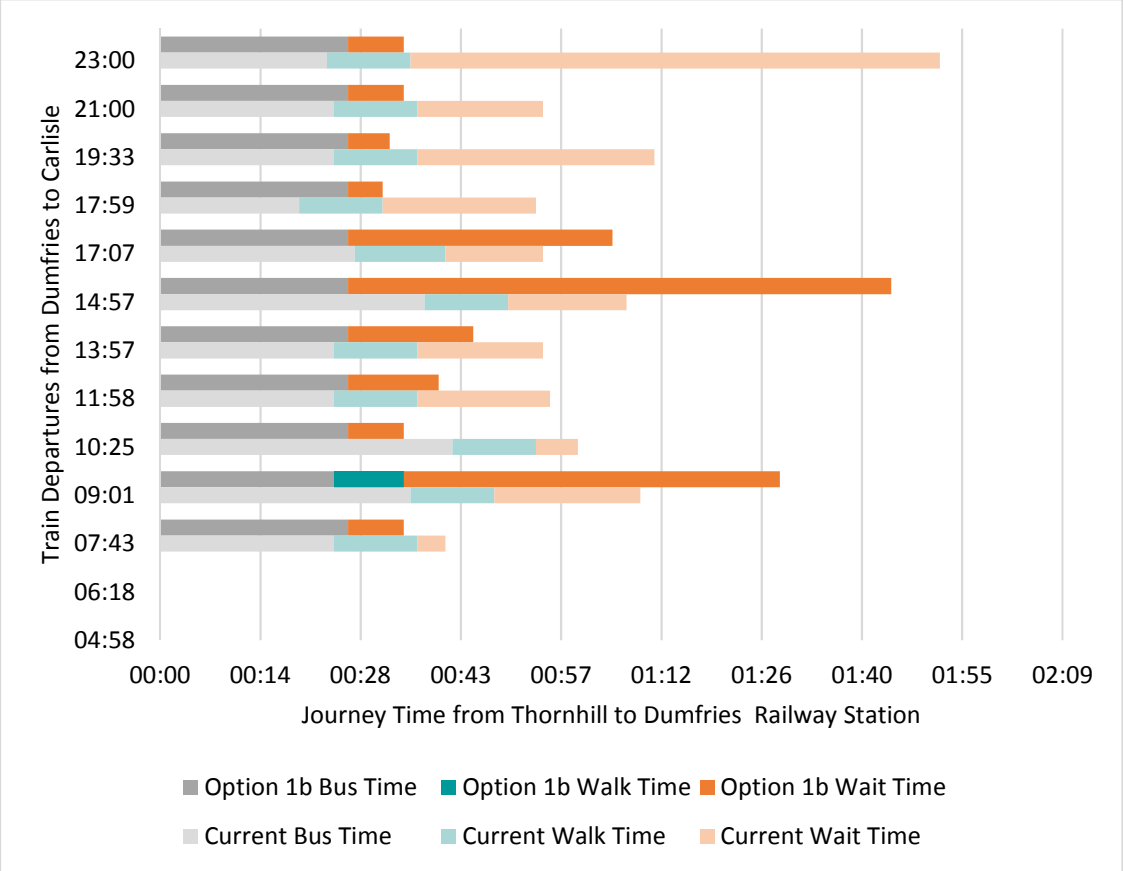

Figure L.9: Total Journey Times from Thornhill to Dumfries Railway Station (Option 1b against Current)

L.5.3 For inbound trips from Dumfries Railway Station to Thornhill, Option 1b will:

- Accommodate access to one additional rail arrival at Dumfries from Carlisle; and
- Generate mixed results in terms of time savings, varying from a 48% reduction (from the 19:55 service) in journey time to a 92% increase (from the 06:46).

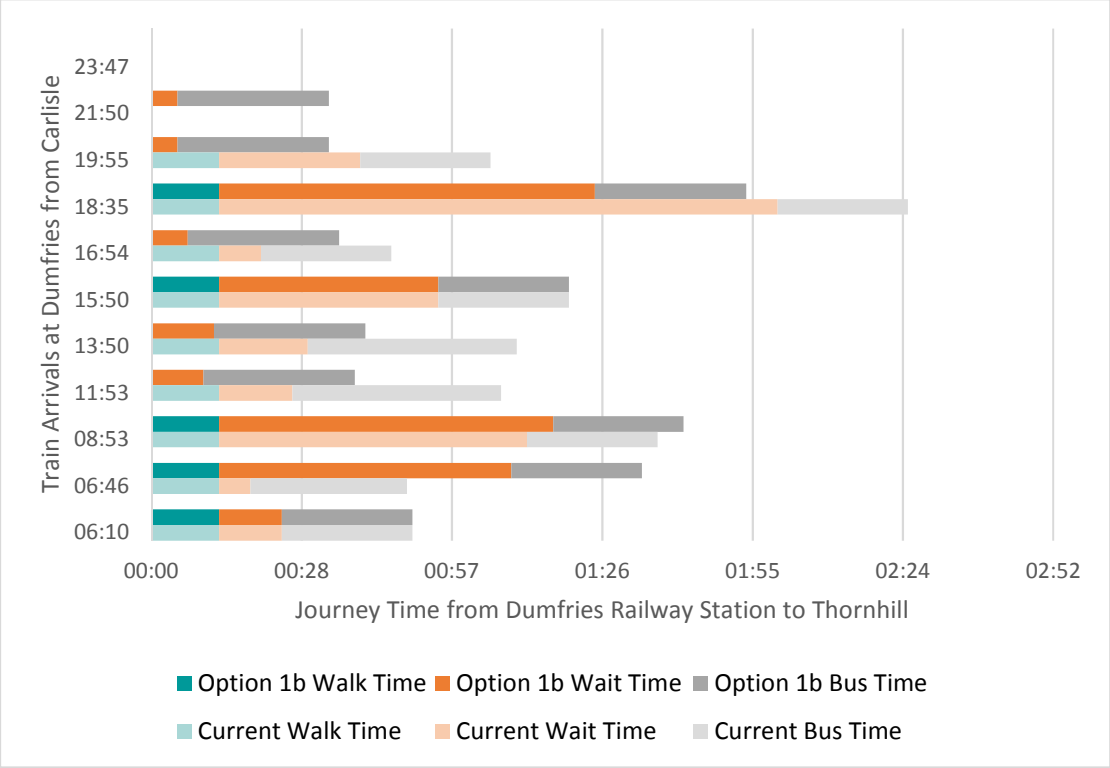

Figure L.10: Total Journey Times from Dumfries Railway Station to Thornhill (Option 1b against Current)

L.6 Impact of Option 1c

L.6.1 Option 1c involves the extension of the 81/381 bus service, such that it connects Lockerbie with Thornhill.

L.6.2 For outbound trips from Thornhill to Dumfries Railway Station, Option 1c will:

- Reduce journey times for those seeking to board rail services between 10:00 and 20:00; however, journey times will increase in the early morning and evening;
- Permit access to the 06:18 rail departure from Dumfries; and
- Remove the need for the 12-minute walk from the Whitesands bus stop to Dumfries Station.

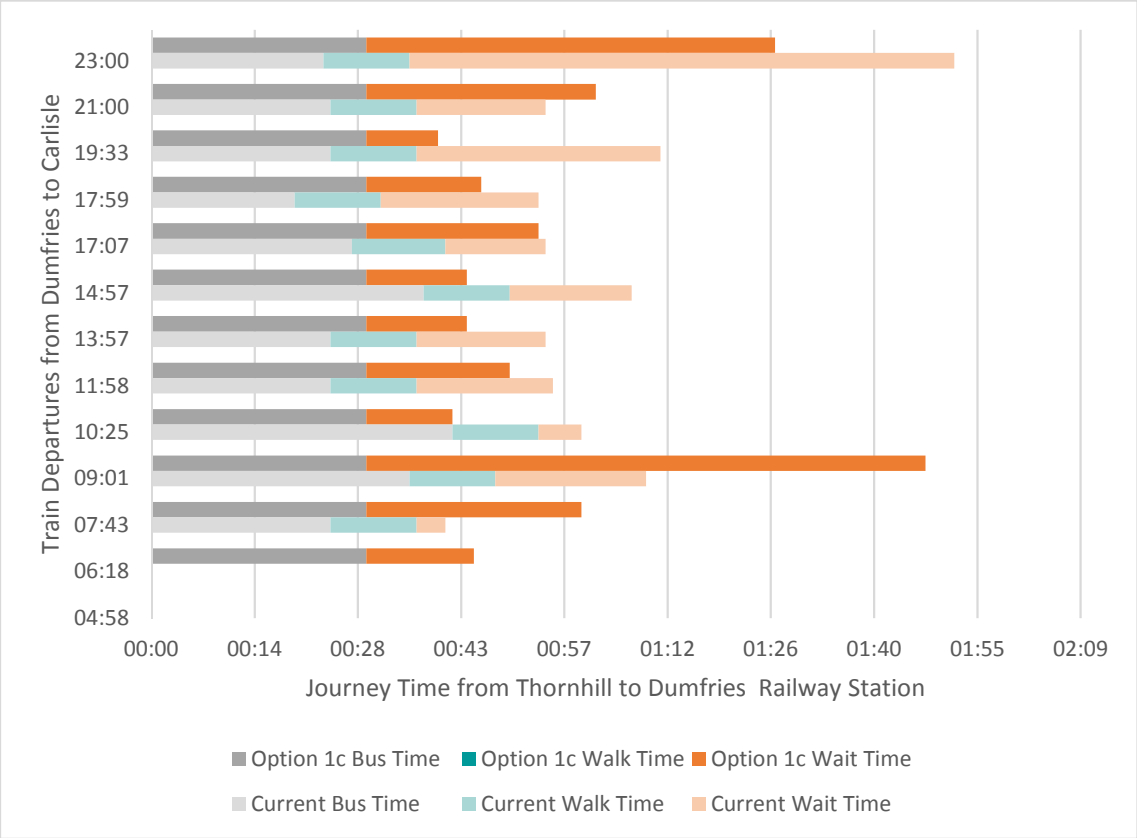

Figure L.11: Total Journey Times from Thornhill to Dumfries Railway Station (Option 1c against Current)

L.6.3 For outbound trips from Thornhill to Lockerbie Railway Station, Option 1c will:

- Permit access to the 07:25 and 08:08 rail departures from Lockerbie, which could not previously be reached by public transport;
- Provide a reduction in bus journey times across the day of circa 15 minutes to one hour;
- Provide a general reduction in total travel times between Thornhill and Lockerbie, although increases are expected for journeys to catch the 09:11 and 10:12 rail services.

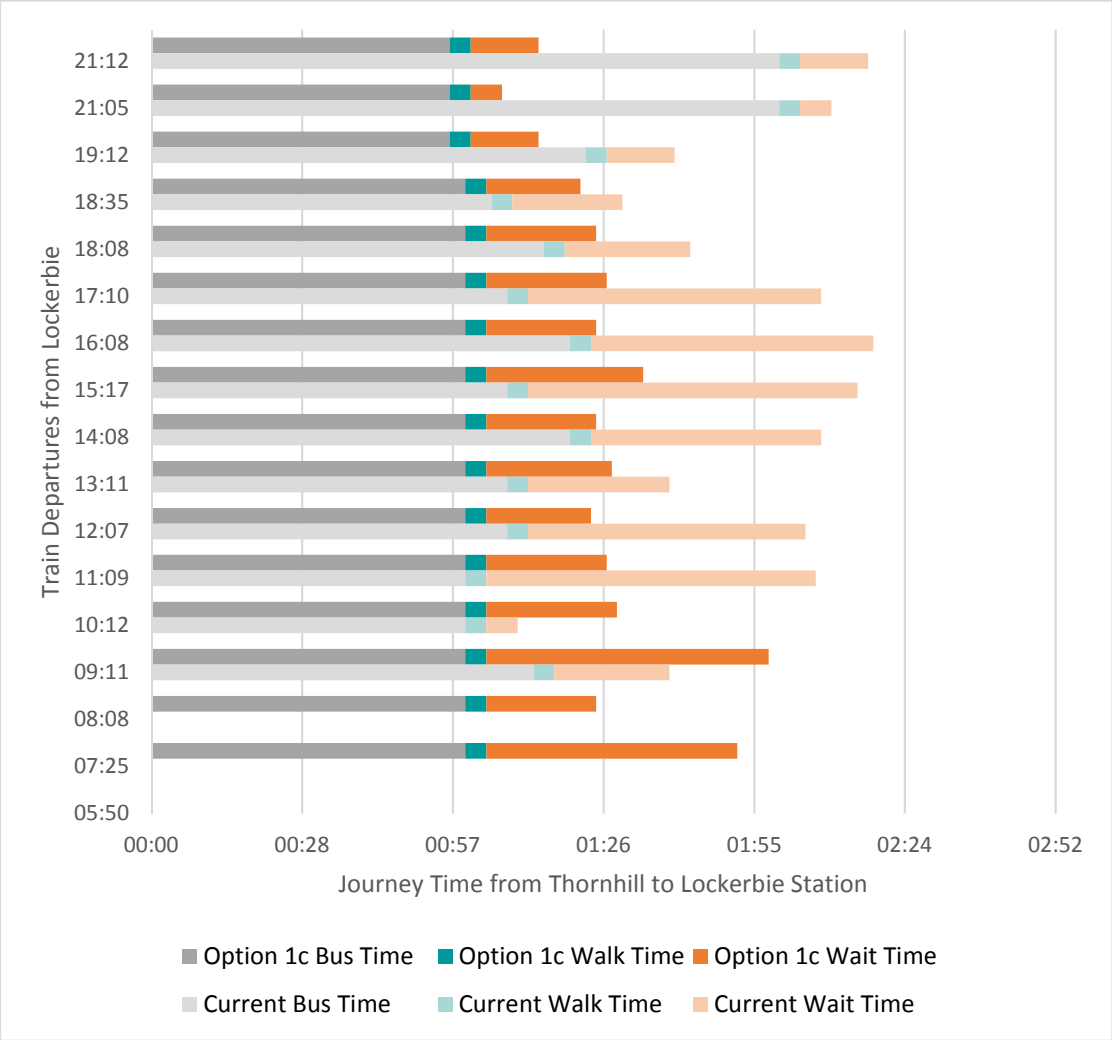

Figure L.12: Total Journey Times from Thornhill to Lockerbie Railway Station (Option 1c against Current)

L.6.4 For inbound trips from Dumfries Railway Station to Thornhill, Option 1c will:

- Provide onward bus connection to Thornhill for those alighting from the 21:50 rail service;
- Remove the need for the 12-minute walk from the Whitesands bus stop to Dumfries Station; and
- Generate an overall reduction in travel time from Dumfries to Thornhill, although increases of 10 to 22 minutes expected for the 06:10 and 16:54 rail services.

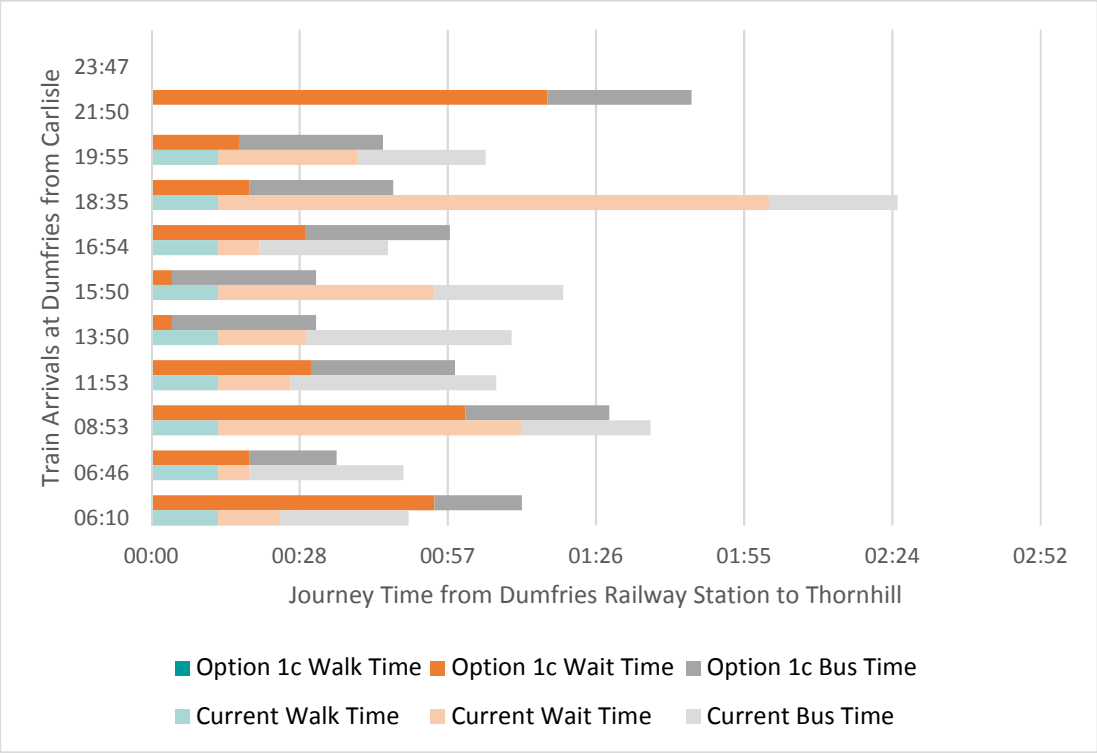

Figure L.13: Total Journey Times from Dumfries Railway Station to Thornhill (Option 1c against Current)

L.6.5 For inbound trips from Lockerbie Railway Station to Thornhill, Option 1c will:

- Provide onward bus connection to Thornhill for four additional evening rail services – currently the latest service accessible is the 18:30 arrival at Lockerbie;
- Reduce total travel times for all services except for the 16:30, where a 12-minute increase is forecast. Greatest travel time improvements are expected for the 08:10 and 18:30 rail services – savings of 70 to 80 minutes.

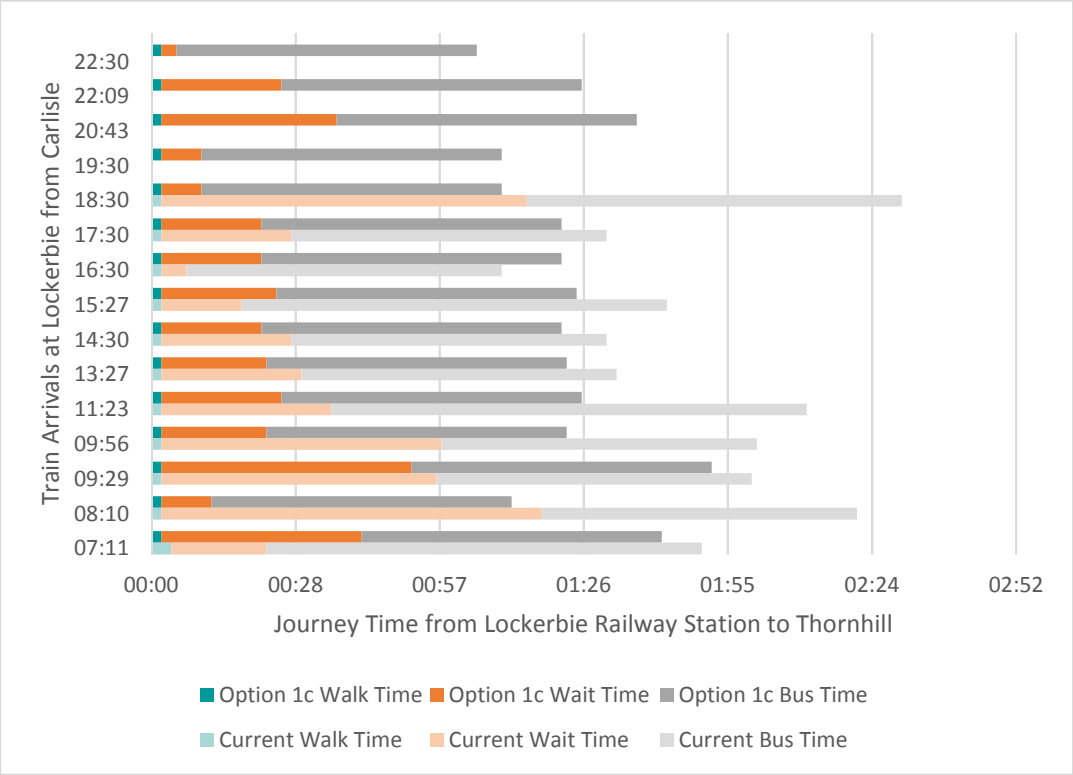

Figure L.14: Total Journey Times from Lockerbie Railway Station to Thornhill (Option 1c against Current)

L.6.6 Table L.1 provides a summary of how each option performs against these metrics, considering the average impacts across a weekday. This analysis assumes that people use the connecting bus services which minimise total 'access' journey time. As such, if an option results in a longer journey time to meet a specific train than at present, it is assumed that individuals would continue to use the existing services where possible. In these instances, a 0% change in journey/interchange time is recorded.

Table L.1: Comparison of Option 1a, 1b and 1c against Existing Situation

Metric	Option	Services to/ from Dumfries		Services to / from Lockerbie	
		Outbound	Inbound	Outbound	Inbound
No. Additional Rail Services Accessible	1a	0	1	3	4
	1b	0	1	-	-
	1c	1	1	2	4
Average Change in Journey Time between Thornhill and Station	1a	-21%	-41%	-39%	-36%
	1b	-21%	-12%	n/a	n/a
	1c	-18%	-35%	-25%	-22%
Average Change in Interchange Time	1a	-32%	-67%	-75%	-86%
	1b	-34%	-16%	n/a	n/a
	1c	-20%	-41%	-29%	-35%

Metric	Option	Services to/ from Dumfries		Services to / from Lockerbie	
		Outbound	Inbound	Outbound	Inbound
No. Additional Rail Services Accessible	1a	0	1	3	4
	1b	0	1	-	-
	1c	1	1	2	4
Average Change in Journey Time between Thornhill and Station	1a	-21%	-41%	-39%	-36%
	1b	-21%	-12%	n/a	n/a
	1c	-18%	-35%	-25%	-22%
Average Change in Interchange Time	1a	-32%	-67%	-75%	-86%
	1b	-34%	-16%	n/a	n/a
	1c	-20%	-41%	-29%	-35%

L.6.7 **Option 1a** is a dedicated RailBus service designed to integrate with arrivals and departures at Dumfries and Lockerbie Railway Stations, and as such, it is unsurprising that this option performs most highly in terms of public transport integration. Option 1a provides access to 8 additional rail services and is expected to yield average 'access' journey time savings across all routes. This option will reduce or maintain the same journey times as existing across 94% of services considered, and as this is a supplementary service, individuals can continue to use the existing 246 bus service where preferable.

L.6.8 **Option 1b** involves the optimisation of an existing commercial bus service to tie in with rail arrivals and departures at Dumfries Railway Station only. This option has limited potential to facilitate access to additional services, and like Option 1c generates more mixed results – shortening some journeys while lengthening others (14% of trips become longer). Option 1b also requires the amendment of a commercial bus service timetable which, although technically feasible, will have to be investigated in detail with the bus operator.

L.6.9 **Option 1c** is an extension to the existing 81/381 bus service, such that it connects Thornhill with both Dumfries and Lockerbie railway stations. The timing of departures from existing stops has not been altered, on the basis that this option would then closely resemble the pattern of bus provision tested under Option 1a. As noted above Option 1c yields varied results like Option 1b (with increased journey times for 19% of trips), and it will bring limited benefit to those travelling through Dumfries Railway Station. However, Option 1c will support access from Thornhill to 6 additional rail services at Lockerbie and reduce travel times to/from Lockerbie Station by circa 20-25% overall.

L.6.10 On the whole, it is considered that Option 1a has the potential to yield the greatest integration benefits, followed by 1c and then 1b.

Appendix M Part 1 Appraisal Summary Tables

Table M.1: Appraisal Summary Table – Option 1a – Transport Planning Objectives

Criteria		Score	Rationale
Transport Planning Objectives	TPO1: Enable an effective day trip by public transport to key education, retail and social opportunities in Glasgow, Ayr, Edinburgh and Carlisle	2	Providing a dedicated Railbus enabling a direct connection to Dumfries and Lockerbie Railway Stations provides reduced journey times to Edinburgh and Glasgow, the greatest improvement being a 45-minute reduction in the journey time back from Edinburgh in the evening period. The reduced journey time between Thornhill and Edinburgh and Glasgow is likely to enable more time in the strategic locations to undertake activities (social, retail and education), enabling a more effective day trip to these locations. This could have a positive benefit in helping the community feel less remote and better connected, with the same opportunities as other parts of Scotland. It was noted during the public consultation that the option would allow a choice in which Central belt city to access. The option provides a positive benefit against this TPO. Note that there is no improvement in access to Ayr.
	TPO2: Provide public transport connectivity which enables travel to and from the area across the day and across the week	2	Option 1a involves the provision of a new Railbus Service connecting Thornhill with Dumfries and Lockerbie Stations. This option facilitates will *direct* access to 13 rail services to/from Lockerbie on a weekday / Saturday that were previously inaccessible by public transport and will also reduce the journey from Thornhill to Lockerbie Railway station by an average of circa 40 minutes. It will also permit onward travel to Thornhill from one further rail arrival into Dumfries Railway Station and reduce average journey times to/from Dumfries Railway Station by circa 20 minutes. The additional connectivity will enable trips to and from the area much earlier / later in the day, opening up opportunities for employment that requires shift / weekend working which were previously inaccessible by public transport.
	TPO3: Increase the inbound public transport catchment to support education, tourism and local businesses	2	The option is likely to provide a significant increase in the number of people able to access Thornhill. The option enables improved connectivity and reduced access time from the West Coast Main Line rail network for travel to / from further afield. The new service enables access to the first three rail departures and four additional rail arrivals from Lockerbie Railway Station, meaning Thornhill is more easily accessible. This may enable a much wider employment catchment area to enable people to access the village to support key services within the village i.e. teachers, GPs etc. and also improve connectivity for tourists into the area to support local businesses.

Table M.2: Appraisal Summary Table – Option 1a – STAG Criteria

Criteria		Score	Rationale
STAG Criteria	Environment	1	This route would make use of the existing road network and as such there will be little adverse impact on the environment from any construction works. Any modal shift that could be achieved would reduce car use and associated noise and emissions. A high level of car use was highlighted during the Pre-Appraisal baselining exercise and improved bus and rail integration could encourage people to change their travel mode.
	Safety	1	Any modal shift to sustainable transport that may be achieved would reduce private vehicles on the road network which has the potential to reduce traffic accidents, although the reduction is anticipated to be minor. The option would offer increased personal security by removing the walk time from the existing bus stops to the stations and the often long wait time at the stations (for departures) or at the bus stop (for rail arrivals). This may be particularly beneficial to more vulnerable members of society such as the elderly, those less able and older unaccompanied children.
	Economy	1	The option may provide some minor benefit to the economy by improving the accessibility of employment and retail in Carlisle and Edinburgh. However, increasing the accessibility of Edinburgh and Carlisle may have a negative impact on the economy of Dumfries if people are more readily able to travel further afield to retail and social opportunities.
	Accessibility & Social Inclusion	2	The TPOs all relate to improving the accessibility of the area and the key points are noted in the ASTs for TPO1, 2 and 3. In addition to the comments for the TPOs it is important to note that a key benefit of improved accessibility to and from the study area will be in reducing the feelings of remoteness of the community and enabling local people to feel connected and part of a wider Scotland. This is especially important in terms of the long term sustainability of the community and the retention of younger people in the area. The option provides better equality of access to all enabling fair access to the wider opportunities.
	Integration	2	Poor integration between bus and rail modes was highlighted as a key problem during the engagement stages of the study and this option has a clear focus on improving this. In addition, improving the public transport network and transport integration supports the aims of the National Transport Strategy, Swestrans Regional Transport Strategy, the Bus Action Plan and the Local Transport Strategy. The option is therefore aligned with the broader policy goals included within key national, regional and local policy documents.

Table M.3: Appraisal Summary Table – Option 1a – Feasibility, Affordability and Public Acceptability

Criteria		Rationale
Other Criteria	Feasibility	From an engineering perspective, the option does not require the build of any infrastructure or any land purchase and as such is unlikely to present any feasibility challenges. Section 63 of the Transport Act 1985 says a council has a duty to secure services it thinks are required where they are not provided by the market, but it cannot secure a service already provided by the market. The key issue is the interpretation of "service": there are many examples of subsidised services that partially parallel commercial services. In this instance, in order to not run in parallel with existing services, the option would need to show a clearly different purpose to the existing services (Service 246 between Thornhill and Dumfries and Service 81/381 operating between Dumfries and Lockerbie) – and this may be difficult in the option's current form. In addition, as intonated by bus stakeholders and SWestrans, the overall viability of services in the region is, in many cases, only achievable due to the resource intensive nature of overall bus operations. As such, the overall bus network and operation across the region is highly fragile and even minor changes to routes or services (or any new competition between services), which have the potential to tie up resources or affect patronage, can have major consequences. This is a very important factor when considering any changes to the network which may impact on existing services.
	Affordability	Analysis of the operating costs for the service indicates an annual operating cost of £695k, requiring approximately 285,000 single trips annually to break even. Consideration of Office of Rail and Road station usage estimates and consideration of National Rail Travel Survey data shows that the service is unlikely to generate sufficient demand to cover operating costs and as such is not considered to be commercially viable unless the service is subsidised. SWestrans budget for the operati n of subsidised bus services has recently reduced. It is therefore unlikely that funding is available to operate the service. It should be noted that the bus schedule for the option, has been has been developed to provide connections to all trains. It may be possible to 'scale back' the number of connecting bus services to concentrate on peak time rail arrivals/departures only to minimise the cost of the service and hence make the service more commercially viable/require a lesser subsidy.
	Public Acceptability	Integration between bus and rail was highlighted in the public consultation exercises undertaken during the study. As the option offers direct connections between bus and rail, and to both stations on the Glasgow South West Line and West Coast Mainline, it is likely to carry a low public acceptability risk. Furthermore, the public consultation undertaken at the Pre-Appraisal stage of the study highlighted sentiment that the most significant transport problem faced by respondents was limited travel mode choice. It was also noted by some that they felt this option would provide better value for money than a rail station. Improving access to the rail network is likely to therefore be publicly acceptable, although there may be disappointment that a railway station in Thornhill itself is not provided given the strong sentiment for this during public engagement.

Table M.4: Appraisal Summary Table – Option 1b – Transport Planning Objectives

Criteria		Score	Rationale
Transport Planning Objectives	TPO1: Enable an effective day trip by public transport to key education, retail and social opportunities in Glasgow, Ayr, Edinburgh and Carlisle	1	Analysis shows that extending Service 246 to include a stop at Dumfries Railway Station, will reduce journey times between Thornhill and Dumfries Station rail departures by approximately ten minutes across the board, as a result of the fact that Option 1b will place a bus stop directly outside of the station removing the need to walk 12 minutes to/from the bus stop to the station. The option has the potential to improve access, in particular, to Carlisle by removing the need to interchange between modes across Dumfries town centre. The improved integration with trains at the station, and the much reduced interchange time between bus and rail is likely to enable a more effective day trip to Carlisle, but will have limited impact on trips to Edinburgh, Glasgow or Ayr. The public engagement exercise undertaken with pupils at Wallace Hall Academy highlighted the importance of Carlisle to them as the closest major town offering social and retail opportunities. This option would therefore be beneficial in enabling more effective day trips for this demographic of the community.
	TPO2: Provide public transport connectivity which enables travel to and from the area across the day and across the week	0	Option 1b involves the optimisation of the existing 246 bus service timetable to better align with arrivals and departures at Dumfries Station although there is limited improvement in accessing additional rail services.
	TPO3: Increase the inbound public transport catchment to support education, tourism and local businesses	1	The option provides reductions in public transport travel time for trips between Thornhill and Carlisle in the morning period (20 minutes), afternoon period (15 minutes), and evening period (20 minutes), and between Thornhill and Edinburgh in the morning period (55 minutes), and evening period (20 minutes). This may enable a wider employment catchment area to enable people to access to village to support key services within the village i.e. teachers, GPs etc. and also improve connectivity for tourists into the area to support local businesses. Note that public transport travel times to the north (Kilmarnock / Glasgow etc.) and north-west (i.e. Ayr etc.) are unlikely to be improved in any period. This is to be expected given the options focus on connecting Thornhill to the railway network at Dumfries and not to Sanquhar to the north of Thornhill which is likely to be the most appropriate place to join the rail network if heading northbound to Glasgow.

Table M.5: Appraisal Summary Table – Option 1b - STAG Criteria

Criteria		Score	Rationale
STAG Criteria	Environment	1	This route would make use of the existing road network and as such there will be little adverse impact on the environment from any construction works. Any modal shift that could be achieved would reduce car use and associated noise and emissions. A high level of car use was highlighted during the Pre-Appraisal baselining exercise and improved bus and rail integration should encourage people to change their travel mode.
	Safety	1	Any modal shift to sustainable transport that may be achieved would reduce private vehicles on the road network which has the potential to reduce traffic accidents, although the reduction is anticipated to be minor. The option would offer increased personal security through removing the walk time from the existing bus stops to the stations and the often long wait time at the station (for departures) or at the bus stop (for rail arrivals). This may be particularly beneficial to more vulnerable members of society such as the elderly, those less able and older unaccompanied children.
	Economy	1	The option may provide some minor benefit to the economy by improving the accessibility of employment and retail in Carlisle, and to a lesser extent Edinburgh. However, increasing the accessibility of Carlisle may have a negative impact on the economy of Dumfries if people are more readily able to travel further afield to retail and social opportunities.
	Accessibility & Social Inclusion	1	The TPOs all relate to improving the accessibility of the area and the key points are noted in the ASTs for TPO1, 2 and 3. A lack of direct travel routes was identified as a key problem during the Pre-Appraisal stage of the study. The provision of a dedicated bus linking directly to Dumfries Railway Station would provide increase sustainable transport accessibility to Carlisle and Edinburgh. Overall the option would provide a moderate improvement in public transport access to employment and leisure and social opportunities in Carlisle and to some extent Edinburgh. This would be particularly beneficial to those without access to a car or for whom driving is not possible. In addition, the reduced journey times to Carlisle may widen the employment opportunities for those resident in the study area, however, while the public transport travel time to Edinburgh has been reduced in the morning and evening periods, the travel time is still substantially longer than the private car and it is unlikely that there would be any significant increase in access to employment opportunities in Edinburgh as a result.
	Integration	2	Poor integration between bus and rail modes was highlighted as a key problem during the Pre-Appraisal stage and this option has a clear focus on improving this. In addition, improving the public transport network and transport integration supports the aims of the National Transport Strategy, Swestrans Regional Transport Strategy, the Bus Action Plan and the Local Transport Strategy. The option is therefore aligned with the broader policy goals included within key national, regional and local policy documents.

Table M.6: Appraisal Summary Table – Option 1b - Feasibility, Affordability and Public Acceptability

Criteria		Rationale
Other Criteria	Feasibility	From an engineering perspective, the option does not require the build of any infrastructure or any land purchase and as such is unlikely to present any feasibility challenges. The option requires alterations to an existing bus service. Discussion with the existing operator highlighted: • The operator does not wish to impact on the timing of the service and its existing connections; • The re-timing of the service could adversely impact on existing service users and negatively impact on patronage if journey times were extended or overall bus times were altered. • A lack of desire to improve connections to the rail network which may take away from bus market share; and • The region wide issue of the highly intensive nature of bus operations to ensure overall regional commercial viability. The operator made it clear that even making minor adjustment to the timing of the service, or altering the routeing to serve the station could have unintended consequences on other service/routes. Given the above, it seems highly unlikely that the changes to the service would be deliverable.
	Affordability	The commercial viability analysis showed that the revision of Service 246 to serve Dumfries Railway Station would involve a total additional annual cost of service provision of around £32k. This would require approximately 13,000 additional passenger trips annually to break even (an additional 35 passenger trips a day - around 2 per service). It is anticipated that this could be achievable if rail and bus times were better integrated.
	Public Acceptability	Integration between bus and rail was highlighted in the public consultation exercises undertaken during the study. As the option offers direct connections between bus and rail, with reduced interchange times, it is likely to be acceptable to the public. Furthermore, the public consultation highlighted sentiment that the biggest transport problem faced by respondents was limited travel mode choice. Improving access to the rail network is likely to therefore be publicly acceptable, although there may be disappointment that a railway station in Thornhill itself is not provided given the strong sentiment for this during public engagement. However, current users of the existing services may not find bus service timetable changes acceptable if the existing running times suit their needs and as such the option has been awarded an overall medium public acceptability risk.

Table M.7: Appraisal Summary Table – Option 1c - Transport Planning Objectives

Criteria		Score	Rationale
Transport Planning Objectives	TPO1: Enable an effective day trip by public transport to key education, retail and social opportunities in Glasgow, Ayr, Edinburgh and Carlisle	1	The option provides reductions in public transport travel time for trips between Thornhill and Edinburgh in the morning period (65 minutes). This option would therefore be beneficial in enabling more effective day trips for travel to Edinburgh but would have limited impact on trips to Carlisle, Glasgow or Ayr.
	TPO2: Provide public transport connectivity which enables travel to and from the area across the day and across the week	2	At present there is not a direct bus connection from Thornhill to Lockerbie. Implementation of Option 1c would permit access to 6 additional rail services to/from Lockerbie and reduce journey times between Thornhill and Lockerbie rail services by an average of 25-30 minutes. The option would also permit access to/from two additional rail services from Dumfries Station, and reduces overall travel times. The additional access to rail across a wider time span is likely to provide access to opportunities for employment that requires shift / weekend working which were previously inaccessible by public transport. It may also enable people to access additional social, retail and educational opportunities in Edinburgh.
	TPO3: Increase the inbound public transport catchment to support education, tourism and local businesses	1	The option is likely to provide an increase in the number of people able to access Thornhill. The option enables improved connectivity and reduced access time from the West Coast Main Line rail network for travel to / from further afield. The extended service enables access to additional rail services on the West Coast Main Line so is likely to make Thornhill more easily accessible. This may enable a wider employment catchment area to enable people to access the village to support key services within the village i.e. teachers, GPs etc. and also improve connectivity for tourists into the area to support local businesses.

Table M.8: Appraisal Summary Table – Option 1c - STAG Criteria

Criteria		Score	Rationale
STAG Criteria	Environment	1	The option is likely to encourage some minor modal shift from private car to bus and rail. As a result there will some minor benefit to the environment through a reduction in vehicle emissions. The bus service would use the current road network and as such there will be little adverse impact on the environment. However, if the service is under utilised then the additional unnecessary bus miles undertaken between Dumfries and Thornhill would increase bus emissions with little benefit. A high level of car use was highlighted during the Pre-Appraisal baselining exercise and improved bus and rail integration should encourage people to change their travel mode.
	Safety	1	Any modal shift to sustainable transport that may be achieved would reduce private vehicles on the road network which has the potential to reduce traffic accidents, although the reduction is anticipated to be minor.
	Economy	1	The option may provide some minor benefit to the economy by improving the accessibility of employment and retail in Dumfries, Lockerbie and Edinburgh. However, increasing the accessibility of Edinburgh may have a negative impact on the economy of Dumfries if people are more readily able to travel further afield to retail opportunities.
	Accessibility & Social Inclusion	1	The TPOs all relate to improving the accessibility of the area and the key points are noted in the ASTs for TPO1, 2 and 3. In addition to the comments for the TPOs it is important to note that a key benefit of improved accessibility to and from the study area will be in reducing the feelings of remoteness of the community and enabling local people to feel connected and part of a wider Scotland. This is especially important in terms of the long term sustainability of the community and the retention of younger people in the area. The option provides better equality of access to all enabling fair access to the wider opportunities.
	Integration	1	Poor integration between bus and rail modes was highlighted as a key problem during the engagement stages of the study. While the option only considers an extension of the existing Service 81/381 to Thornhill and not a re-timing of the service to better integrate with rail times, the option does not provide overall improvements in transport integration by better linking the bus and rail networks. In addition, improving the public transport network and transport integration supports the aims of the National Transport Strategy, Swestrans Regional Transport Strategy, the Bus Action Plan and the Local Transport Strategy. The option is therefore aligned with the broader policy goals included within key national, regional and local policy documents.

Table M.9: Appraisal Summary Table – Option 1c - Feasibility, Affordability and Public Acceptability

Criteria		Rationale
Other Criteria	Feasibility	From an engineering perspective, the option does not require the build of any infrastructure or any land purchase and as such is unlikely to present any feasibility challenges. Section 63 of the Transport Act 1985 says a council has a duty to secure services it thinks are required where they are not provided by the market, but it cannot secure a service already provided by the market. The key issue is the interpretation of "service": there are many examples of subsidised services that partially parallel commercial services. In this instance, in order to not run in parallel with existing services, the option would need to show a clearly different purpose to the existing services (Service 246 between Thornhill and Dumfries) – and this may be difficult in the option's current form. In addition, if the legal issues could be overcome, the competition over the extended section of the route would raise the further issue of antagonising the existing Service 246 operator through impacting on the services patronage. As stated above, the fragile nature of the existing region wide bus operations means minor impacts can have major consequences and there may be the unintended consequence of reducing service provision elsewhere.
	Affordability	The extension of Service 81/381 (Lockerbie - Dumfries) to Thornhill on an hourly basis Monday to Saturday would require one extra bus operating 20 hours per day. With an annual cost of service provision approximately £195k, this would require 70,000 passenger trips annually to break even. Assuming that 5% of passengers to Lockerbie Railway Station arrive by bus equates to a total of 10,750 passengers annually arriving or departing by bus. The required number of passengers for the service extension to break even is far in excess of this (70,000) and therefore the service is not commercially viable. It should be noted that the bus schedule for the option, has been developed to provide connections to all trains. It may be possible to 'scale back' the number of connecting bus services to concentrate on peak time rail arrivals/departures only to minimise the cost of the service and hence make the service more commercially viable/require a lesser subsidy.
	Public Acceptability	Integration between bus and rail was highlighted in the public consultation exercise undertaken during undertaken during the study. As the option offers direct connections between bus and rail, with reduced interchange times, it is likely to be acceptable to the public. Furthermore, the public consultation highlighted sentiment that the biggest transport problem faced by respondents was limited travel mode choice. Improving access to the rail network is likely to therefore be publicly acceptable, although there may be disappointment that a railway station in Thornhill itself is not provided given the strong sentiment for this during public engagement. However, current users of the existing services may not find bus service timetable changes acceptable if the existing running times suit their needs and as such the option has been awarded an overall medium public acceptability risk.

Table M.10: Appraisal Summary Table – Option 3 - Transport Planning Objectives

Criteria		Score	Rationale
Transport Planning Objectives	TPO1: Enable an effective day trip by public transport to key education, retail and social opportunities in Glasgow, Ayr, Edinburgh and Carlisle	2	As the option provides greater accessibility to Dumfries in the evenings, it would provide an increased ability to undertake a day trip. The results show that at present, it is not possible to travel between any of the four strategic locations and Thornhill after 20:00. In the evening period however, the option provides three new opportunities to travel back from Glasgow, Edinburgh and Carlisle as the additional bus services provide connections from arriving trains into Dumfries back to Thornhill. As such, the option provides the connectivity required to extend the current time spent in the strategic locations and enables a more effective day trip to these places to undertaken activities.
	TPO2: Provide public transport connectivity which enables travel to and from the area across the day and across the week	2	Option 3 provides an extension of the operating day by 1 hour & ½ on weekdays, providing greater connectivity to Thornhill from Dumfries in the evenings. While Option 3 only increases the operating day on a Sunday by around 20 minutes, there are an additional 8 connections provided offering far greater flexibility in time of travel.
	TPO3: Increase the inbound public transport catchment to support education, tourism and local businesses	1	Given the focus of the option on evening and weekend service improvements, there will be no change in the morning period. In the evening period there is likely to be an increase in the number of people able to access Thornhill. The greater ability for the increased number of people to access the town on weekend evenings may be especially beneficial from a tourism perspective in supporting locally based social activities (concerts, festivals etc.) in the study area.

Table M.11: Appraisal Summary Table – Option 3 - STAG Criteria

Criteria		Score	Rationale
STAG Criteria	Environment	1	A high level of car use was highlighted during the Pre-Appraisal baselining exercise and the option is likely to encourage some minor modal shift from private car to bus. As a result there will be some minor benefit to the environment through a reduction in vehicle emissions and noise. The bus service will use the current road network and as such there will be little adverse impact on the environment.
	Safety	1	Any modal shift to sustainable transport that may be achieved would reduce private vehicles on the road network which has the potential to reduce traffic accidents, although the reduction is anticipated to be minor.
	Economy	1	The option is likely to have a minor benefit to the economy, with the provision of a later evening service and improved Sunday services enabling a greater number of people to access a greater range of leisure and (to a lesser extent) employment opportunities. This may be especially beneficial from a tourism perspective in supporting locally based social activities (concerts, festivals etc.) in the study area.
	Accessibility & Social Inclusion	1	The TPOs all relate to improving the accessibility of the area and the key points are noted in the ASTs for TPO1, 2 and 3. In addition, the option is particularly beneficially to those without a private car or unable to drive. This includes: - Those on lower incomes for whom owning a car is not possible due to the costs involved; - Those less-abled for whom driving is not an option; - Children under the age of 17. In terms of those on lower incomes and the less-abled, the increased accessibility to Dumfries may open up new job opportunities which require shift or weekend working as well as enabling better access to social and recreational activities in Dumfries which have a finish time later than 20:30 (the current time of the last bus back to Thornhill). Particularly for school children, the option would provide an increased ability to travel independently, providing access to greater range of extra-curriculum and social activities in which to participate in Dumfries. The option may also help support local businesses, especially those connected to the tourism industry, by enabling people to visit the area in the evenings, attending local events.
	Integration	1	In addition, improving the public transport network and transport integration supports the aims of the National Transport Strategy, SWestrans Regional Transport Strategy, the Bus Action Plan and the Local Transport Strategy. The option is therefore aligned with the broader policy goals included within key national, regional and local policy documents.

Table M.12: Appraisal Summary Table – Option 3 - Feasibility, Affordability and Public Acceptability

Criteria		Rationale
Other Criteria	Feasibility	From an engineering perspective, the option does not require the build of any infrastructure or any land purchase and as such is unlikely to present any feasibility challenges.
	Affordability	The commercial viability analysis showed that the total annual cost of service provision for Option 3 would be £57k compared to additional annual revenue of £15k. Option 3 would therefore incur losses of £42k and would not be commercially viable. SWestrans budget for the operation of subsidised bus services has recently reduced. It is therefore unlikely that subsidy funding is available to operate the service.
	Public Acceptability	Increased bus frequencies and services which run earlier in the morning and later in the evening were the most popular potential improvements to bus services amongst respondents to the Pre-Appraisal public engagement survey. Assuming that implementation does not impact any other services and given the improvement in accessibility offered, this option is likely to therefore be publicly acceptable. However, there may be disappointment that a railway station in Thornhill itself is not provided given the strong sentiment for this during public engagement.

Table M.13: Appraisal Summary Table – Option 4 - Transport Planning Objectives

Criteria		Score	Rationale
Transport Planning Objectives	TPO1: Enable an effective day trip by public transport to key education, retail and social opportunities in Glasgow, Ayr, Edinburgh and Carlisle	1	The additional X74 service (from Dumfries to Glasgow via Thornhill) considered as part of this option would reduce the travel time between Thornhill and Glasgow at 07:00 (by 70 minutes), 12:00 (by 20 minutes) and at 17:00 (by 35 minutes). For trips from Glasgow to Thornhill a reduction in public transport travel time of 15 minutes and an hour could be achieved for travel at 09:00 and 14:00 respectively. The service operating at 19:00 presents a new possibility to travel enabling Thornhill to be reached by bus from Glasgow in the evening period. Overall the additional services would provide increased accessibility to Glasgow, to retail, social and employment opportunities and creates more effective day trip potential to Glasgow. There are however no benefit to travel to Edinburgh, Carlisle or Ayr.
	TPO2: Provide public transport connectivity which enables travel to and from the area across the day and across the week	2	The additional X74 services provide additional direct connectivity to Glasgow across the day and as noted in TPO1, the additional service operating at 19:00 presenting a new possibility to travel enabling Thornhill to be reached by bus from Glasgow in the evening period, overall offering far greater flexibility in time of travel.
	TPO3: Increase the inbound public transport catchment to support education, tourism and local businesses	1	The additional X74 services may increase in the number of people able to access Thornhill, specifically from Moffat / Beattock / Motherwell and Glasgow. The greater ability for an increased number of people to access the town may be especially beneficial from a tourism perspective in supporting locally based social activities (concerts, festivals etc.) in the study area.

Table M.14: Appraisal Summary Table – Option 4 - STAG Criteria

Criteria		Score	Rationale
STAG Criteria	Environment	1	The option involves introducing a new bus service. The services proposed would use the existing road network. As such the environmental impact would be minimal. A high level of car use was highlighted during the Pre-Appraisal baselining exercise and an improved service offering could encourage people to change their travel mode for access to Glasgow. Any modal shift that could be achieved would reduce car use and associated noise and emissions.
	Safety	1	Any modal shift to sustainable transport that may be achieved would reduce private vehicles on the road network which has the potential to reduce traffic accidents, although the reduction is anticipated to be minor. The option would offer increased personal security by removing the need to interchange. This may be particularly beneficial to more vulnerable members of society such as the elderly, those less able and older unaccompanied children due to the removal of the interchange requirement.
	Economy	1	The option is likely to have a minor benefit to the economy, with the provision of direct services enabling a greater number of people to access a leisure, retail and (to a lesser extent) employment opportunities in Glasgow. This may have a negative impact on the economy of Dumfries.
	Accessibility & Social Inclusion	1	The TPOs all relate to improving the accessibility of the area and the key points are noted in the ASTs for TPO1, 2 and 3. In addition, a lack of direct public transport routes was identified during the study's Pre-Appraisal stage. This option would provide a moderate improvement in access to both employment, healthcare and social and leisure opportunities in Glasgow through the provision of a direct bus service. Rather than providing additional services, it could be that a number of the existing X74 services are re-routed via Thornhill. However, this would be at the expense of a reduced service offering in Beattock and Moffat with an associated reduction in accessibility for existing uses of the service.
	Integration	1	The option would remove the need for interchange for journeys between Thornhill, Moniaive and Dumfries Royal Infirmary and between Thornhill and Glasgow, removing the need to interchange (in Dumfries Town Centre for trips to the Infirmary) and between buses or between bus and rail for public transport access to Glasgow. In addition, improving the public transport network supports the aims of the National Transport Strategy, SWestrans Regional Transport Strategy, the Bus Action Plan and the Local Transport Strategy. The option is therefore aligned with the broader policy goals included within key national, regional and local policy documents.

Table M.15: Appraisal Summary Table – Option 4 - Feasibility, Affordability and Public Acceptability

Criteria		Rationale
Other Criteria	Feasibility	From an engineering perspective, the option does not require the build of any infrastructure or any land purchase and as such is unlikely to present any feasibility challenges.
	Affordability	The affordability analysis showed that a new express Service between Dumfries, Thornhill and Glasgow which utilised one bus and operated Monday to Saturday would cost approximately £175k per year and would require 28,000 passengers per annum (or 15 passengers per bus) in order to break even; and Given that average bus occupancy on local buses across Scotland (including in more populated areas where occupancy is higher) was just 8.7 in 2015/16, reaching this patronage figures for the service was felt to be unlikely especially given the rural nature of the community. As such the service was not considered to be commercially viable and would require substantial subsidy to operate.
	Public Acceptability	The option is likely to be acceptable to the public given the direct connection to Glasgow that would be provided as no direct connection currently exists.

Table M.16: Appraisal Summary Table – Option 6 - Transport Planning Objectives

Criteria		Score	Rationale
Transport Planning Objectives	TPO1: Enable an effective day trip by public transport to key education, retail and social opportunities in Glasgow, Ayr, Edinburgh and Carlisle	2	With the option in place, trips to Carlisle experience up to a 60% reduction in public transport travel time, with the largest reduction in time equating over 1 hour 10 minutes in public transport travel time reduction. Trips by public transport are quicker than the private car in 9 of the 16 hours considered when the trip by public transport can be up to around 15 minutes quicker. Trips to Glasgow experience up to around a 50% reduction in public transport travel time, with the largest reduction in time equating over 90 minutes in public transport travel time reduction. Trips by public transport are never quicker than the private car with the quickest travel time by public transport still 15 minutes slower than the private car. The option also provides a new opportunity to travel to Glasgow after 22:00. Journey times to Ayr also reduce by around 20 minutes in the morning period and around 15 minutes for return journeys in the evening period. This differences open up opportunities for more effective day trips to the strategic locations, especially Carlisle. This could have a positive benefit in helping the community feel less remote and better connected, with the same opportunities as other parts of Scotland. Travel times to Edinburgh are unaffected and as such the option does not provide benefit in enabling an effective day trip to the capital.
	TPO2: Provide public transport connectivity which enables travel to and from the area across the day and across the week	2	With the option in place, there is: - An increase in weekday and Saturday northbound connections , with the rail services providing 10 additional connections - An increase in operating hours for weekday, Saturday and Sunday travel - An additional 5 hours' coverage during the weekday and Saturday in terms of access for northbound travel - An additional 1 hour 20 minutes and 3 & ½ hours coverage for southbound travel on a weekday/Saturday and Sunday respectively. Specifically, of note is the ability to travel from Dumfries to Thornhill on a Sunday at 23:43. The additional connectivity will enable trips to and from the area much earlier / later in the day, opening up opportunities for employment that requires shift / weekend working which were previously inaccessible by public transport.
	TPO3: Increase the inbound public transport catchment to support education, tourism and local businesses	3	The option is likely to provide a very significant increase in the number of people able to access Thornhill, with the potential to substantially increase the accessibility, enabling a much wider employment catchment area to enable people to access the village to support key services within the village i.e. teachers, GPs etc. and also improve connectivity for tourists into the area to support local businesses.

Table M.17: Appraisal Summary Table – Option 6 - STAG Criteria – Environment, Safety and Economy

Criteria		Score	Rationale
STAG Criteria	Environment	1	The option would involve the construction of the railway station at Thornhill. This may have adverse effects on the environment during construction and there may also be long-term noise impacts in the area close to the station due to train deceleration and acceleration. The option does not involve the running of additional trains (just an additional stop for existing trains) and therefore there will be little adverse impact on the environment in terms of emissions. High private car use for those in the study area was identified during the public engagement stages of the study and any modal shift to rail that could be achieved would reduce car use and associated noise and emissions. The public noted that currently, people drop family / friends at Sanquhar station. Each journey transferred to Thornhill station, if it opened, would save around 25 car miles and driver time (around 50 car miles if the return pick up trip is also considered). In addition, for those currently driving to Sanquhar station and leaving their car, transfer to Thornhill station would free up one of the (very few) parking spaces at Sanquhar, as well as reducing car miles by around 25 miles 9for the outward and return trip to the station).
	Safety	1	Any modal shift to rail that may be achieved would reduce private vehicles on the road network which has the potential to reduce traffic accidents, although the reduction is anticipated to be minor.
	Economy	2	The option has the potential to provide considerable benefit to the local economy by improving the accessibility of employment opportunities and retail in Dumfries, Carlisle and Glasgow. However, increasing the accessibility Carlisle and Glasgow may have a negative impact on the economy of Dumfries if people are more readily able to travel further afield to retail and social opportunities. in addition, there would be increased opportunity for local businesses to take advantage of the improved connectivity for their business needs. There is potential for the option to have a significant impact on tourism, by enabling ease of access to the area to encourage further tourists to the area, especially capitalising on the regions ‘festival’ offering.

Table M.18: Appraisal Summary Table – Option 6 - STAG Criteria – Accessibility and Integration

Criteria		Score	Rationale
	Accessibility & Social Inclusion	3	The TPOs all relate to improving the accessibility of the area and the key points are noted in the ASTs for TPO1, 2 and 3. The option is particularly beneficially to those without a private car or unable to drive. This includes: those on lower incomes for whom owning a car is not possible; local businesses, especially those connected to the tourism industry, by enabling people to more easily visit the area. The existence of a rail station does tend to place a location 'on the map'; the elderly who have stopped driving for whom the improved access may enable improved accessibility to the major hospitals in Edinburgh and Glasgow; those seeking Higher Education opportunities; children under the age of 17 through providing an increased ability to travel independently, providing access to a greater range of extra-curriculum and social activities in which to participate in both Dumfries and Carlisle. It should be noted that the station is located 1.5km outside of the village, which presents an accessibility issue for those less abled and the elderly. In addition to the comments for the TPOs it is important to note that a key benefit of improved accessibility to and from the study area will be in reducing the feelings of remoteness of the community and enabling local people to feel connected and part of a wider Scotland. This is especially important in terms of the long term sustainability of the community and the retention of younger people in the area. The option provides better equality of access to all enabling fair access to the wider opportunities.
	Integration	2	Provision of the rail station itself does not offer any direct mode integration benefits. However, the development of a station with suitable facilities for cycle parking, and with safe and secure walking access routes has the potential to integrate rail and active travel modes. It is also assumed that existing bus services or a new service may redirect to serve the station, and offer bus to rail integration benefits. This will be particularly important for Thornhill Railway Station given the stations location to the east of the village and the wide rural area it may serve i.e. it will be the closest railway station for those in Moniaive, Tynron, Penpont etc. for whom a walk to the railway station will not be possible by foot and in many instances by bike, given the distance. In addition, improving the public transport network and transport integration supports the aims of the National Transport Strategy, SWestrans Regional Transport Strategy, the Bus Action Plan and the Local Transport Strategy. The option is therefore aligned with the broader policy goals included within key national, regional and local policy documents.

Table M.19: Appraisal Summary Table – Option 6 – Feasibility

Criteria		Rationale
Other Criteria	Feasibility	In terms of the feasibility to implement a stop at the railway station in light of current established policy, the Scotland Route Study and RDG's "Investing in the Future Choices for Scotland's Railways 2019 and beyond" publications, do not propose any new stations or routes. However, they do create an opportunity for dialogue on a more integrated approach to developing the GSWL and to providing benefits which will enable Thornhill station to be delivered. A move towards the GSWL becoming the WCML freight (possibly passenger) diversionary route presents an opportunity to secure upgrades and improve services for the Dumfries & Galloway area with an opportunity for Dumfries and Galloway Council and SWestrans to enter into dialogue with the railway industry. While any future extension of an HS2 route into Scotland is unlikely to have any significant impact on services on the GSWL, it may offer an opportunity to upgrade the infrastructure on the route if it is required as a diversionary route during HS2 construction works. In terms of the feasibility to accommodate a new stop at Thornhill, re-timing trains at the northern end of the GSWL route is incredibly complex when the wider network is considered with a comprehensive re-planning of all the services on this route, including the Barrhead and East Kilbride suburban services required. The impact would be right into Glasgow Central Station. Extending train journey times at the southern end of the route would cause interaction with trains running on the WCML due to the 'single lead' Gretna junction and has the potential to destroy a number of currently published connections. However, a potential reduction in unnecessary pathing time, increases in the generic line speed, reduced calls at other stations, the potential for new trains or improvements made as part of the Abellio ScotRail franchise agreement do offer alternative opportunities for the introduction of a stop at Thornhill Railway Station. From an engineering perspective, the option requires the build of the railway station. The station itself will require: two platforms; a Cross-track, DDA compliant footbridge; and passenger facilities (including waiting shelters, Customer Information System (CIS), Public Address (PA) & CCTV systems with one ticket machine). Assuming the old station site is renovated, its location close to local roads means there is limited requirement for works to provide any major access to the station. The station would serve a wide rural area and bus access will be required. Considerable car parking is therefore required to serve this wide rural area. Overall, no major engineering feasibility issues are envisaged.

Table M.20: Appraisal Summary Table – Option 6 - Affordability and Public Acceptability

Criteria		Rationale
	Affordability	The option requires the build of the railway station requiring two platforms whose length must be at least sufficient for a four car 23m unit (100m length is required which is about the same, or shorter than, most recent new stations or those under construction); a Cross-track, DDA compliant footbridge; and passenger facilities (including waiting shelters, Customer Information System (CIS), Public Address (PA) & CCTV systems with one ticket machine). Comparisons with other stations currently being constructed, or recently reopened stations has allowed for an estimated station construction cost of **£8million - £11million.** While no analysis of potential revenue generation has been made, a very high level estimate of potential patronage has been made and shows: • A potential Thornhill Railway Station catchment population of 7,900 (with no limit on drive time to the station; • A potential Thornhill Railway Station catchment population of 6,505 (if a 30-minute drive time 'cap' to the station is assumed).
	Public Acceptability	The option is likely to be widely accepted by the public given the survey responses during the public engagement which showed the strong sentiment for this option. If the station were to be re-opened, there would be some minor impact to existing rail users due to the additional rail stop at Thornhill. However, this is anticipated to be of the order of two minutes and is therefore relatively minor. Existing users may also oppose any required timetable changes that may occur. The reopening of the station may impact on bus services running between Thornhill and Dumfries, with potential for these services to reduce in frequency if patronage is lost to rail. If so, smaller communities served by these buses (who would not benefit from Thornhill station) would see their overall accessibility reduce. This is unlikely to be publically acceptable to these communities.

Appendix N Part 2: Further Engagement

N.1 Engagement Overview

N.1.1 During the later stages of the study, further consultation was undertaken, including:

- Public Event in Thornhill with an associated online survey;
- SWestrans and Dumfries and Galloway Council Officers: face-to-face meeting
- Stagecoach West Scotland – also speaking on behalf of Stagecoach Cumbria: face-to-face meeting
- Houstons Coaches: face-to-face meeting
- Network Rail: email correspondence
- ScotRail: email correspondence
- East Ayrshire Council: email correspondence
- Strathclyde Partnership for Transport: email correspondence
- Cumbria and Carlisle Councils: email correspondence

N.2 Public Event

N.2.1 A Public Event was held on 17th January 2019 in Thornhill from 17:30 – 20:30 at Wallace Hall Academy. The purpose of the event was to present information about the study, covering all stages of the study including the problems identified, the options generated and the option appraisal process and key appraisal findings. The events were publicised via social media by the Council and also communicated to local people through Thornhill Railway Station Action Group.

N.2.2 A feedback form was available for completion at the event asking participants about the severity of the problems identified, the impacts of the problems on them and their community, and their thoughts on the options and how they would benefit them. Pre-paid envelopes were also made available if people wished to complete the feedback form at home and post back. Furthermore, the feedback survey (identical to that handed out at the event) was made available online for completion.

N.2.3 The Public Event material was also made available online after the event, with the link to the online version of the feedback survey alongside it. The Council further publicised that the material was available.

N.2.4 In total 329 people attended the event on the night, with a total of 616 feedback surveys completed (combined paper, posted and online surveys completed).

N.2.5 A summary of the feedback provided is presented here.

N.2.6 Figure N.1 maps the postcodes that respondents gave indicating where they live. Some respondents noted that they live outside of the area shown in the map in Figure N.1. There were respondents from towns further afield in the Dumfries and Galloway area including Girvan, Newton Stewart, Kirkcudbright and Annan. Of those living outside of the region there were two respondents from Glasgow, one from Stirling and one from Aberdeen. There was only a

respondent from Mallaig. Three respondents indicated that they lived in England, all in the London area.

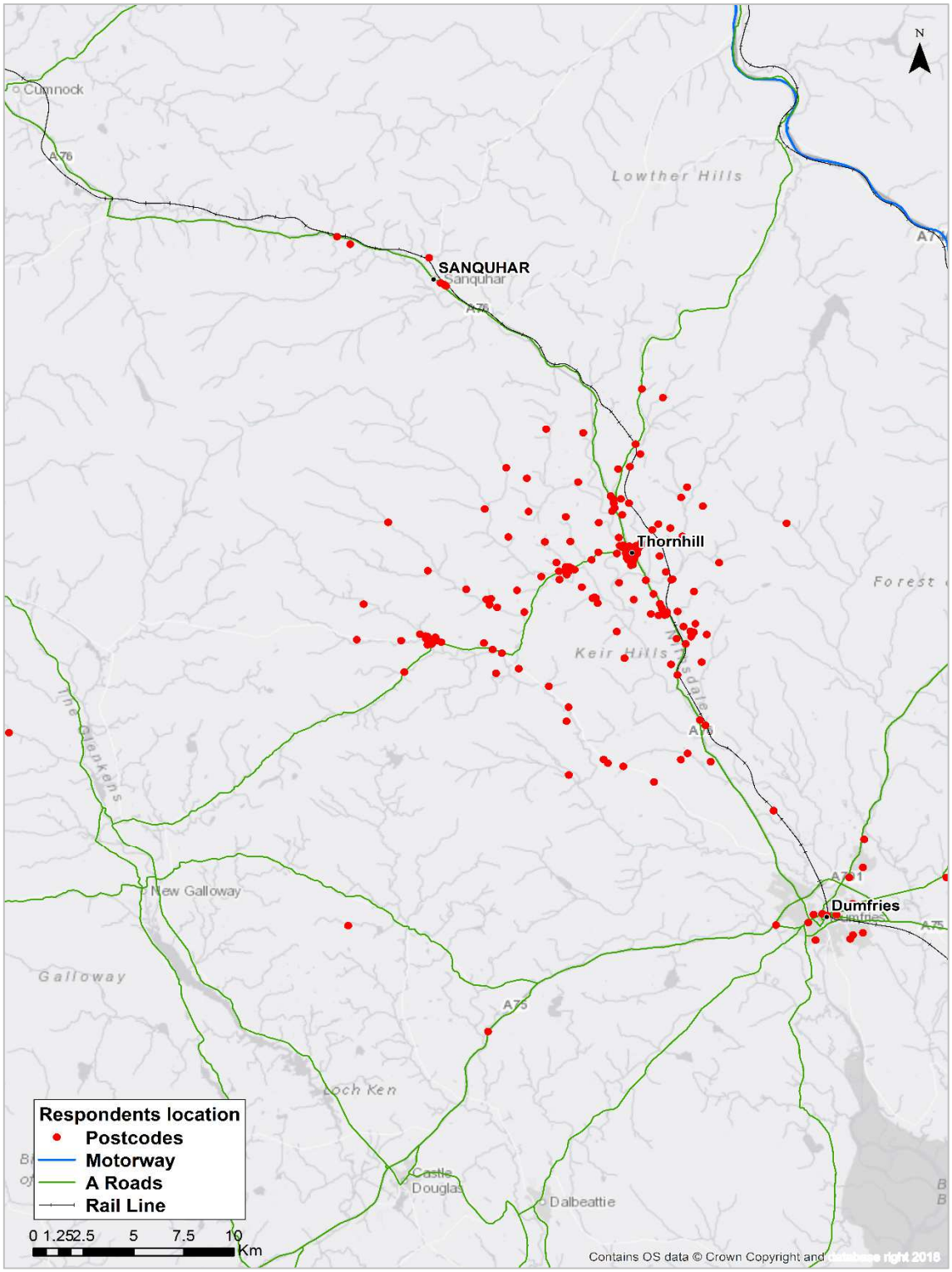

Figure N.1 Respondents Location

Q1 – Which area best describes where you live?

N.2.7 Respondents were asked to state which area they lived in. All respondents answered this question. Thornhill was the most common answer, representing 42% (n=261) of the

respondents (see Figure N.2). The next most common response was Closeburn, where 10% (n=64) of respondents stated they lived. 12% (n=73) of respondents noted that they lived in areas that were not included on the list. Of these respondents, 14 selected that they lived Dumfries and 8 in Dunscore.

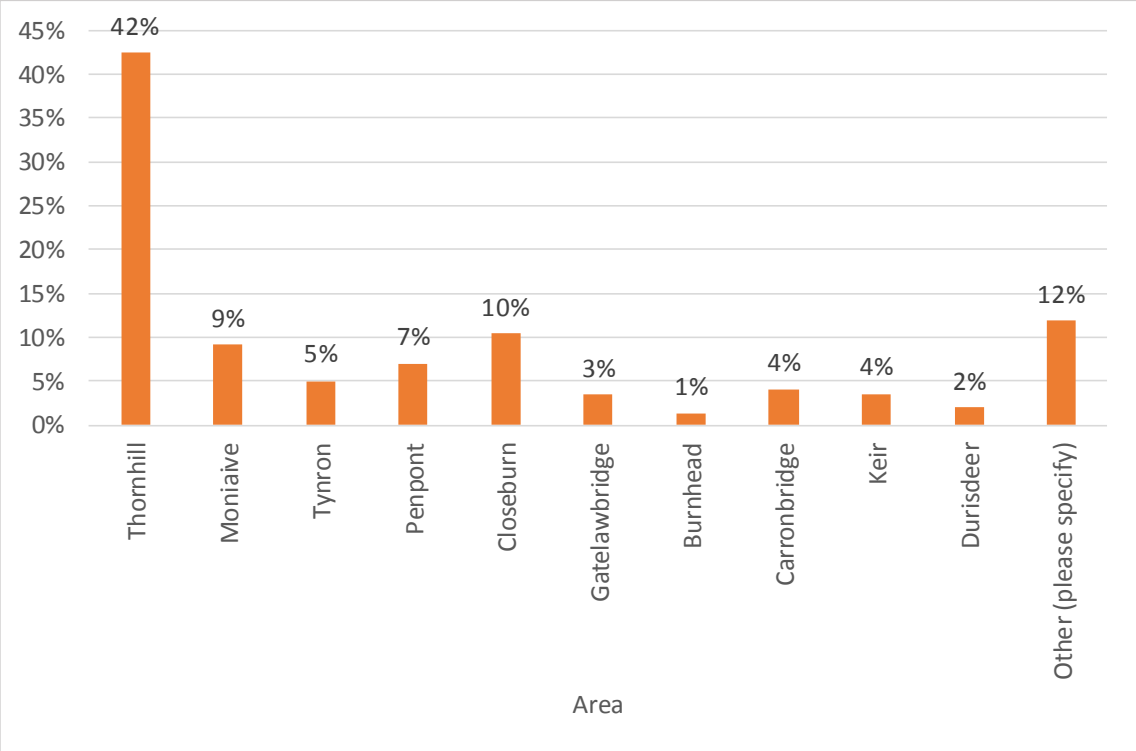

Figure N.2 Location where respondents live

Q3 – Which mode of transport do you most regularly use when you go about your day to day business?

N.2.8 Respondents were asked to select which mode of transport they most regularly used. All respondents answered this question. 76.6% (n=472) stated that they most regularly drove their car (see Figure N.3). A further 8.1% (n=50) used the bus service and 1.8% (n=11) used the rail service.

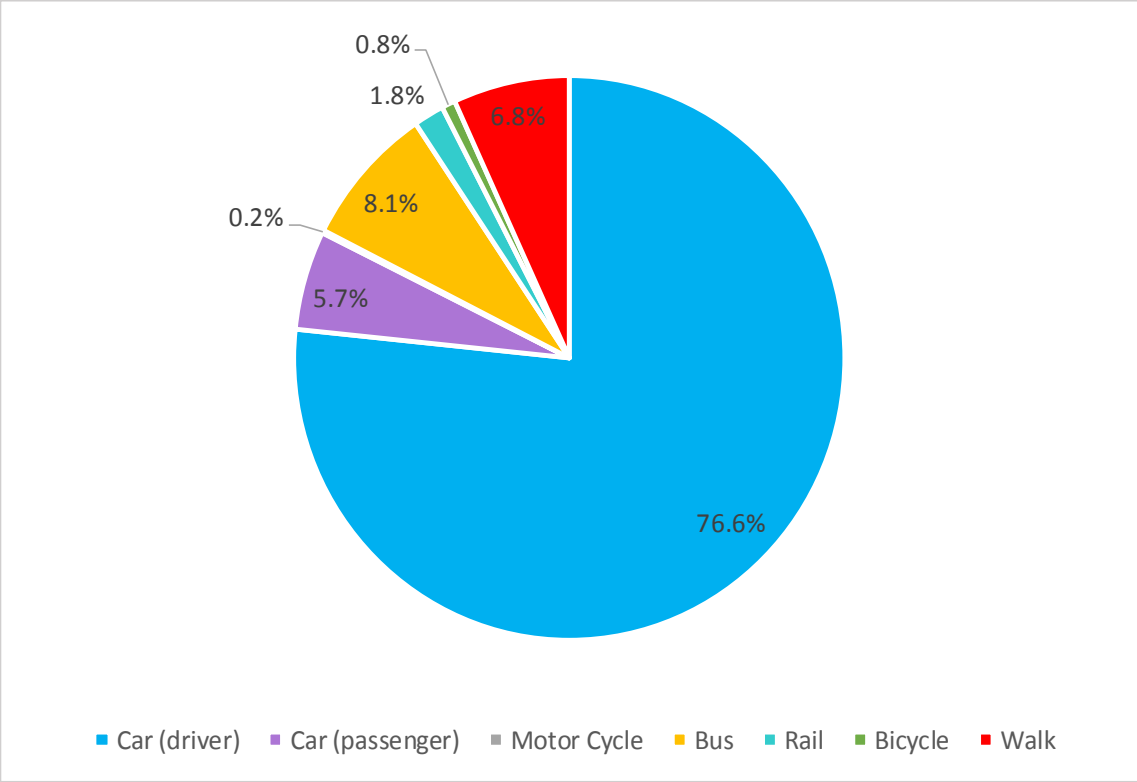

Figure N.3 Main mode of transport

Transport Problems

Q4 – We have identified a series of transport problems which affect the area. For each of these problems, indicate whether you feel this is a major problem, slight problem or not a problem for you.

N.2.9 There were several transport problems identified in the area. All respondents answered this question. 77% (n=473) of respondents felt the fact that the rail network was not easily accessible was a major problem. This was followed by poor integrations of bus and rail services with 63% (n=386) stating that it was a major issue. The problem that respondents were least dissatisfied with was the lack of safe cycling routes. Figure N.4 illustrates the results.

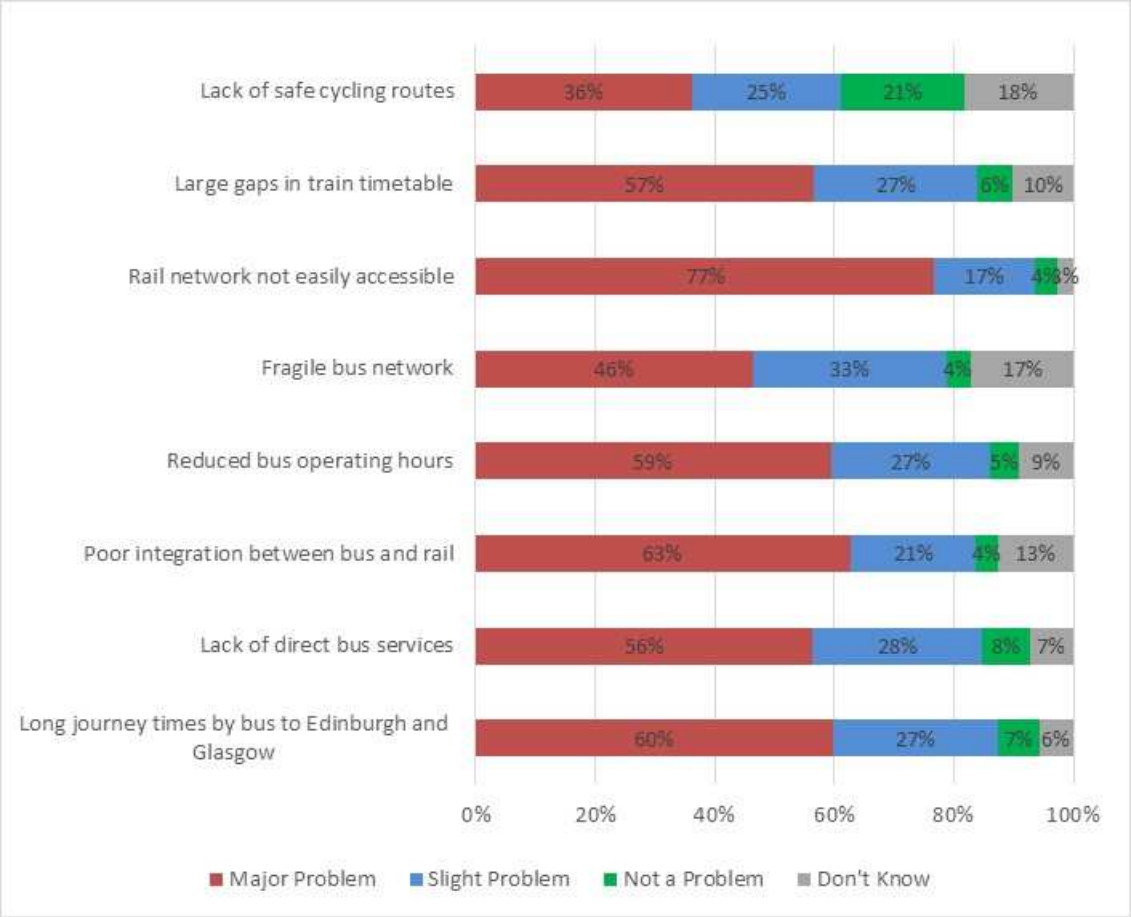

Figure N.4 Opinions of transport problems in the area

Transport Options

N.2.10 There were three options selected for further appraisal at the end of the Part 1 Appraisal. These were:

- Option 1a: Dedicated 'Rail-bus' to Lockerbie Station
- Option 3: Earlier, later and Sunday services
- Option 6: Re-open Thornhill Railway Station

Q5 – Considering the options identified in the appraisal, what level of positive benefit or negative impact do you think each option will provide for travel to and from the Thornhill area?

N.2.11 Respondents were asked to state the level of benefit they believed the option would make to the area. 592 respondents answered this question. 85% (n=501) of respondents felt that Option 6 would have a major positive impact for travelling to and from the Thornhill area. 38% (n=225) thought that Option 3 would have a major positive impact on the area and 24% (n=143) felt that Option 1a would provide a major benefit. Figure N.5 shows the results.

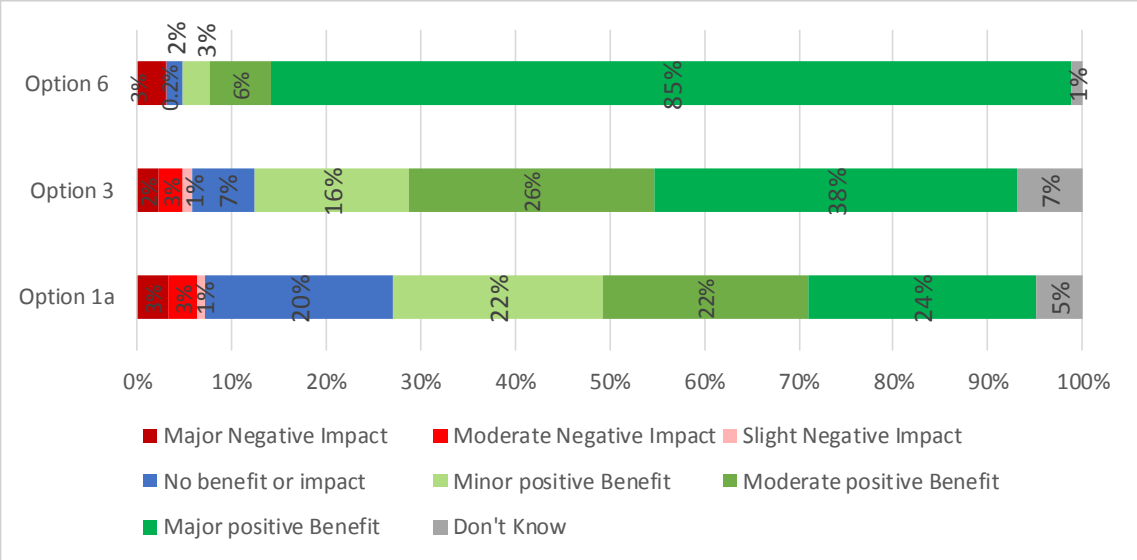

Figure N.5 Impact of transport options

Q6 - Which would be your preferred option for the future?

Respondents were asked to state which was there preferred option for the future. 591 respondents answered this question. 90% (n=533) stated that their preferred option was Option 6, to re-open Thornhill railway station (see Figure N.6). 6% (n=33) selected Option 3 and 4% (n=25) selected Option 1a.

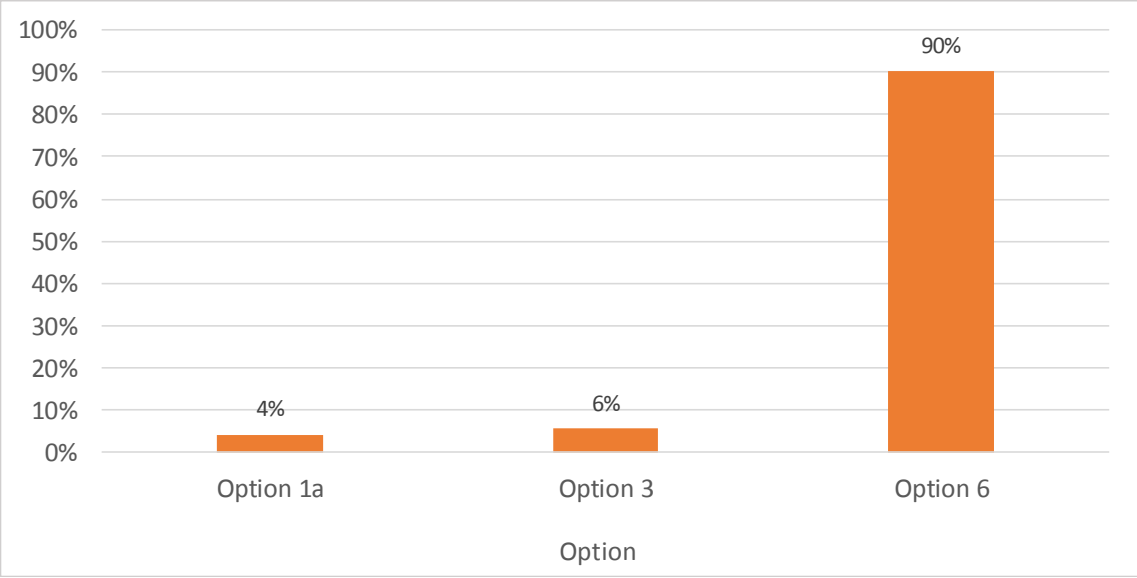

Figure N.6 Preferred Option

Open Responses

N.2.12 The survey provided respondents the chance to make open comments. There were two questions, one regarding their preferred option and the other gathering further comments on the study. The responses are summarised below.

Q6 - Please explain the main way(s) you think you and / or your community would benefit from your preferred choice option

Option 1a – Dedicated Rail-Bus to Lockerbie Station

Better access to the mainline

N.2.13 Respondents noted that the dedicated rail-bus service to Lockerbie Station would provide better access to the mainline for the community. Trains from Lockerbie are much faster and would provide far better onward travel connections. It was also noted that it would give people a choice which city in the central belt they wished to travel to.

Cheaper option

N.2.14 Some respondents noted that they felt a dedicated rail-bus to Lockerbie would be a better use of money. There were some comments noting that due to the railway line being away from the town centre the station would not be used and therefore, would be a 'waste of money'.

Avoid parking difficulties in Lockerbie

N.2.15 It was noted that a rail-bus service would remove the issues with parking at Lockerbie Station. Three respondents noted that they regularly travel to Edinburgh, so this would be their preferred option. It would be much easier than driving and parking at Lockerbie. It was also noted that this would be a more environmentally friendly option than driving to Lockerbie.

Option 3 – Earlier & later (and Sunday) services between Thornhill, Moniaive & Dumfries

Car-free travel

N.2.16 Some respondents noted that pubic transport was the only option for those that don't drive in the area. For these members of the community they need a frequent bus service with services in the evenings and at the weekend.

Easy access

N.2.17 Some respondents highlighted that the bus service in the area is easy to access with lots of stops spread across the area.

Advantageous for surrounding villages

N.2.18 It was also noted that strengthening the bus service would a great advantage to those living in villages surrounding Thornhill.

Easier to socialise

N.2.19 Some respondents felt that an advantage of later bus services would be a greater ability to socialise in the area. It was felt that this would be especially advantageous for teenagers in the area who would no longer have to rely on their parents driving them. Respondents felt that Thornhill is essentially 'cut off' past 9pm as there are no bus services.

Ability to commute

N.2.20 It was noted that earlier buses would allow members of the community, especially those working in Dumfries, to commute to work by bus. This is an issue currently as the bus timetable does not allow people to arrive in Dumfries before 08:30. Respondents noted that this could reduce congestion in the roads and improve air pollution. It was also noted that an improved bus service would also help those working shifts and/ or at the weekend.

Encourage people to use the bus

N.2.21 It was noted that an improved, more convenient bus timetable could encourage more people to use the bus in general. Respondents noted that this included the ability to commute to work and attend events in the evening.

Option 6 - Re-open Thornhill Railway Station

Easier travel to areas across the country

N.2.22 The number one way that respondents felt a train station would improve their community was by providing quick and easy travel across the country. It was noted many times that it would provide better access to the central belt of Scotland and other cities across Scotland. Access to Manchester and London was also desirable among the respondents. It was noted that rail travel is also more comfortable, with facilities such as toilets, which are not available on all buses from the study area. In total, there were 190 comments regarding the benefits of a train station for accessing cities further afield.

Reduced journey time

N.2.23 A major benefit of rail travel in the area was noted to be the reduction in journey times. Respondents felt that anything that reduced journey time is a benefit to the whole community.

Bring visitors into the area

N.2.24 In total, there was 98 comments noting that improved transport could encourage more people to visit the area. Reducing the travel time and removing the need to drive were both noted as reasons more tourists may visit.

N.2.25 There are many small businesses in the area which would benefit from increased footfall in the town. It was noted that it would open Thornhill up and could act as a catalyst for new businesses to move into the area.

Encourage people to live in the area

N.2.26 As noted above, re-opening the railway station significantly reduces the journey time to key destinations. This links Thornhill with the wider transport network. Some respondents felt that this could potentially attract people to live in the area. Links to employment, education, health care, shops and social activities would all improve with the re-opening of the railway station. This could make living in Thornhill much more attractive and encourage people to come into the area.

N.2.27 Respondents noted that many of the young people in the area go to university and then don't return to Dumfries and Galloway at all because it does not provide them with the opportunities they have in bigger cites. Better transport links could encourage these people to return to area which would hugely benefit the entire community. Respondents were hopeful that professionals would be encouraged to live in the area. They feel that this is especially important with the ageing population in the area.

Improved employment opportunities

N.2.28 A local station in the area would significantly improve employment opportunities and could provide greater career progression. It would make the commute to the central belt a viable option and in turn allow people to choose from a wider range of jobs. It was noted that in some cases this could result in people being able to get higher paid jobs. Respondents noted that rail travel is much better than driving or getting the bus because you can work while travelling when on the train.

N.2.29 Better connections employment opportunities have other knock on effects to those living in the community. For example, one respondent noted that re-opening the railway station would

significantly reduce their commute to work in the central belt. They would get home earlier in the evening and be able to pick their children up earlier. This reduces their expenditure on child care and therefore, they are financially better off and get to spend more time with their family.

Improved access to education

N.2.30 In addition to improved job opportunities, respondents noted that re-opening the train station would provide better access to higher education for those living in the area. It would give people the option to commute to Glasgow for higher education. This is an attractive option for many families in the area who would not be able to afford rent in Glasgow for members of their family studying there. It would also provide better access to Dumfries and Carlisle.

N.2.31 Respondents also noted that it would be beneficial for students from the area who are already at university. It would make it easier for these students to visit home and from their family to visit them without relying on driving.

N.2.32 A few respondents also noted that the train station would be beneficial for pupils studying at Wallace Hall Academy. Children travel from outside the immediate area to attend the school and some parents felt rail travel would be an easier and safer option of travel, especially during the winter months. It should be noted that there are currently school buses that transport children from outside the immediate study area.

Improved access to health care services

N.2.33 Re-opening Thornhill railway station would give people in the access to health care further afield. This includes accessing specialists in the central belt and going to the hospital in Dumfries. Respondents noted that this was a priority as the population grew older.

N.2.34 A few respondents also noted that better transport links to and from the area could attract more GPs to practice in the area. One respondent noted that there is currently a shortage and they felt it was primarily due the rurality and isolation of the area for their children and families.

Remove dependency on car

N.2.35 Respondents in the area noted that without a car their travel options were limited. The bus connections were felt to be slow, uncomfortable, infrequent and not enjoyable for long journeys. For those unable to travel on the bus due to accessibility issues they often have no choice but to drive. It was noted that re-opening the train station would allow people and alternative, accessible mode of transport for people to use, reducing the dependency on car-based travel.

N.2.36 The study area has an ageing population so providing accessible transport options is a priority. Respondents felt that the train would be much more suitable than the buses in the area and would encourage more people to use public transport.

N.2.37 Respondents also noted that cars are expensive to purchase and maintain. Some people in the area cannot afford to run a car and therefore are restricted to the destinations available by public transport. A train station would allow these people to make quicker to journeys further afield locations with ease. Often families in the area have no choice but to have multiple cars so allow them to carry out their daily lives. Some respondents noted that re-opening the railway station would remove the need for them to own two cars.

Remove the need to drive to Sanquhar, Dumfries or Lockerbie

N.2.38 Respondents noted that they currently have to drive to one of Sanquhar, Dumfries or Lockerbie to connect with the rail network. Re-opening Thornhill railway station would remover the need to do this. Therefore, passengers would not have to build this travel time into their overall journey time. A station in Thornhill would be more practical and many respondents noted that it would remove the hassle of driving to the nearest stations. In addition to this, there were some

comments stating that the road from Thornhill to Sanquhar can be dangerous, especially in adverse weather.

Reliable travel

N.2.39 Many respondents felt that re-opening the train station would be a far more reliable travel option. It was noted that some of the buses in the area do not stick to the timetable and passengers are left not knowing when they are going to arrive. There is also no need to worry about coordinating bus and rail timetables.

Positive environmental impact

N.2.40 There were 67 comments made regarding the positive impact a rail station would make to the environment in the area specifically due to a reduction in car use. Respondents felt people in their area were dependent on car-based journeys and therefore there are always a lot of cars. It was noted that the air quality could be significantly improved If people switched from using their car to using the train.

Cost effective

N.2.41 Some respondents said that re-opening the railway station would be cost effective for them. Currently when travelling to the central belt respondents noted that if they drive they pay for the fuel of the car and parking in the city centre which can be expensive. The option is driving to Sanquhar or Lockerbie and then getting the train and once again paying additional fuel costs.

N.2.42 It was noted that bus tickets in the area can be very expensive, especially for families and that train tickets would not be significantly more but provide a much faster, direct travel option.

Greater ability to socialise

N.2.43 There were 63 comments noting that re-opening the railway station would allow respondents to socialise more and visiting friends and family. It was felt that there are some social activities that people wish to attend outside Dumfries and Galloway. A railway would provide quicker and easier access to these activities, without having to drive to Sanquhar, Dumfries of Lockerbie. It was noted that this would mean that people would be able to have an alcoholic drink while socialising as they can get home without needing to drive. It also removes the dependency on family members to collect each other from the station further away or pay for taxis, which are very expensive.

N.2.44 A railway station in Thornhill could introduce a social structure for younger people that Dumfries and Galloway lacks. Respondents noted that this would be particularly beneficial for teenagers who are old enough to travel alone but currently rely on either the slow bus services or their parents driving them to activities.

Better shopping and leisure opportunities

N.2.45 In addition to being able to socialise more, respondents felt that re-opening the railway station would result in better shopping and leisure opportunities for people living in the surrounding area. Respondents wish to be able to spend the evening in Dumfries, Carlisle or Glasgow and return home afterwards.

General Comments

N.2.46 Two respondents felt that a better option altogether would be regular, direct bus services to Glasgow and Edinburgh.

N.2.47 There were many comments regarding the location of the railway line in relation to the town. Some respondents felt that due to the distance people would not choose to travel by train and instead continue to drive.

Q7- Do you have any further comments to make on the study, and the interim conclusions presented at this stage? – 287 responses

Re-open Thornhill railway station

N.2.48 In total, there were 75 comments noting respondents' desires to re-open the railway station in Thornhill. This would suggest strong public interest and acceptance of Option 6. Many respondents noted that it was the best option for the future of the community as it provided quick and easy access major cities.

Improved public transport

N.2.49 There were numerous comments from respondents noting that public transport in the area desperately needs to be improved. Respondents want more frequent and reliable services. Some respondents noted that any improvement would benefit the lives of people in the area and the more public transport the better.

Further employment opportunities

N.2.50 Some respondents reiterated that a train station in Thornhill would open new employment opportunities for people in the area.

Bring tourists into the area

N.2.51 Respondents noted that re-opening the train station could encourage tourists into the area, increasing footfall and boosting the local economy.

Accessing education

N.2.52 It was noted that the train station is close to Wallace Hall Academy. There are children at the school that come daily from Dumfries and a train station would significantly reduce their journey time.

Bus connections to station

N.2.53 Due to the location of the railway line it was noted that there would have to be a bus connection from the town centre to the new railway station. Some respondents had concerns that the station would not be used due to its location and people would continue to use their private car.

Cost of re-opening the station

N.2.54 There were 18 comments regarding the estimated cost of re-opening Thornhill railway station. Respondents felt that the cost seemed very high and many noted that they would have liked to have seen a further break down of this cost.

Reduction in car use

N.2.55 Some respondents noted that all of the options would reduce the number of car journeys in the area. This would reduce congestion on the roads and improve air quality. It would also give people the option to commute by public transport which importantly reduces the number of cars on the roads at peak time.

Elderly population

N.2.56 It was noted that improved public transport would be a huge benefit for the elderly members of the local community. Respondents felt that this is particularly the case with the train as there can be accessibility issues with some buses in the area.

Integrated transport

N.2.57 Some respondents noted that to encourage people in the area to use public transport the network must be integrated. It was noted that sometimes there can be long wait times between bus and train connections and this deters people from using the services.

Alternative train stations

N.2.58 There were five respondents who felt that re-opening Closeburn railway station would be a better option than re-opening a station at Thornhill. One respondent felt a station at Crawford, on the Edinburgh line, would be the best alternative. Another respondent noted that they felt a station at Cumnock and Mauchline should also be re-opened in addition to Thornhill.

Active travel improvements

N.2.59 Three respondents noted that the cycle lanes in the area needed to be improved. One respondent noted specifically that there could be improvements to the route between Penpont and Thornhill.

Frustrations with the process

N.2.60 A few respondents noted that felt they had been campaigning for better public transport in Thornhill for many years and were frustrated with the lack of progress. One respondent felt that the STAG model was not sensitive enough to rural communities and their specific issues.

N.2.61 There were two comments from respondents who felt that the rurality of the area had not been fully considered in the study. This included the importance of maintaining fragile bus services.

N.3 Thornhill Station Action Group

N.3.1 A meeting with Thornhill Station Action Group was held on 17th January 2019, prior to the public event. A phone call was also undertaken with the group on 21st November 2018 as part of Transport Scotland's South West Scotland Transport Study. The phone call was undertaken by members of the team working on this study, and for completeness is included here as the same key messages were discussed.

One-to-one phone call (21st November 2018)

Problems

Rail

N.3.2 The Thornhill Station Action Group are campaigning for the re-opening of Thornhill railway station in Mid-Nithsdale. There is currently no station easily accessible for Thornhill or the surrounding area. The closest existing stations are those at Sanquhar (12 miles north) or Dumfries (14 miles south).

N.3.3 In the public survey undertaken in 2016, as part of the Thornhill Sustainable Transport Study STAG work (commissioned by SWestrans), many people (77% of respondents to the survey) stated the distance to the nearest station was a main factor in them not utilising rail as a means of travel.

N.3.4 The existing timetable from the nearest available stations was discussed. It was noted that the current timetable offers no service to Carlisle between 1429 and 1731, and there are no trains

north to Glasgow between 1545 and 1835, very large gaps in the afternoon where travel by rail is not possible – and this limits the use of rail for education, retail and social activities. There are now only 3 direct trains a day between Glasgow and Newcastle (which call at Sanquhar and Dumfries) and one direct train a day between Newcastle and Glasgow. All other times require waiting for a connection at Carlisle.

N.3.5 The lack of a rail station in Thornhill and poor current timetable was felt to be majoring impacting on local people's ability to travel further afield.

N.3.6 It was felt that there was much greater capacity for rail freight, with the current high level of freight traffic on the road, and through the village, having a major impact on local residents.

Bus Network

N.3.7 At present, as there is no rail station, bus is the primary sustainable travel mode, but a lack of integration between bus and rail services, means that, at present, you can have to wait for up to an hour at a rail station from bus arrival to train departure. In addition, there is no direct link from Thornhill to the railway station in Dumfries, meaning interchange (or a cross-town walk) from Whitesands is necessary. This is therefore a highly unattractive alternative to the private car, and reduces accessibility for those without access to a car or unable to drive.

N.3.8 The bus network in Dumfries and Galloway is fragile and there is an ever present threat of further cuts to the subsidy available to support the operation of the existing bus network. Local people feel they cannot depend on the bus network in the future. In general, while North-South travel by bus is possible, travelling East-West is very difficult.

N.3.9 The main bus service operating through Thornhill is Service 246 which runs between Dumfries and Cumnock (from where a connection can be made to travel on to Ayr – although the connection time in Cumnock can be lengthy (a 40-minute wait time was noted). However, there have been recent cuts to the service. It is no longer possible to travel back from Dumfries to Thornhill after 20:30 on a Monday – Saturday, and the later bus which only ran on Friday and Saturday (at 10.30pm from Dumfries and around 11.45pm back through Thornhill) was cut in July 2018, seriously impacting on the use of the bus for evening activities, and limiting the ability of the local community to participate in social activities, particularly young people. In addition, due to the Service 246 cuts, you can also no longer travel from Thornhill to Dumfries after 20:30, again impacting on the accessibility of Thornhill later in the evening. This lack of later running services also means there are no connections to meet evening arriving or departing trains.

N.3.10 Cuts have also recently been made to bus services operating between Dumfries and Edinburgh, making East-West travel out of the Thornhill area, more difficult still.

N.3.11 It was noted that the X74 service from Dumfries to Glasgow is very successful but that you have to interchange from Thornhill to connect to the service.

N.3.12 Bus travel from Thornhill to Carlisle was noted to take around 90 minutes or with interchange to rail in Dumfries required (via Whitesands), making it highly unattractive and difficult for those less mobile, without car access or unable to drive.

Car

N.3.13 The poor sustainable transport connectivity, and remote rural area, means that the community has a high reliance on the private car which the community sees as highly undesirable as there is a desire to be able to travel more sustainably.

Economic and Social Problems (due to existing transport network)

N.3.14 It was felt that the existing poor transport connectivity is causing major social problems in the local communities, particularly in terms of young people feeling isolated and unable to integrate effectively with schools and associated activities in Dumfries, the result being a reduction in

social opportunities. The poor connectivity of the area was felt to be a key driver in the area's inability to retain young people and the associated ageing population demographic as young people need to move elsewhere to access higher education opportunities and employment.

N.3.15 Access to healthcare was noted as a key concern, both in term of accessing important healthcare facilities and in particular, the ability of the community to attract skilled healthcare professionals to the local area.

Opportunities

N.3.16 The group divided up the key opportunities into four key themes:

- **Economic** benefits included the ability of a rail station to sustain their community through the retention of young people, through offering improved access to education and employment. The increased opportunity for local businesses to take advantage of improved connectivity for their business needs as well as an increased skilled labour force was also noted. It was noted that there are a high number of 'one-man band' businesses in the area, who are highly reliant on local transport links for their business needs and attracting staff to local businesses was an issue as current transport connectivity was reducing the available labour catchment area. The greater ability of key services (healthcare, education) to recruit staff if transport connectivity were improved was also noted.

- **Tourism** was felt to be a key opportunity with much untapped potential. The large range of walking, cycling, fishing and shooting opportunities in the area was discussed. The group would like to be a community where this offering can be accessed by sustainable means, supporting the Scottish Government's Sustainable Tourism agenda. Opportunities were noted to promote the area through the newly formed South of Scotland Enterprise Partnership and Visit Scotland's 'See South Scotland' initiative (with half a million pounds of funding announced to launch a new campaign dedicated to attracting visitors to the South of Scotland.), as well as the potential for a Dumfries and Galloway National Park – with the potential to attract visitor who may otherwise have favoured the (very busy) Lake District. Improved transport links were seen as key to enabling these opportunities to be realised.

  The group believe local businesses, particularly those focussed in the tourism sector, would benefit greatly from a rail station in the town. The HALO Trust was cited as a good example of a local business who operate internationally, and a station which enabled travel by rail to the area from Prestwick and Glasgow airports would be highly beneficial. In addition, the Trust also welcomes visitors from London and the South and increased accessibility from the south by rail would be beneficial.

  The group noted the number of festivals across the region including: the renowned Spring Fling Arts and Crafts festival which happened across the entire region; Electric Fields (attracting 5,000 people and growing); the events at Drumlanrig Castle; and Moniaive as a 'festival village'. The potential for improved access to the Galloway and South Ayrshire Biosphere and Southern Upland Way was also noted and the desire for Thornhill to be seen as a 'Gateway' to the region, especially if a rail station existed.

- In terms of **Social** opportunity, the group felt a rail station had real potential in terms of the long term sustainability of their community, encouraging younger people to remain or move into the area to rebalance its current ageing population demographic and offering improved social accessibility for all. The highly regarded Wallace Hall Academy in Thornhill had requests for placements from out with the local area and the rail station was seen as allowing a greater number of students to easily access the academy as well as offering opportunity for greater higher education access. A station was also seen as providing the necessary catalyst for unlocking development in the area, especially land allocated for housing in Thornhill in the Dumfries and Galloway Local Development Plan.

- Finally, the **Environmental** benefit of a rail station was noted. The group are keen that Thornhill is able to offer, as noted above, sustainable tourist opportunities, as well as a reduction in the current high reliance on the private car for travel. Reduced emissions and noise levels were noted as key benefits of the implementation of greater sustainable travel access in the area.

N.3.17 In general, the re-opening of a rail station was seen by the local community (as expressed clearly in the Community Plan) as having massive potential for the area.

N.3.18 The re-opening of the rail station is clearly the group's main focus, but improved integration between bus and rail services (particularly to connect Thornhill, and the surrounding local villages, with Dumfries and Glasgow) was also noted as a key area for improvement to help reduce the problems noted above and enable the realisation of the key opportunities.

Face-to-face Meeting (17th January 2019)

Opening a railway station

N.3.19 There were numerous questions raised regarding the estimated cost of a rail station.

N.3.20 The group asked if the various offerings of land had been considered in the cost. It was explained that they have not been included as it was not considered to be a restriction at this stage in the STAG process, at this stage the 'feasibility' of a station was being considered, and these issues would be considered at a more detailed stage in the process.

N.3.21 In this case it is not a possibility to just re-open the old, existing station due to needing to adhere to modern standards. It was noted that the costs are based meeting the standards and do not include any additional expense. The cost has been estimated through consideration of the recent outturn costs of building new stations across the entire UK. The Action Group brought along figures from various new stations around Scotland that were all around £2m. It was explained that the price of a new station has substantially increased since those stations were built and that the prices that have been estimated are in line with the current prices that the rail industry are offering. The new station would have to be two platforms as the additional maintenance and impact of a single platform would be significantly more.

N.3.22 To have two platforms there would need to be a footbridge. The price of footbridges doesn't vary a lot so is reasonable easy to estimate. Examples of East Linton and Reston were given where initial estimates suggested £1-£2m but the outturn cost was closer to £8m.

N.3.23 The station location was discussed with the group and they acknowledged that if it were to be opened there would need to be a connecting bus service from the town as walking out to the station would not be a possibility for everyone. This could potentially be provided by local bus or taxi providers. In addition to this the road to the station would need lighting and footpaths to make it safe for those accessing the station on foot or by cycle.

N.3.24 It was noted that re-opening the train station could have an impact on the commercial viability of the local bus service. In this case it would be the smaller local communities on bus routes, for whom the station was not easily accessible, that would lose out from the loss of their service.

Transport Problems

N.3.25 The group's members were aware of the current fragility of bus services in the area. They agreed that the local bus connections from Thornhill to Dumfries were however, at present, adequate. However, the area has very poor strategic bus connections to places further afield.

N.3.26 It was noted that one of the major problems for the area stems from the remoteness of the community. Therefore, a few group members felt that bus connections from Thornhill could not be compared to those of towns of the same size / population, but not as remote. It was

mentioned, for example, that people living in Moniaive would really appreciate having a frequent link to Thornhill.

N.3.27 The ability to access health care was highlighted as a transport issue that the group felt to be very important. They explained that many major treatments happen in Glasgow and therefore introducing a direct link to Glasgow would be highly beneficial.

N.3.28 The group agreed that the recent cuts to the bus service had resulted in the operating hours being massively reduced. It was also noted that the integration of the bus and train services in the area was very poor. The walk from the Dumfries bus station to the rail station was highlighted as a particular barrier, especially for those with mobility issues.

N.3.29 Currently, there is no way to have a meaningful day trip to Edinburgh by bus. There is one service a day which does not allow for much time in the city at all. It was noted however that the introduction of the railway station would not help all that much with access to Edinburgh except providing better links to strategic routes.

N.3.30 There is no direct bus to Glasgow, Ayr or Carlisle. This results in very long public transport journey times and often results in people opting to use the car for the entire trip.

N.3.31 In terms of rail, it was noted that the timetabling issues for accessing Glasgow had been noted. It was noted that rail platform surveys undertaken at Sanquhar had been analysed and would be including in the report. There is some evidence that could suggest that people use trains due to the fact that they have a local station and therefore people in Thornhill may be missing out.

N.3.32 It was felt that the London train was significant in addition to accessing Glasgow and Dumfries.

Transport Opportunities

Tourism

N.3.33 In terms of opportunities the group wanted to highlight that Galloway Cycling Holidays use Thornhill as a base due to its locations and offerings. From here people cycle to various places, with Castle Douglas and Kirkcubright being common destinations. The group see the potential of a rail station as a way to capitalise on the current tourist demand and hopefully bring more people into the area.

N.3.34 Another attraction that it was felt could benefit from a train station in Thornhill was the popular Electric Fields festival.

Local Business

N.3.35 It was noted that the HALO Trust have an office in Thornhill that people come into every day. Many of these visitors are international and are often picked up from the airport due to the public transportation difficulties in accessing the area. A train station would alleviate some of these issues and help bring people directly into the area.

Education

N.3.36 A train station in the town would bring better access to higher education for people in the area. It could open up opportunities to attend new educational institutes, such as South Ayrshire College in Kilmarnock. Very few young people in the area want to stay locally due to a lack of opportunities and options. Even in school they are sometimes disadvantaged due to the remoteness of the town and limited ability to connect with other schools. An example of this were the students currently studying politics at Wallace Hall Academy who are behind in their course due to the fact they don't have access to other students in Dumfries to network with for that particular subject. It was also noted that the Open University, which is popular in the area, hold tutorials in Glasgow which a lot of people would attend if they could.

Additional Notes

N.3.37 It was noted that both Thornhill and Closeburn have Community Action Plans which were driven by the community (produced by consultants on the community's behalf). Driven largely by community and social benefits, they state that a railway station at Thornhill is a community priority.

N.3.38 There were questions raised regarding the STAG 7-point scale and why a direct bus to Lockerbie Station often had the same score as opening a station in Thornhill. Members of the groups felt that this was wrong and not representative of the benefits to the community. It was explained that both options provide links to different places and therefore are both beneficial. Capturing how beneficial an option is, is a subjective task and in this case, it highly depends where one wishes to travel. For example, a direct bus to Lockerbie Station would provide better access to London and cities further afield. Whereas a new train station would provide better access to Glasgow and Dumfries. The action group felt that in Thornhill the priority would be to access Dumfries, Glasgow and Carlisle for education, jobs, health care and social activities.

N.3.39 The action group questioned some wording in the public event material. They felt that 'small station catchment area' was not representative of the number of people that would use the station. It was explained that the comparison was with more densely populated areas. In addition to this, it is unlikely that elderly people would use the train as they have free bus travel and travel by rail (although discounted) would be at an expense to them. However, it was noted that that is purely considering the economic terms and is therefore not the entire picture.

N.4 Wallace Hall Academy

N.4.1 A meeting with pupils (representing the wider student body) and a teacher from Wallace Hall Academy in Thornhill was held prior to the public engagement event on 17th January 2019.

N.4.2 It was noted that:

Leisure / Social:

- Teenagers in the area often travel to Carlisle by getting the bus to Dumfries and the train to Carlisle. Paying for the bus and the train separately was not felt to be cost effective. The students wish to access various social activities in Carlisle including the cinema, bowling and trampoline parks. They are drawn there already due to better restaurants and the Gretna Outlets. A rail station in Thornhill itself would provide better and easier access to Carlisle and beyond. It was noted that they prefer going to Carlisle over Glasgow due to the extra time that they can have in Carlisle due to quicker journey times. If there was a train station it is likely that more people would travel to Glasgow as it has even more leisure activities, restaurants and shops. This could potentially have a negative impact on the economy in Carlisle as people choose to spend their money in Glasgow instead.

- Children in the area are currently highly dependent on their parents driving them places. If they want to attend a concert in Glasgow they have to leave early to catch the last train home and then needed to be picked up at Sanquhar station late at night.

- The teacher at the school explained that if someone from Thornhill wants to go for a night out in Glasgow the transport available restricts the length of time you can stay and adds an additional cost. The options are to drive all the way or to get the train from Sanquhar. It was suggested that sometimes people will choose to just stay in Glasgow, but if they were to get the train back they would be relying on someone collecting them from Sanquhar station or getting a taxi, of about £30-40 back to Thornhill, adding a significant expense to the night out.

Education

- If a railway station was opened in the area it would open up opportunities for educational school trips to galleries, museums and to visit other school events. There are a lot of pupils that attend Wallace Hall Academy but who live in Dumfries and Sanquhar. The pupils felt that opening up the railway station would provide them with the option to travel to school by train.

- In terms of accessing higher education, a train station in Thornhill could open up opportunities for pupils to commute to university / college. Parents and students would not have to worry about affording rent, which would be a huge advantage to a lot of families in the area who are less well-off. This was felt to be a viable option as more and more full-time courses are not 5 days a week – but with lectures condensed into 3 full days.

- It would open up new access to the college in Kilmarnock which is not somewhere that pupils are currently either aware of or think about attending. There is a hope that this may encourage some younger people to stay in the area which is becoming increasingly important. The pupils felt that the popular higher education establishments for those attending the academy were Glasgow and Stirling Universities. A train station in Thornhill would allow them to come home and visit their families much more easily and without relying on their parents to collect them.

Tourism

- It was noted that the golf club in Thornhill is very active and could potentially attract visitors to the area. The course has recently had 'Youtubers' broadcasting from it, which could increase the popularity even further. Having a railway station in the village would allow people to be able to get on the train, with their clubs, and easily travel to Thornhill.

Economy

- A station in the town could also encourage people to come in and spend money in local small businesses. This would hugely benefit the restaurants and cafes in the town and help sustain the high street.

Additional notes

- It was noted that for commuters there is a possibility to work on a train whereas this is not possible while driving. The commute could therefore become integrated into the working day. There would be a wider catchment area than just Thornhill who would benefit from the station, including those living in Moniaive and other surrounding smaller villages.

N.5 SWestrans and Stagecoach (South-West – on behalf of Stagecoach Cumbria)

N.5.1 Key points from the discussion were:

- Stagecoach's resources work hard in the Dumfries and Galloway region, with buses and drivers often providing the resource to operate a number of differing services over the day, with little 'down time' at a depot. Operations need to be heavily resource intensive in order to enable the commercial viability of services region wide.

- Stagecoach described the commercial viability of their services in the region as 'shaved to the bone'

- Given the resource intensive nature of operations and the inherent logistics of operating a range of services across the day (i.e. providing both school services and local services), minor changes to a single service could have major consequences across a range of services

- Given this fragile nature of existing operations, Stagecoach would not be willing to take on any services which were required to be operated without subsidy. Consideration would be given to operating services if subsidy were available but they would not want to take on any commercial risk

- In general, as a bus operator, Stagecoach seek to provide connections between their bus services. Creating better integration with rail services was seen as a measure that could actually reduce their patronage overall. While they may gain additional passengers using the bus to access the rail network, overall, they may lose out in passenger volumes as passengers utilise rail for onward travel as opposed to connecting bus services. Therefore, providing improved bus connections to the rail network was not seen as a positive for their operations.

- In terms of potential re-timing and a potential extension to the existing Service 246 such that it directly served Dumfries Railway Station (Option 1b), Stagecoach noted that:

  - Their focus is on ensuring good connections with onward bus services at the northern end of the route i.e. Kilmarnock to Glasgow and Ayr and connecting with Dumfries rail services (which they have considered previously) would have major implications on the connections in Kilmarnock.

  - There may be scope to alter the service during the off-peak or very early in the morning.

- In terms of Lockerbie Railway Station, the issues of parking at the station were noted – with limited parking capacity available, therefore improving access by other modes had potential.

- In relation to improving access to the rail network from Thornhill, SWestrans noted that a far greater number of rail services stop at Carlisle compared to Lockerbie and therefore improving access to Carlisle Railway Station rather than Lockerbie Railway Station would provide greater accessibility benefits.

- SWestrans noted the potential benefits of operating a 'dial-a-bus' type service providing connectivity to rail service may have good potential. The Community Planning Partnership have endorsed a strategic, coordinated and integrated approach to social/community transport service delivery across the partnership through the development of a Public Social Partnership and the potential for this could be raised in this context. It was noted though that no bus operator grant would be available to support the operation of such a service.

- In terms of the potential impacts of a railway station opening in Thornhill:

  - The existing Service 246 (running from Kilmarnock to Dumfries) currently operates commercially – given the number of school children travelling to the Wallace Academy in Thornhill utilising the service. The introduction of a railway station in Thornhill, which could be utilised by pupils to access the academy, would be likely to significantly impact on the commercial viability of the service, especially over the southern end of the route, south of Thornhill.

N.5.2 If the service were no longer viable, Stagecoach would potentially curtail the service at Thornhill or further north. As such, the smaller communities between Thornhill and Dumfries served by the route would lose the service and hence the accessibility to Thornhill which it provides

N.6 SWestrans and Houstons

N.6.1 A face to face meeting was held with SWestrans and Houstons.

N.6.2 Houston's operate Service 381 between Dumfries Lockerbie. The service operates commercially from Monday to Friday with Saturday services running with subsidy from SWestrans.

N.6.3 Option 1c considers extending service 381 to Thornhill to provide a direct link to Dumfries and Lockerbie railway stations.

N.6.4 Key points from the discussion were:

- Houston's noted that they also operate service 236 between Thornhill and Dumfries. The service connects to smaller communities between Thornhill and Dumfries (Auldgirth etc.). As an alternative to extending the 381 north to Thornhill, a similar end result would be to extend the 236 to Lockerbie.

- It was noted that the section of the 381 service between Thornhill and Lockerbie would be in direct competition with the existing commercially operated service 246 (if the most direct routeing along the A76 were utilised), operated by Stagecoach. This would raise two clear issues:

  - Operating directly against Stagecoach would require careful consideration to provide a suitable fare that would encourage use of the service to ensure it could be operated commercially. This would impact on Stagecoach's services patronage and could likely antagonise. The fragile nature of the existing region wide bus operations means minor impacts can have major consequences and there may be the unintended consequence of reducing service provision to smaller communities on the route or impacting on an unrelated service elsewhere.

  - If the service were to be operated with some subsidy from SWestrans, this would need very careful consideration to ensure the legality of such a service given the direct competition with the commercial service between Thornhill and Dumfries.

- It was noted that it would be very difficult to provide a journey time by bus that could be comparable with the private car for trips between Thornhill and Lockerbie.

- It was noted that in order to ensure a new direct service between Thornhill and Lockerbie (as per Option 1a) that were not in direct competition with an existing service, and also provide a service with a journey time which encouraged patronage, would likely be a service which routed from Thornhill to Lockerbie but did not serve Dumfries (i.e. routed along the A76 and then A75 Dumfries bypass before joining the A709). It was noted that such a such a service would be highly unlikely to gain sufficient patronage and would require a heavy subsidy.

- Houston's noted the issues with regards rail departure and arrival delays and the impact this would cause on bus users specifically using public transport to access the station. A bus timetable aligned to rail times can only provide a good level of integration if both operate to schedule. A late running rail arrival could mean a passenger missing the onward bus connection and vice versa. Due to this, it was felt that people would always be more inclined to access the station by private car.

- Parking issues at Lockerbie railway station were discussed. It was acknowledged, again, that Lockerbie Station has very constrained parking provision. However, it was noted that there is plenty of available free on-street parking within a 5-minute walk of the station. The constrained parking at the station was therefore not seen as a significant deterrent to accessing the station by private car.

- Houston's noted that their biggest issue was the limited driver capacity over the region, and indeed the UK as a whole. They noted the difficulty in finding bus drivers. This was further emphasised by SWestrans who noted Dumfries and Galloway Council's difficulties in finding drives to operate their services and the overall ageing population amongst its drivers

(with an average age of over 60 amongst their currently employed 42 drivers). This was seen as the key issue in the long term planning of bus services in the region.

- Houston's did not feel that a station at Thornhill would impact on their 236 service between Thornhill as Dumfries. The existing service 236 serves a number of smaller communities for which a station at Thornhill provides no direct connectivity benefit and who would still require the use of their service.

N.7 SWestrans, Dumfries and Galloway Council Officers (Transportation, Planning, Environment and Economic Development officers)

N.7.1 A workshop was undertaken with key officers (transport, economic, environmental etc.) from the Council and SWestrans on 8th February 2018. Key points from the workshop were:

- Council officers raised concerns about the potential impact of re-opening Thornhill station on the patronage levels at Sanquhar railway station especially given a current focus on investing in Sanquhar and Kirkconnel – which it does not want to undermine.

- The recently published Proposed Local Development Plan (to 2029), Dumfries and Galloway Council Local Development Plan 2, had been approved at the Full Council meeting in January 2018 and was now being published for 8 weeks (until late March 2018) to allow the public to make representations. Five housing sites have been identified within the Thornhill settlement boundary, equating to 450 dwellings in total. All the sites are however located to the south and west of the village (the opposite side of the village to the station). It was however noted that the completion rate for house builds in Dumfries and Galloway is very low and there is limited developer appetite. While the re-opening of a station at Thornhill might provide some potential to encourage the citing of housing in new areas between the village and the station (i.e. to the East of the station), it was not felt that the station re-opening would encourage housing development.

- The possibility for the station to provide increased access to higher education opportunities in Kilmarnock was noted.

N.8 Network Rail and ScotRail

N.8.1 Two key option development tasks were undertaken in relation to the rail option (Option 6 – the re-opening of Thornhill station) before engagement was undertaken with the rail industry:

- **Engineering Feasibility Work** – which involved a site visit to Thornhill to establish the potential viability for a railway station within/close to the village with key considerations being station access from the road network. A paper was produced which was provided to the stakeholders for comment and is provided in Appendix O ; and

- **Development of a potential timetable for the GSWL** which included a stop at Thornhill (and given the parallel study for Thornhill, a potential timetable for the GSWL which included stops at both Thornhill and Eastriggs). The timetable was shared with the stakeholders for comment and is included in Appendix P .

Engineering Feasibility Work:

- A site visit, undertaken by members of our project team, investigated the feasibility of reinstating a station at Thornhill. A number of potential sites were considered in terms of station access, available land, and railway regulations and operational issues. The former station site and a site to the north were both considered. Both sites could potentially provide a location for a new station but a station slightly to the north of the former site (as presented in Appendix O), probably with access through an adjoining field (owned by Buccleuch Estates) (but alternatively using a former Cattle Mart site). This site offers the flexibility to

put in place a facility that could be expanded over time (through platform lengthening) as demand and hence train lengths increased.

Timetable Development:

- Based on the new December 2017 timetable for the GSWL, a new timetable was developed which included a stop at Thornhill (as well as one which considered an additional stop at both Thornhill and Eastriggs). The timetable (to be used to test the impacts of the additional stops on existing users, using the rail industry standard MOIRA software) was passed to Network Rail and ScotRail for consideration and agreement as a sound platform for testing, before any analysis using MOIRA was undertaken.

N.8.2 The timetable work established that:

- The additional station (and with both Thornhill and Eastriggs calls) could be introduced into the December 2017 timetable, on all currently passing services, without structural alterations.

N.8.3 Both documents were supplied to all stakeholders for their comment.

N.8.4 **ScotRail** noted that:

- They were content that the analysis undertaken considering the potential station locations was appropriate
- They were content that the timetable analysis undertaken was appropriate and at a level of detail suitable for this stage in the project lifecycle
- The use of the GSWL for freight and strategic diversionary paths as well as long signalling block sections which both constrain capacity on the rail corridor
- The performance and rostering impacts (due to journey and turnaround times changing) of incorporating one or both (Thornhill and Eastriggs) stops would not be neutral compared to today
- The existing timetable structure for Thornhill is potentially unsuitable (dependent on the forecast key destinations for customers). It was noted that the current structure does not provide a good morning peak arrival nor evening peak departure for trips to Dumfries. This effectively restricts rail to leisure travel. ScotRail noted that they were not sure how viable this would be and that restructuring the timetable to achieve a commuting service to Dumfries would almost certainly increase franchise subsidy.

Network Rail noted that:

- They had the Technical Note provided on the potential station location for Thornhill and were content that the level of analysis is appropriate for the current stage of development and has captured the issues for consideration going forward.

N.9 East Ayrshire Council

N.9.1 East Ayrshire Council noted the request to engage with them but were not in a position to respond.

N.10 Strathclyde Partnership for Transport

N.10.1 Email correspondence was had with Strathclyde Partnership for Transport. Key points from the consultation were:

- The operational implications for services in the SPT area are relatively minor;
- The potential electrification of the line to Kilmarnock/East Kilbride/Barassie could have some impact on train timings and/or rolling-stock compatibility;
- The single-line issue between Barrhead and Kilmarnock – whilst acknowledging the dynamic loop at Lugton – still constrains additional services being operated and this situation could be exacerbated if differing (and incompatible) rolling stock is required for local as opposed to longer distance services.
- Any impact on freight services on the line is presumably considered minimal. The interworking of these services from Muirhouse Junction into Glasgow Central will still be an issue to be dealt with as per present arrangements.

Appendix O Option 6 - Potential Station Sites – Site Visit Findings

O.1 General Points

O.1.1 It was important prior to the site visits to take cognisance of the underlying rail regulations and standards, in respect of new or relocating stations, in order to ensure these are fully considered.

O.2 Railway Regulations and Standards Concerning the Location of Stations

O.2.1 The location of stations is dictated by a range of factors including local markets and physical access to the railway, which are clearly site specific.

O.2.2 The railway industry has standards that govern the location of new stations in relation to **gradients** and **curvature**. These are published in a number of documents.

O.2.3 The first document in the process is *"Investment in Stations: A guide for promoters and developers"* published by Network Rail in December 2014 as part of the Network Route Utilisation Strategy (RUS) programme. As it is a RUS publication it has been developed with the wider rail industry, including funders, and is approved by the Office of Rail and Road (ORR).

O.2.4 The document is comprehensive and sets out the issues that need to be considered when proposing the relocation of a station or the building of a new one. It includes a specific reference to the *Railway Group Standard GIGN7616* in respect to acceptable gradients and curvature for new station sites.

O.2.5 Section G4 refers to track gradients through proposed station sites:

- Section G 4.2.2 states that: "it is considered good practise to locate platforms on gradients not steeper than 1:500."
- Section G 4.2.8 sets out the points to consider if a new platform is to be built on a gradient steeper than 1:500.

O.2.6 There is no prohibition on placing a new platform on a gradient steeper than 1:500, but some thought needs to be given to the consequences. These points need to be considered with regard to the potential station sites, initially if they are relevant to the choice of site and, if necessary, at the detailed design stage.

O.2.7 The issues that arise with platforms on curved track are generally around the platform/train stepping distances, which can be widened or raised / enlarged as a result of the interaction between straight carriages and curved platforms. These issues are not insurmountable, but it is preferable to avoid them if possible.

O.2.8 The relevant standard is GI/RT7016 which is quoted in GIGN7616 Section G 4.1:

- Extract 2.1 Station platforms shall not be located on horizontal curves with radius less than 1000m.
- Extract 2.1.5 GC/RT50221 requires that the normal limiting design value of can't adjacent to a station platform is 110mm, with an exceptional limiting design value of 130mm.

O.2.9 In summary, new stations should be ideally located on straight track but can be located on track with a horizontal curve of more than 1000m (but not less) and ideally on track that is level (less steep than 1:500) but can be located on track where the gradient is steeper than 1:500.

O.3 Railway Operational Issues

O.3.1 There are detailed implications in the location of any new station on the network particularly its impact on the operation of trains. Two important issues are:

- The special location of a station in respect of the signalling sections and how that impacts on headways, especially, but also junction working;
- The interface with signalling equipment and point work and the detailed sighting of signals.

O.3.2 These will be considered in the context of the station sites.

O.4 Access

O.4.1 Station sites need to be accessible to the public road network, which also includes public footpaths and footways. Sites that are impractical to access from the public road network will be discounted. The other important consideration is the location of the station in relation to the community it is intended to serve.

O.5 Platform Lengths

O.5.1 Platforms are required to be of sufficient length so that all the coaches, and thus doors of the trains that are expected to regularly call, are on the platform.

O.5.2 On the Glasgow South West Main Line (GSWL) the current stations platform lengths for the smaller stations south of Kilmarnock are (based on information from the 2019 Train Planning Rules):

- Auchinleck: 141m both
- New Cumnock: 111m both
- Kirkconnel: 99 up & 106 down
- Sanquhar: 111m both
- Annan: 130 up & 152 down
- Gretna Green: 112m both

O.5.3 The current train service is operated by two-car class 156 Diesel Multiple Units (DMUs), each vehicle of which is 23m long. A single unit is therefore 46m and 2 units (4 coaches) are 92m long. The longest DMUs in Scotland are the class 170 which are 23.62m per vehicle.

O.5.4 There are no regional DMUs operating on the British network longer than 24m, so this will be used to determine the required platform length. A four car train will be 96m long, to which needs to be added a 5m “stopping tolerance” so the minimum permissible platform length will be 101m for a 4-car train.

O.5.5 As a 5-car train would be 120m and a 6 car train would be 144m it can be seen that the smaller stations along the GSWL limit the useable train to 4-cars (longer trains could be run, but any vehicles above 4 cars would need to be locked out of use or selective door operation introduced.)

O.5.6 Consequently, it is proposed that Thornhill and Eastriggs railway stations would be built with 101m long platforms, but with passive provision to extend these to 150m to cater for 6-car trains, should that be required in the future.

O.6 Site Visit Findings

O.6.1 The potential station sites were visited on 6th November 2017. This section details the findings and draws on published railway information in its commentary, including railway gradient charts. Mileages that are quoted are from the published information including their Sectional Appendices and Quail Maps.

Gradient

O.6.2 The gradient of the railway line for about 6 miles around Thornhill is 1 in 150, so it has no influence on a potential station site as it is the same for all potential locations.

Curvature

O.6.3 The track through the existing disused station platforms (closed in 1965) appears to be gently curved, but the whole of the railway in this area appears to curve as it follows the side of the valley.

Access

O.6.4 There are only two potential locations for access to the railway (as shown in Figure O.1):

- **Site A:** The **former station site** with access from the east or west side of the tracks:
  - To the east of the tracks, from the road immediately south-east of **the former Station House** (now a residential property);
  - To the west of the tracks, using the former goods yard site which is currently in use as a **small oil depot**;
- **Site B:** A **completely new site to the north** of the existing station site and road bridge. There are two access options:
  - To the east of the tracks from the former **Cattle Mart**;
  - To the west of the tracks from the **field owned by Buccleuch Estates** (who have noted their willingness to lease for the purposes of providing a railway station).

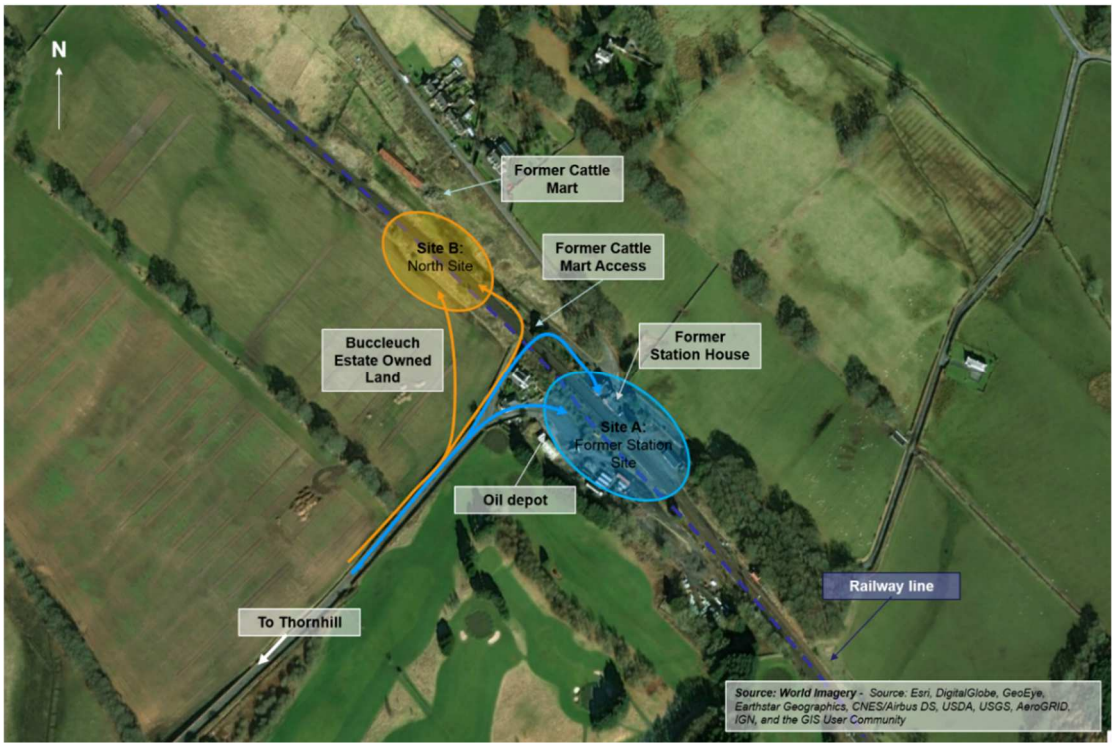

Figure O.1: Thornhill Railway Station - Potential Railway Station Sites and Access

O.6.5 In terms of both Site A and Site B, access from the east of the railway line requires negotiation of a narrow right-angle road bend under the narrow railway overbridge (shown in Figure O.2) with no pedestrian access and poor sightlines. This creates difficulties in providing safe access to the station from the village if road access were from the east of the railway lines. To provide access would require a widening of the road under the existing rail bridge to accommodate footways and improve sightlines, or a narrowing of the bridge to accommodate footways in conjunction with traffic signal control to ensure safe vehicle movement under the bridge.

O.6.6 Site A (the former station site), offers limited space for car parking on the east side of the tracks and parking would be a great nuisance for the residents of the Station House.

O.6.7 In terms of Site B, new housing plots are being sold with access via the former Cattle Mart access (on the road above which forms the eastern boundary of the Cattle Mart site) which may further restrict station access options from the east to Site B.

O.6.8 For these reasons, the option of providing access to both potential sites from the east of the tracks has been discarded.

Figure O.2: Thornhill Railway Station Locations – Access from the East

O.6.9 In terms of access to Site A and B from the west of the railway tracks (i.e. on the Thornhill side of the tracks as shown in Figure O.3):

- **Site A** access would be via the former goods yard, now a fuel storage facility. This is below the railway and platform level and step free access will require a ramp or three level lift (top level for an overbridge) to provide access to both platforms. Alternatively, the levels here could possibly accommodate a subway with short ramps for step free cross-line access. Car parking is limited, and some rearrangement of the adjacent oil depot and associated buildings may be required. Access onto the local road is only fair, with limited visibility, but that is mitigated by the slow speed of the traffic due to the right angle turn on the east side of the railway underbridge.

- **Site B** access could potentially be via the Buccleuch Estates owned field (with Buccleuch Estates, as noted above, willing to lease the land for the purposes of providing a railway station). Access could therefore be made reasonably satisfactory, with no major physical constraints and would link into the existing footpath into Thornhill village. The Buccleuch field is largely below the railway so suffers the same issues as the access through the former goods yard to get to the platform level. However, access to the road would be easier and car parking would be the furthest from any residential dwellings of any of the access options.

O.6.10 The pedestrian and cycle access from Thornhill village is not at present particularly good to either Site A or Site B, but as the railway is remote from the town, there is no alternative. What will be required in terms of mitigation is likely to include adequate pick up/set down facilities, ideally a demand responsive bus or taxi service to link with all trains, and improved footways (and lighting) for pedestrians and cyclists.

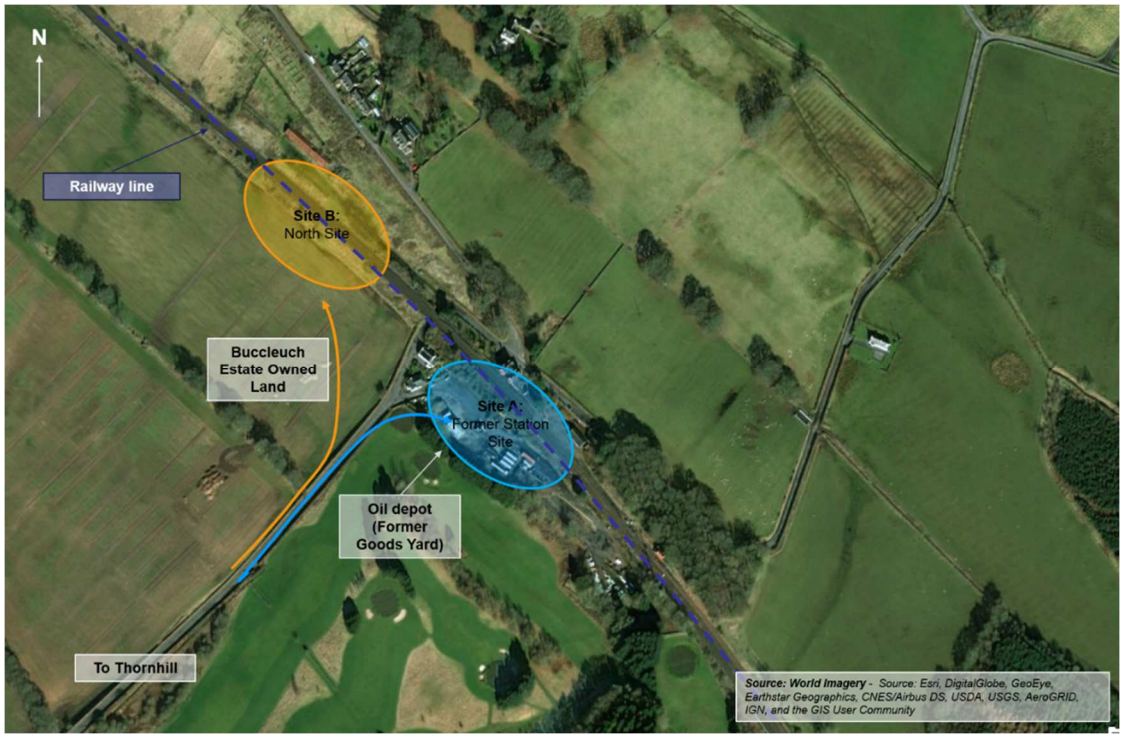

Figure O.3:Thornhill Railway Station Locations – Access from the West

Operational issues

O.6.11 Whether Site A or B is chosen, for both sites the platforms will be in the signal section Thornhill – Kirkconnel, (just inside the section at the Thornhill end). This may be a restriction on any station at Thornhill, but there is no difference between Sites A and B in this respect.

O.6.12 The possibility of the station operating with a single platform has been considered, and also been suggested by Thornhill Station Action Group. While the construction of a single platform station on one of the above sites might prove cost effective in the present economic climate:

- Cross over points between up and down lines already exist immediately south of the existing station and are controlled from the Thornhill signal box. The existing crossover has a 15 mph speed limit and would need to be fitted with facing point locks. To balance this set of points, return crossover points would be needed, along with appropriate signals, to the north of the selected station site. The crossover operates with a 20 mph speed limit so would increase the time penalty of a call and will would need facing point locks and full signalling.

- The costs of a simple un-signalled crossover will be of the order of £1m, plus signalling – which may require a re-signalling of the whole area because of the interaction of the signals with each other. This will be considerable extra costs and the savings associated with just single platform provision may be outweighed.

- Adding a new up/down conflict will make timetabling more difficult.

- While a simple single platform station is more likely to be able to attract innovative funding and other methods of delivery in line with the *Hansford Report* ideas, adding the required signalling will be much more complex.

O.6.13 A rail overbridge will be required. There is no possibility of a level crossing controlled from the signal box by intercom, lights and loud speakers as the Office for Road and Rail (ORR) will not accept any new level crossings of any sort and Network Rail would not suggest them. It is Transport Scotland policy to close level crossings for public safety reasons.

O.7 Summary

O.7.1 The area around the former station site is the only possible location for a station serving Thornhill. There are two possible options:

- Re-activating the former station (Site A); or
- Building a station to the north of the rail bridge over the road (Site B) probably with access through the Buccleuch field (but alternatively using the former Cattle Mart site) just to the north of the former station. This site offers the flexibility to put in place a facility that could be expanded over time (through platform lengthening) as demand and hence train lengths increased.

O.7.2 Which option offers the best solution requires a more detailed, investigation at GRIP Stage 2/3.

Appendix P Option 6 - Potential Timetable

P.1 Background

P.1.1 The timetable analysis for the STAG Part 2 has been undertaken for both the inclusion of Thornhill railway station and, given the concurrently running study, the inclusion of both Thornhill and Eastriggs railway stations on the GSW Main Line.

P.1.2 The ScotRail GSWL timetable changed quite significantly in December 2017 with the introduction of predominantly additional services between Dumfries and Carlisle, but with one additional service each way between Dumfries and Glasgow. This revised timetable has been used as the base from which to work and the RWA Rail Report: Operational Assessment of the proposed Thornhill and Eastriggs Stations (RWA Report), which was a part of the 2009 STAG produced by Colin Buchanan and Partners, was used to as the source document for the detailed changes in times resulting from additional calls at these two stations.

P.1.3 During the Part 2 stage of study, the potential for extending existing Carlisle - Dumfries shuttle services to Thornhill (and turning the train there rather than in Dumfries) was considered. There are seven Dumfries - Carlisle shuttle services and in addition potentially two early morning Dumfries starting trains and one late evening terminating service that could also serve Thornhill. However only two shuttles have sufficient turn-round time in Dumfries to run to Thornhill (this would require 40 minutes in total, including running time, time to reverse at the crossover and station dwell times.) These additional train opportunities are one mid-afternoon opportunity and one in the late evening, both times of relatively low travel demand. The costs of running an additional 30 miles return between Dumfries and Thornhill will be considerable, and the marginal train running costs of fuel, mileage based maintenance and variable track access charges are unlikely to covered by the additional revenue generated. In addition, additional staff costs would certainly arise if the extra running removes staff break periods. For this reason, the potential to extend Carlisle – Dumfries trains was not explored further.

P.2 Additional Time Required for Station Calls

P.2.1 The additional time required for station calls is extensively documented in the RWA Report, where detailed times have been generated using RailSys – an industry standard train planning tool and one that is recognised by Network Rail.

P.2.2 The key times (in seconds) are noted in Table P.1. These are based on the RWA Report and made consistent with the timetable supplied by ScotRail. Data has been derived from the Network Rail Working Timetable and also the derived from the Realtimetrains website (which used open source Network Rail data: *http://www.realtimetrains.co.uk/*

Table P.1: Additional Time Required for Station Calls

From - To		Time (seconds)	SRTs for additional station calls including dwell Diesel Multiple Units 075
Dumfries - Thornhill	Start Stop	825 = 13 min dep to dep	13 minutes (start - start) 780 sec
Dumfries - Thornhill	Start Pass	804 (Current T/t 810) as now	

From - To		Time (seconds)	SRTs for additional station calls including dwell Diesel Multiple Units 075
Thornhill - Sanquhar	Start Stop	897 = 15 mins	15 minutes (start - start) 900 sec
Thornhill - Sanquhar	Pass Stop	830 (Current T/t 750)	
Dumfries - Sanquhar	Start Stop Non-Stop	1,634 (Current T/t 1560 = 26 minutes dep - dep)	26 min (start - start) 1,560 sec
Dumfries - Sanquhar	Start Stop calling at Thornhill	1,722 (No station dwell time) = 29 mins	28 min (start - start) 1,680 sec
Sanquhar - Thornhill	Start Stop	855 = 15 minutes dep to dep	15 minutes (start - start)
Sanquhar - Thornhill	Start Pass	835 (Current T/t 12 min = 720 sec)	
Thornhill - Dumfries	Start Stop	795 = 13 mins	14 minutes (start - start)
Thornhill - Dumfries	Pass Stop	755 (Current T/t 810) No 870!!	
Sanquhar - Dumfries	Start Stop Non-Stop	1,590 = 26.5 minutes (Current T/t 26.5 mins)	26.5 minutes (start - stop) inc [2]
Sanquhar - Dumfries	Start Stop calling at Thornhill	1,650 (No station dwell time) =27.5 mins	29 min (start - stop) 1,740 sec

P.2.3 The use of different data sources and particularly the different rounding rules used – the timetable supplied by ScotRail is based on whole minutes - creates some data constituency discrepancies. Consequently, a conservative view has been taken of the time required to call at the new station, with each being allowed **a full two minutes per call** as shown in Table P.2.

This will potentially adversely impact on the journey time extensions for existing passengers, but it will give more confidence that the timetable can be delivered as there is potentially some "flex" in the timetable to work round the conflict points, especially Gretna Junction to Carlisle.

Table P.2: Time Penalty for calls (in each direction)

From - To	Time Penalty (in seconds) for call
Thornhill – Up – Southbound	60 + 30 dwell = 90 – rounded to 1.5 minutes for timetabling
Thornhill – Down – Northbound	88 +30 dwell = 118 – rounded to 2 minutes for timetabling
This time will be added into the timetable for each call made	

P.3 Timetable Testing

P.3.1 The central section of the GSWL between Kilmarnock and Gretna Junction is a double track railway and quite self-contained for passenger working. There are still a lot of freight paths, but these are largely for coal traffic which will dwindle to nil by 2025 due to UK Government policy to phase out coal fired power generation. A substantial number of paths remain but utilisation is low, but volatile, reflecting customers' demands.

P.3.2 There are also capacity restrictions caused by the long signalling block sections, which may be resolved if the route receives capacity enhancements in Control Period 6 (CP6) which would provide a diversionary route for HS2 enabling works on the WCML. This would permit the development of a more balanced timetable using the same resource.

P.3.3 Because the likely dates for the introduction of the new stations are some way into the future and the carriage of coal to power stations is diminishing, it was decided not to try to take account of all the freight path constraints as this was likely to be different when any timetable is specified.

P.3.4 As two concurrently running studies are being undertaken (one for Thornhill, and the other for Eastriggs – for which a similar proposal in terms of re-opening the station is being considered), two timetable tests have been considered: the impact of adding one extra call; and the impact of adding two additional calls into the timetable.

P.3.5 The impact of adding one extra call into the timetable will be broadly the same whichever station is added. Consequently, the first test undertaken was to understand the impact of adding one station based on two minutes a call.

P.4 Network Constraints

P.4.1 The timetable at the north end (Kilmarnock – Glasgow Central) is heavily constrained with single line sections between Barrhead and Kilmarnock and the need to integrate with local services from Glasgow to East Kilbride and Barrhead. To add an additional call at Eastriggs or Thornhill would result in down (northbound) trains arriving at Kilmarnock two minutes later and up (southbound) trains departing two minutes earlier.

P.4.2 There appears to be enough flex in the timetable for this to work at Kilmarnock, Lochridge Junction (Stewarton) and Lugton, but it fails completely at Barrhead where the current timetable is extremely tight with the down train coming off the single line from Lugton to be immediately replaced by the up train going onto the single line. Whilst this may be able to be changed it will require a wholescale re-planning of all the trains on this corridor into Glasgow and is beyond the scope of this project. Consequently, this study has started with the premise that no train

times will be altered north of Kilmarnock. This has been varied, but the individual circumstances have been tested to demonstrate that the re-timing was possible north of Kilmarnock.

P.4.3 As a general rule all the additional time required for station calls will be provided by re-timing trains at the south end of the route generally, but not exclusively with up trains arriving later at Gretna Junction and running into Carlisle, and down trains departing from Carlisle earlier. The maintenance of the 8-minute connectional allowance for passengers at Carlisle has been an important consideration. The junction margin at Gretna Junction is 4 minutes for all conflicting movements.

P.4.4 Each train has been individually assessed for the consequences of the changes.

P.5 Data Presentation

P.5.1 The results are presented in two styles:

- Tabular listing of the trains and the changes made, with two lists, one for one call and one for both calls, listed by direction – in Table P.3 to Table P.6; and

- Simplified timetables with two versions, ones with a call at Thornhill added (both Carlisle – Glasgow, and Glasgow – Carlisle / Newcastle) and ones with both calls at Thornhill and Eastriggs added (both Carlisle – Glasgow, and Glasgow – Carlisle / Newcastle). The timetables, presented in Table P.7 to Table P.17) show the December 2017 ScotRail timetable and the amended times side by side, permitting direct comparison. The new stations and times have been added in red, with the times that have been altered highlighted in green. Only relevant trains are shown in each timetable.

Table P.3: Train and Changes – One additional call – Up (Southbound) direction

Train	Impacts
2L01 0458 Dumfries to Carlisle	Depart Dumfries 2 minutes earlier, call Eastriggs as booked from Gretna Green. Maintains connection into **1R20 0428 Glasgow Central to London Euston** and 9 07 arrival time into Euston.
2N08 0618 Dumfries to Newcastle	Depart Dumfries 2 minutes earlier, call Eastriggs as booked from Gretna Green. Maintains connection into **1M91 0615 Edinburgh to Manchester Airport**
2N08 0618 Dumfries to Newcastle	Depart Dumfries 2 minutes earlier, call Eastriggs, as booked into Carlisle.
2L03 0713 Dumfries to Carlisle	Depart Dumfries 1 minute earlier, call at Eastriggs, remove 1 minute (of 1.5 minutes) pathing time at Gretna Jn as booked into Carlisle.
2N12 0743 Dumfries to Newcastle	Runs as booked, call at Eastriggs, runs 2 minutes later into Carlisle, going forward to Newcastle as booked. Maintains existing connections.
1E95 0709 Glasgow Central to Newcastle	Runs as booked to Thornhill/Eastriggs, then 2 minutes later to Gretna Green, as booked from Gretna Jn (3 minutes pathing time at Gretna Jn)
1L51 0837 Glasgow Central to Carlisle	No simple solution available – 2 minutes later at Gretna Jn conflicts with 1S42 0730 London Euston to Glasgow Central, requiring 6 minutes pathing time with 8 minutes later arrival in Carlisle (11 10), conflicting with and missing the connection into the following **9M53 1000 Glasgow Central to London Euston, via Birmingham** (booked arrival 11 10). It will arrive too late to form the return service: **1L54 1115 Carlisle to Glasgow Central** at its current timing or if booked 2 minutes earlier to provide for the extra station call. So 1L51 given priority over **1S42 0730 London Euston to Glasgow Central** requiring 2 minutes pathing time in 1S42 approaching Gretna Jn which would be partly recovered by the removal of 1-minute pathing time at Carstairs. Thus 1L51 arrives in Carlisle at 11 04, which would just make the connection into **9M53 1000 Glasgow Central to London Euston, via Birmingham** which leaves at 11 12 This also permits 11 13 departure in the current **1L54 1115 Carlisle to Glasgow Central** permitting one additional station call.
2L05 1102 Dumfries to Carlisle	Depart Dumfries 2 early, call Eastriggs, as booked from Gretna Green.

Train	Impacts
1L53 1013 Glasgow Central to Carlisle	Runs as booked to Thornhill/Eastriggs forward 2 later. Conflicts at Gretna Jn (12 28) with **2L06 1220 Carlisle to Dumfries**. However, 2 minutes later into Carlisle (arrive 12 39) will still provide forward connections**.**
2L07 1304 Dumfries to Carlisle	Departs 2 minutes earlier, calls at Eastriggs as booked from Gretna Green into Carlisle
1E76 1213 Glasgow Central to Newcastle	Runs as booked to Thornhill/Eastriggs, then runs 2 minutes later.
1L55 1313 Glasgow Central to Carlisle	Runs as booked to Thornhill/Eastriggs, then 2 minutes later to Gretna Jn (15 27) and Carlisle (15 36). Arrives just in front of **1M99 1418 Edinburgh to Manchester Airport**. There is no connection, but there is none now.
2L09 1602 Dumfries to Carlisle	Departs Dumfries 2 early, calls at Eastriggs, then as booked.
2L11 1707 Dumfries to Carlisle	Departs Dumfries 4 early, calls at Eastriggs, runs 2 early to Carlisle.
1E97 1613 Glasgow Central to Newcastle	Runs as booked to Thornhill/Eastriggs, then runs 2 minutes later which breaks the connection into **1M18 1730 Glasgow Central to London Euston**. Arrival in Newcastle as booked due to 3 minutes pathing time on the approach.
2L13 1841 Dumfries to Carlisle	Departs Dumfries 2 early, calls at Eastriggs, then as booked.
1L57 1742 Glasgow Central to Carlisle	Runs as booked to Dumfries reduce station dwell to 1 minute, runs 1 early to Annan, calls Eastriggs, runs 1 later to Gretna Green, then as booked at Gretna Jn (due to 1-minute pathing time.)
1L57 1742 Glasgow Central to Carlisle	Runs as booked to Thornhill, 2 later to Dumfries, reduce station dwell to 1 minute, runs 1 later to Gretna Green, then as booked at Gretna Jn (due to 1-minute pathing time.)
1L63 1913 Glasgow Central to Carlisle	Runs as booked to Thornhill/Eastriggs, then runs 2 minutes later to Gretna Jn, then as booked due to 2.5 minutes pathing time here.
1A10 2013 Glasgow Central to Dumfries	As booked to Thornhill, run 1.5 minutes later to Holywood, arriving Dumfries 1 minute later due to 0.5 minute pathing time on the approach to Dumfries.

Train	Impacts
1L61 2113 Glasgow Central to Carlisle	As booked to Thornhill/Eastriggs, runs 2 minutes later to Gretna Jn (23 30) and Carlisle. Headway conflict with **1M95 2215 Edinburgh to Manchester Piccadilly** with which there is a designed connection. Pathing time will need to be added to the 1M95 north of Gretna Jn, which will be recovered by reducing pathing time south of Carlisle.
2A22 2313 Glasgow Central to Dumfries	As booked to Thornhill, then runs 2 minutes later to Dumfries.

Table P.4: Train and Changes – One additional call – Down (Northbound) direction

Train	Impacts
2L02 0531 Carlisle to Dumfries	Departs 4 minutes earlier, call at Eastriggs, then 2 minutes earlier to Dumfries. 2 minutes earlier arrival to permit 8-minute turn round to form retimed 2N08 0618 Dumfries to Newcastle
2A21 0513 Dumfries to Glasgow Central	Starts 2 minutes early, call at Thornhill, then as booked.
1A03 0545 Dumfries to Glasgow Central	Starts 1 minutes early, removing 1-minute pathing time at Holywood to be 2 early call at Thornhill, then as booked.
1L52 0608 Carlisle to Glasgow Central	Starts 2 minutes early, call at Eastriggs or Thornhill, forward from Annan/Sanquhar as booked
1S50 0646 Newcastle to Glasgow Central	Starts 2 minutes early, call at Eastriggs or Thornhill, forward from Annan/Sanquhar as booked
2L04 0958 Carlisle to Dumfries	Runs as booked to Eastriggs, then 2 later to Dumfries.
1L54 1115 Carlisle to Glasgow Central	Runs 2 minutes earlier to either Eastriggs/Thornhill then as booked from Annan/Sanquhar.
2L06 1220 Carlisle to Dumfries,	Departs 6 minutes earlier to avoid clash at Gretna Jn with **1L53 1013 Glasgow Central to Carlisle,** calls Eastriggs, runs 4 minutes earlier Dumfries, arr 1254. This retains the connection out of 1S46 1000 Manchester Airport to Edinburgh.
1L56 1313 Carlisle to Glasgow Central	Start 2 minutes early, call at Eastriggs or Thornhill, forward from Annan/Sanquhar as booked. Connections maintained.
2L08 1430 Carlisle to Dumfries	Runs as booked, call at Eastriggs, then 2 minutes later to Dumfries.
1S74 1323 Newcastle to Glasgow Central	As booked Newcastle to Carlisle, depart Carlisle 2 minutes earlier calling at Eastriggs/Thornhill, as booked from Annan/Sanquhar. Connections maintained.
2L10 1617 Carlisle to Dumfries	Runs as 2 minutes earlier to Eastriggs, then as booked to Dumfries.

Train	Impacts
2L12 1727 Carlisle to Dumfries	Runs as booked to call at Eastriggs then 2 minutes later to Dumfries.
1L58 17 57 Carlisle to Glasgow Central	Runs as booked to call at Eastriggs/Thornhill, forward 2 minutes later from Annan/Sanquhar to Kilmarnock, forward as booked.
1S73 1716 Newcastle to Glasgow Central	Runs as booked Newcastle to Carlisle, depart Carlisle 2 minutes earlier calling at Eastriggs/Thornhill, as booked from Annan/ Sanquhar. Connections maintained.
2L14 Carlisle to Dumfries	Runs as booked to Eastriggs, then 2 later to Dumfries.

Table P.5: Train and Changes – Two additional calls – Up (Southbound) direction

Train	Impacts
1E95 0709 Glasgow Central to Newcastle	As booked to Thornhill, runs 2 minutes later to Annan, calls Eastriggs, runs 4 minutes later to Gretna Jn where there is 3 minutes pathing time, runs 1 minute to Carlisle later and on towards Newcastle where it is on time at King Edward Bridge Jn using 1 minute of the 2 minutes pathing time.
1L51 0837 Glasgow Central to Carlisle	No simple solution available – call at Thornhill and Eastriggs make 4 minutes later at Gretna Jn results in a conflict with **1S42 0730 London Euston to Glasgow Central,** so would require an additional 4 minutes pathing time making an arrival time in Carlisle 8 minutes later at 11 10, conflicting with and missing the connection into the following **9M53 1000 Glasgow Central to London Euston, via Birmingham** which arrives at 11 10. It will also fail to connect with the return service: **1L54 1115 Carlisle to Glasgow Central** at its current timing and certainly not if it was 4 minutes earlier to provide for the extra two station calls. Solution offered is to omit call at Eastriggs and time as for single station call.
1L53 1013 Glasgow Central to Carlisle,	As booked to Thornhill, runs 2 minutes later to Annan, calling at Eastriggs, runs 4 minutes later at Gretna Jn which conflicts at 12 30 with 2L06 1220 Carlisle to Dumfries (which is retimed). 4 minutes later into Carlisle (arrive 12 39) will still provide forward connections.
1E76 1213 Glasgow Central to Newcastle	As booked to Thornhill, runs 2 minutes Annan, calls Eastriggs, runs 4 minutes later at Gretna Jn and on to Carlisle and Newcastle
1L55 1313 Glasgow Central to Carlisle	Runs as booked to Thornhill, runs 2 minutes later to Eastriggs, runs 4 minutes later from Eastriggs creating a conflict at Gretna Jn (15 29) with 1M99 1418 Edinburgh to Manchester Airport (pass 15 31), which it will need to follow into Carlisle requiring 4 minutes pathing time, so arrival time will be 8 minutes later at 15 42. This is likely to break the connection into 1M15 1440 Glasgow Central to London Euston.
1E97 1613 Glasgow Central to Newcastle	Runs as booked to Thornhill, runs 2 minutes later to Eastriggs, runs 4 minutes later. There is no conflict at Gretna Jn, but the 4 minutes later arrival breaks the connection into 1M18 1730 Glasgow Central to London Euston. There is 3 minutes pathing time on the approach to Newcastle so arrival would only be I minute later
1L57 1742 Glasgow Central to Carlisle	Runs as booked to Thornhill, 2 minutes later to Eastriggs, 4 minutes later to Gretna Green, but only 3 minutes later at Gretna Jn (20 05) due to 1-minute pathing time there. This will require 9S85 1543 London Euston to Glasgow Central to incur 1-minute pathing time here, but that will be recovered by removing pathing time further north. All connections are maintained
1L63 1913 Glasgow Central to Carlisle	With calls at Thornhill and Eastriggs, will be only 1.5 minutes later at Gretna Jn (21 30.5) due to 2.5 minutes pathing time there. An additional 3.5 minutes pathing time results in arrival as booked.

Train	Impacts
1L61 2113 Glasgow Central to Carlisle	Runs as booked to Thornhill, 2 minutes later to Eastriggs, runs 4 minutes later to Carlisle. Gretna Jn (23 32) conflicts directly with 1M95 2215 Edinburgh to Manchester Piccadilly with which there is a designed connection. To resolve this conflict and the potentially broken connection pathing time will need to be added to the 1M95 north of Gretna Jn, but this will then have recovered by reducing pathing time south of Carlisle.

Table P.6: Train and Changes – Two additional calls – Down (Northbound) direction

Train	Impacts
1L52 0608 Carlisle to Glasgow Central	Departs 4 minutes earlier, calls Eastriggs, runs 2 minutes earlier to Thornhill, then as booked
1S50 0646 Newcastle to Glasgow Central	Departs 4 minutes earlier, calls Eastriggs, runs 2 minutes earlier to Thornhill, then as booked
1L54 1115 Carlisle to Glasgow Central.	Departs 4 minutes earlier, calls Eastriggs, runs 2 minutes earlier to Thornhill, then as booked
2L06 1220 Carlisle to Dumfries,	Depart 4 minutes earlier to avoid clash at Gretna Jn with 1L53 1013 Glasgow Central to Carlisle, calls Eastriggs, runs 2 minutes earlier into Dumfries at 1256.
1L56 1313 Carlisle to Glasgow Central	Departs 4 minutes earlier, calls Eastriggs, runs 2 minutes earlier to Thornhill, then as booked. Connections maintained (Just)
1S74 1323 Newcastle to Glasgow Central	As booked Newcastle to Carlisle, depart Carlisle 2 minutes earlier (substandard headway after **1S61 1300 Manchester Airport to Glasgow Central),** calling at Eastriggs, runs as booked to Thornhill, 2 minutes late to Mauchline, 1 minute late to Lugton/Barrhead, then as booked. Connections maintained (just).
1L58 1757 Carlisle to Glasgow Central	Runs as booked to Eastriggs, 2 minutes later to Thornhill, 4 minutes later to Kilmarnock, depart Kilmarnock as booked.
1S73 1716 Newcastle to Glasgow Central	As booked Newcastle to Carlisle, depart Carlisle 4 minutes earlier, call at Eastriggs, runs 2 minutes earlier to Thornhill, then as booked.
1L60 2113 Carlisle to Glasgow Central	Runs 2 minutes earlier to Eastriggs, as booked to Thornhill, runs forward 2 minutes later. Carlisle connections maintained (just).

Table P.7: New Timetable: Carlisle – Glasgow with Thornhill: SX Dec 2017 (Table 1)

Business ID		2A21LA	2A21LA	1A03LA	1A03LA	1L52LG	1L52LG	1S50LA	1S50LA	1L54LG	1L54LG	1L56LG	1L56LG
Orig. Dep. Time													
Orig. Loc. Code													
Dest. Loc. Code													
Dest. Arr. Time													
Timing Load		150	150	150	150	150	150	150	150	150	150	150	150
		SX	SX	SX	SX	SX	SX	SX	SX	SX	SX	SX	SX
		12336	12336	12336	12336	12336	12336	12336	12336	12336	12336	12336	12336
Train Service Code		23579003	23579003	23579003	23579003	23579003	23579003	21793000	21793000	23579003	23579003	23579003	23579003
Newcastle	dep							06:46	06 44				
Carlisle	arr							08:15	08 13				
	dep					06:08	06 06	08:15	08 13	11:15	11:13	13:13	13:11
Gretna Jn	*pass*					*06 17*	*06 15*	*08 24*	*08 22*	*11 24*	*11 22*	13 22	13 20
Gretna Green						06:19	06 17	08:26	08 24	11:26	11:24	13:24	13:22
Annan						06:27	06 25	08:34	08 32	11:34	11:32	13:32	13:30
Dumfries	arr					06:45	06 43	08:52	08 50	11:52	11:50	13:50	13:48
	dep	05:13	05:11	05:45	05:44	06:46	06 44	08:53	08 51	11 53	11:51	13:51	13:49
Thornhill			05 24		05 58		06 57		09 04		11 04		13:02
Sanquhar		05:39	05:39	06:12	06:12	07:12	07:12	09:19	09:19	12:19	12:19	14:17	14:17
Kirkconnel		05:44	05:44	06:17	06:17	07:17	07:17	09:24	09:24	12:24	12:24	14:22	14:22
New Cumnock		05:53	05:53	06:26	06:26	07:26	07:26	09:33	09:33	12:33	12:33	14:31	14:31
Auchinleck		06:01	06:01	06:34	06:34	07:34	07:34	09:41	09:41	12:41	12:41	14:39	14:39
Kilmarnock	arr	06:18	06:18	06:51	06:51	07:52	07:52	09:58	09:58	12:58	12:58	14:57	14:57
	dep	06:20	06:20	06:52	06:52	07:55	07:55	09:59	09:59	12:59	12:59	14:59	14:59
Glasgow Central	arr	07:07	07:07	07:31	07:31	08:38	08:38	10:37	10:37	13:35	13:35	15:38	15:38

Table P.8: New Timetable: Carlisle – Glasgow with Thornhill: SX Dec 2017 (Table 2)

Business ID		1S74LB	1S74LB	1L58LG	1L58LG	1S73LA	1S73LA	1L60LG	1L60LG			
Orig. Dep. Time												
Orig. Loc. Code												
Dest. Loc. Code												
Dest. Arr. Time												
Timing Load		150	150	150	150	150	150	150	150			
		SX	SX	SX	SX	SX	SX	SX	SX			
		12336	12336	12336	12336	12336	12336	12336	12336			
Train Service Code		21793000	21793000	23579003	23579003	23579003	23579003	23579003	23579003			
Newcastle	dep	13:23	13:23			17:16	17:16					
Carlisle	arr	14:48	14:48			18:52	18:52					
	dep	15:12	15:10	17:57	17:57	19:17	19:17	21:13	21:11			
Gretna Jn	*pass*	*15:21*	*15:19*	*18:06*	*18:06*	*19:26*	*19:24*	*21:22*	*21:22*			
Gretna Green	--	15:23	15:21	18:08	18:08	19:28	19:26	*21:24*	*21:22*			
Annan		15:31	15:29	18:17	18:17	19:37	19:35	21:32	21:30			
Dumfries	arr	15:49	15:47	18:34	18:34	19:54	19:52	21:50	21:48			
	dep	15:50	15:48	18:35	18:35	19:55	19:53	21:51	21:49			
Thornhill			*16:01*		*18:48*		*20:06*		*22:02*			
Sanquhar		16:16	16:16	19:01	19:03	20:21	20:21	22:17	22:17			
Kirkconnel		16:21	16:21	19:06	19:08	20:26	20:26	22:22	22:22			
New Cumnock		16:30	16:30	19:15	19:17	20:35	20:35	22:31	22:31			
Auchinleck		16:38	16:38	19:24	19:26	20:44	20:44	22:39	22:39			
Kilmarnock	arr	16:56	16:56	19:41	19:43	21:01	21:01	22:56	22:56			
	dep	16:57	16:57	19:57	19:57	21:01	21:01	22:57	22:57			
Glasgow Central	arr	17:37	17:37	20:37	20:37	21:39	21:39	23:36	23:36			

Table P.9: New Timetable: Glasgow - Carlisle with Thornhill: SX Dec 2017 (Table 1)

Business ID		1E95GN	1E95GN	1L51FG	1L51FG	1L53FG	1L53FG	1E76GN	1E76GN	1L55FG	1L55FG	1E97GN	1E97GN
Orig. Dep. Time													
Orig. Loc. Code													
Dest. Loc. Code													
Dest. Arr. Time													
Timing Load		150	150	150	150	150	150	150	150	150	150	150	150
		SX	SX	SX	SX	SX	SX	SX	SX	SX	SX	SX	SX
		12336	12336	12336	12336	12336	12336	12336	12336	12336	12336	12336	12336
Train Service Code		23579003	23579003	23579003	23579003	23579003	23579003	23579003	23579003	23579003	23579003	23579003	23579003
Glasgow Central	dep	07:09	07:09	08:37	08:37	10:13	10:13	12:13	12:13	13:13	13:13	16:13	16:13
Kilmarnock	arr	07:49	07:49	09:18	09:18	10:51	10:51	12:50	12:50	13:50	13:50	16:52	16:52
	dep	07:54	07:54	09:18	09:18	10:51	10:51	12:50	12:50	13:50	13:50	16:52	16:52
Auchinleck		08:11	08:11	09:35	09:35	11:08	11:08	13:07	13:07	14:07	14:07	17:09	17:09
New Cumnock	--	08:19	08:19	09:43	09:43	11:16	11:16	13:15	13:15	14:15	14:15	17:17	17:17
Kirkconnel		08:28	08:28	09:52	09:52	11:25	11:25	13:24	13:24	14:24	14:24	17:26	17:26
Sanquhar	--	08:33	08:33	09:57	09:57	11:30	11:30	13:29	13:29	14:29	14:29	17:31	17:31
Thornhill	--		08:48		10:12		11:45		13:44		14:44		17:46
Dumfries	arr	09:00	09:02	10:24	10:26	11:57	11:59	13:56	13:58	14:56	14:58	17:58	18:00
	dep	09:01	09:03	10:25	10:27	11:58	12:00	13:57	13:59	14:57	14:59	17:59	01:01
Annan		09:16	09:18	10:40	10:42	12:13	12:15	14:13	14:15	15:12	15:14	18:14	18:16
Gretna Green		09:25	09:27	10:49	10:51	12:22	12:24	14:21	14:23	15:21	15:23	18:23	18:25
Gretna Jn	pass	*09 32*	*09 32*	*10:51*	*10:53*	*12 26*	*12 28*	*14:25*	*14:27*	*15:25*	*15:27*	*18:27*	*18:29*
Carlisle	arr	09:41	09:41	11:02	11:04	12:35	12:39	14:35	14:37	15:34	15:36	18:36	18:38
	dep	09:43	09:43					14:36	14:38			18:38	18:40
Newcastle	arr	11:06	11:06					15:58	16:00			20:17	20:17

Table P.10: New Timetable: Glasgow - Carlisle with Thornhill: SX Dec 2017 (Table 2)

Business ID		1L57FG	1L57FG	1L63LG	1L63LG	1A10LG	1A10LG	1L61FG	1L61FG	2A22LC	2A22LC		
Orig. Dep. Time													
Orig. Loc. Code													
Dest. Loc. Code													
Dest. Arr. Time													
Timing Load		150	150	150	150	150	150	150	150	150	150		
		SX	SX	SX	SX	SX	SX	SX	SX	SX	SX		
		12336	12336	12336	12336	12336	12336	12336	12336	12336	12336		
Train Service Code		23579003	23579003	23579003	23579003	23579003	23579003	23579003	23579003	23579003	23579003		
Glasgow Central	dep	17:42	17:42	19:13	19:13	20:13	20:13	21:13	21:13	23:13	23:13		
Kilmarnock	arr	18:22	18:22	19:52	19:52	20:52	20:52	21:53	21:53	00:01	00:01		
	dep	18:25	18:25	19:52	19:52	20:58	20:58	21:53	21:53	00:02	00:02		
Auchinleck		18:42	18:42	20:09	20:09	21:25	21:25	22:10	22:10	00:20	00:20		
New Cumnock		18:51	18:51	20:17	20:17	21:41	21:41	22:18	22:18	00:30	00:30		
Kirkconnel		18:59	18:59	20:26	20:26	21:50	21:50	22:27	22:27	00:44	00:44		
Sanquhar		19:04	19:04	20:31	20:31	21:55	21:55	22:32	22:32	00:49	00:49		
Thornhill			19:19		20:46		22:10		22:47		*01:04*		
Dumfries	arr	19:31	19:33	20:58	22:00	22:22	22:23	22:59	23:00	01:15	01:17		
	dep	19:33	19:34	21:00	21:02			23:00	23:02				
Annan		19:48	19:47	21:15	21:17			23:15	23:17				
Gretna Green	pass	*19:57*	*19:57*	*21:24*	*21:26*			*23:24*	*23:26*				
Gretna Jn	*pass*	20:02	20:02	21:30	21:30			23:28	23:30				
Carlisle	arr	20:11	20:11	21:43	21:43			23:37	23:39				

Table P.11: New Timetable: Carlisle – Glasgow with both Eastriggs and Thornhill: SX Dec 2017 (Table 1)

Business ID		2A21LA	2A21LA	1A03LA	1A03LA	2L02LG	2L02LG	1L52LG	1L52LG	1S50LA	1S50LA	2L04LG	2L04LG	1L54LG	1L54LG
Orig. Dep. Time															
Orig. Loc. Code															
Dest. Loc. Code															
Dest. Arr. Time															
Timing Load		150	150	150	150	150	150	150	150	150	150	150	150	150	150
		SX	SX	SX	SX	SX	SX	SX	SX	SX	SX	SX	SX	SX	SX
		12336	12336	12336	12336	12336	12336	12336	12336	12336	12336	12336	12336	12336	12336
Train Service Code		23579003	23579003	23579003	23579003	23579003	23579003	23579003	23579003	21793000	21793000	23579003	23579003	23579003	23579003
Newcastle	dep									06:46	06:42				
Carlisle	arr									08:15	08:11				
	dep					05:31	05:27	06:08	06:04	08:15	08:11	09:58	09:58	11:15	11:11
Gretna Jn	*pass*					*05 40*	*05 36*	*06 17*	*06 13*	*08 24*	*08 20*	*10 07*	*10 07*	*11 24*	*11 20*
Gretna Green						05:42	05:38	06:19	06:15	08:26	08:22	10:09	10:09	11:26	11:22
Eastriggs							05:44		06:21		08:30		10:15		11:28
Annan						05:53	05:51	06:27	06:25	08:34	08:32	10:17	10:19	11:34	11:32
Dumfries	arr					06:10	06:08	06:45	06:43	08:52	08:50	10:35	10:37	11:52	11:50
	dep	05:13	05:11	05:45	05:43			06:46	06:44	08:53	08:51			11:53	11:51
Thornhill			05 24		05 58				06:57		09:04				12:04
Sanquhar		05:39	05:39	06:12	06:12			07:12	07:12	09:19	09:19			12:19	12:19
Kirkconnel		05:44	05:44	06:17	06:17			07:17	07:17	09:24	09:24			12:24	12:24
New Cumnock		05:53	05:53	06:26	06:26			07:26	07:26	09:33	09:33			12:33	12:33
Auchinleck		06:01	06:01	06:34	06:34			07:34	07:34	09:41	09:41			12:41	12:41
Kilmarnock	arr	06:18	06:18	06:51	06:51			07:52	07:52	09:58	09:58			12:58	12:58
	dep	06:20	06:20	06:52	06:52			07:55	07:55	09:59	09:59			12:59	12:59
Glasgow Central	arr	07:07	07:07	07:31	07:31			08:38	08:38	10:37	10:37			13:35	13:35

Table P.12: New Timetable: Carlisle – Glasgow with both Eastriggs and Thornhill: SX Dec 2017 (Table 2)

Business ID		2L06LG	2L06LG	1L56LG	1L56LG	2L08LG	2L08LG	1S74LB	1S74LB	2L10LG	2L10LG	2L12LG	2L12LG	1L58LG	1L58LG
Orig. Dep. Time															
Orig. Loc. Code															
Dest. Loc. Code															
Dest. Arr. Time															
Timing Load		150	150	150	150	150	150	150	150	150	150	150	150	150	150
		SX	SX	SX	SX	SX	SX	SX	SX	SX	SX	SX	SX	SX	SX
		12336	12336	12336	12336	12336	12336	12336	12336	12336	12336	12336	12336	12336	12336
Train Service Code		23579003	23579003	23579003	23579003	23579003	23579003	21793000	21793000	23579003	23579003	23579003	23579003	23579003	23579003
Newcastle	dep							13:23	13:23						
Carlisle	arr							14:48	14:48						
	dep	12:20	12:14	13:13	13:09	14:30	14:30	15:12	15:10	16:17	16:15	17:27	17:27	17:57	17:57
Gretna Jn	*pass*	*12:30*	*12:24*	*13:22*	*13:18*	*14:39*	*14:39*	*15:21*	*15:19*	*16:26*	*16:24*	*17:37*	*17:37*	*18:06*	*18:06*
Gretna Green		12:32	12:26	13:24	13:20	14:41	14:41	15:23	15:21	16:28	16:26	17:39	17:39	18:08	18:08
Eastriggs			12:32		13:26		14:47		15:27		16:32		17:45		18:14
Annan		12:40	12:36	13:32	13:30	14:49	14:51	15:31	15:31	16:36	16:36	17:49	17:49	18:17	18:19
Dumfries	arr	12:58	12:54	13:50	13:48	15:07	15:09	15:49	15:49	16:54	16:58	18:06	18:06	18:34	18:36
	dep			13:51	13:49			15:50	15:50					18:35	18:37
Thornhill					14:02				16:03						18:50
Sanquhar				14:17	14:17			16:16	16:18					19:01	19:05
Kirkconnel				14:22	14:22			16:21	16:23					19:06	19:10
New Cumnock				14:31	14:31			16:30	16:32					19:15	19:19
Auchinleck				14:39	14:39			16:38	16:40					19:24	19:28
Kilmarnock	arr			14:57	14:57			16:56	16:57					19:41	19:45
	dep			14:59	14:59			16:57	16:58					19:57	19:57
Glasgow Central	arr			15:38	15:38			17:37	17:37					20:37	20:37

Table P.13: New Timetable: Carlisle – Glasgow with both Eastriggs and Thornhill: SX Dec 2017 (Table 3)

Business ID		1S73LA	1S73LA	2L14LG	2L14LG	1L60LG	1L60LG	2L16LG	2L16LG						
Orig. Dep. Time															
Orig. Loc. Code															
Dest. Loc. Code															
Dest. Arr. Time															
Timing Load		150	150	150	150	150	150	150	150						
		SX	SX	SX	SX	SX	SX	SX	SX						
		12336	12336	12336	12336	12336	12336	12336	12336						
Train Service Code		21793000	21793000	23579003	23579003	23579003	23579003	23579003	23579003						
Newcastle	dep	17:16	17:16												
Carlisle	arr	18:52	18:52												
	dep	19:17	19:13	20:17	20:17	21:13	21:11	23:10	23:10						
Gretna Jn	*pass*	*19:26*	*19:22*	*20:26*	*20:26*	*21:22*	*21:20*	*23:19*	*23:19*						
Gretna Green		19:28	19:24	20:28	20:28	21:24	21:22	23:21	23:21						
Eastriggs			19:30		20:34		21:28		23:27						
Annan		19:37	19:35	20:36	20:38	21:32	21:32	23:29	23:31						
Dumfries	arr	19:54	19:52	20:54	20:56	21:50	21:50	23:47	23:39						
	dep	19:55	19:53			21:51	21:51								
Thornhill			20:06				21:04								
Sanquhar		20:21	20:21			22:17	22:19								
Kirkconnel		20:26	20:26			22:22	22:24								
New Cumnock		20:35	20:35			22:31	22:33								
Auchinleck		20:44	20:44			22:39	22:41								
Kilmarnock	arr	21:01	21:01			22:56	22:58								
	dep	21:01	21:01			22:57	22:59								
Glasgow Central	arr	21:39	21:39			23:36	23:38								

Table P.14: New Timetable: Glasgow - Carlisle with both Eastriggs and Thornhill: SX Dec 2017 (Table 1)

Business ID		2L01FG	2L01FG	2N08GN	2N08GN	2L03FG	2L03FG	2N12GN	2N12GN	1E95GN	1E95GN	1L51FG	1L51FG
Orig. Dep. Time													
Orig. Loc. Code													
Dest. Loc. Code													
Dest. Arr. Time													
Timing Load		150	150	150	150	150	150	150	150	150	150	150	150
		SX	SX	SX	SX	SX	SX	SX	SX	SX	SX	SX	SX
		12336	12336	12336	12336	12336	12336	12336	12336	12336	12336	12336	12336
Train Service Code		23579003	23579003	23579003	23579003	23579003	23579003	23579003	23579003	23579003	23579003	23579003	23579003
Glasgow Central	dep									07:09	07:09	08:37	08:37
Kilmarnock	arr									07:49	07:49	09:18	09:18
	dep									07:54	07:54	09:18	09:18
Auchinleck										08:11	08:11	09:35	09:35
New Cumnock										08:19	08:19	09:43	09:43
Kirkconnel										08:28	08:28	09:52	09:52
Sanquhar										08:33	08:33	09:57	09:57
Thornhill											08:48		10:11
Dumfries	arr									09:00	09:02	10:24	10:26
	dep	04:58	04:56	06:18	06:16	07:13	07:12	07:43	07:43	09:01	09:03	10:25	10:27
Annan		05:13	05:11	06:33	06:31	07:28	07:27	07:58	07:58	09:16	09:18	10:40	10:42
Eastriggs			05:16		06:36		07:32		08:03		09:23		no call
Gretna Green		05:22	05:22	06:42	06:42	07:37	07:38	08:07	08:09	09:25	09:29	10:49	10:51
Gretna Jn	*pass*	*05:26*	*05:26*	*06:46*	*06:46*	*07:41*	*07:41*	*08:11*	*08:13*	*09:32*	*09:33*	*10:51*	*10:53*
Carlisle	arr	05:35	05:35	06:55	06:55	07:53	07:53	08:20	08:22	09:41	09:42	11:02	11:04
	dep			07:18	07:18			08:28	08:28	09:43	09:44		
Newcastle	arr			08:58	08:58			*09:58*	*09:58*	11:06	11:06		

Table P.15: New Timetable: Glasgow - Carlisle with both Eastriggs and Thornhill: SX Dec 2017 (Table 2)

Business ID		2L05FG	2L05FG	1L53FG	1L53FG	2L07FG	2L07FG	1E76GN	1E76GN	1L55FG	1L55FG	2L09FG	2L09FG
Orig. Dep. Time													
Orig. Loc. Code													
Dest. Loc. Code													
Dest. Arr. Time													
Timing Load		150	150	150	150	150	150	150	150	150	150	150	150
		SX	SX	SX	SX	SX	SX	SX	SX	SX	SX	SX	SX
		12336	12336	12336	12336	12336	12336	12336	12336	12336	12336	12336	12336
Train Service Code		23579003	23579003	23579003	23579003	23579003	23579003	23579003	23579003	23579003	23579003	23579003	23579003
Glasgow Central	dep			10:13	10:13			12:13	12:13	13:13	13:13		
Kilmarnock	arr			10:51	10:51			12:50	12:50	13:50	13:50		
	dep			10:51	10:51			12:50	12:50	13:50	13:50		
Auchinleck				11:08	11:08			13:07	13:07	14:07	14:07		
New Cumnock				11:16	11:16			13:15	13:15	14:15	14:15		
Kirkconnel				11:25	11:25			13:24	13:24	14:24	14:24		
Sanquhar				11:30	11:30			13:29	13:29	14:29	14:29		
Thornhill					11:45				13:44		14:44		
Dumfries	arr			11:57	11:59			13:56	13:58	14:56	14:58		
	dep	11:02	11:00	11:58	12:00	13:04	13:02	13:57	13:59	14:57	14:59	16:02	16:00
Annan		11:17	11:15	12:13	12:15	13:19	13:17	14:13	14:15	15:12	15:14	16:17	16:15
Eastriggs			11:20		12:20		13:22		14:20		15:16		16:20
Gretna Green		11:26	11:26	12:22	12:26	13:28	13:28	14:21	14:25	15:21	15:25	16:26	16:26
Gretna Jn	*pass*	*11:30*	*11:30*	*12:26*	*12:30*	*13:32*	*13:32*	*14:25*	*14:29*	*15:25*	*15:33*	*16:30*	*16:30*
Carlisle	arr	11:39	11:39	12:35	12:39	13:41	13:41	14:35	14:39	15:34	15:42	16:39	16:39
	dep							14:36	14:40				
Newcastle	arr							15:58	16:02				

Table P.16: New Timetable: Glasgow - Carlisle with both Eastriggs and Thornhill: SX Dec 2017 (Table 3)

Business ID		2L11FG	2L11FG	1E97GN	1E97GN	2L13FG	2L13FG	1L57FG	1L57FG	1L63LG	1L63LG	1A10LG	1A10LG
Orig. Dep. Time													
Orig. Loc. Code													
Dest. Loc. Code													
Dest. Arr. Time													
Timing Load		150	150	150	150	150	150	150	150	150	150	150	150
		EWD	EWD	SX	SX	SX	SX	SX	SX	SX	SX	SX	SX
		12336	12336	12336	12336	12336	12336	12336	12336	12336	12336	12336	12336
Train Service Code		23579003	23579003	23579003	23579003	23579003	23579003	23579003	23579003	23579003	23579003	23579003	23579003
Glasgow Central	dep			16:13	16:13			17:42	17:42	19:13	19:13	20:13	20:13
Kilmarnock	arr			16:52	16:52			18:22	18:22	19:52	19:52	20:52	20:52
	dep			16:52	16:52			18:25	18:25	19:52	19:52	20:58	20:58
Auchinleck				17:09	17:09			18:42	18:42	20:09	20:09	21:25	21:25
New Cumnock				17:17	17:17			18:51	18:51	20:17	20:17	21:41	21:41
Kirkconnel				17:26	17:26			18:59	18:59	20:26	20:26	21:50	21:50
Sanquhar				17:31	17:31			19:04	19:04	20:31	20:31	21:55	21:55
Thornhill					17:46				19:19		20:46		22:10
Dumfries	arr			17:58	18:00			19:31	19:33	20:58	21:00	22:22	22:23
	dep	17:07	17:03	17:59	18:01	18:41	18:39	19:33	19:35	21:00	21:02		
Annan		*17:22*	*17:18*	18:14	18:16	18:56	18:54	19:48	19:50	21:15	21:17		
Eastriggs			17:23		18:21	--	18:59		19:55		21:22		
Gretna Green		17:31	17:29	18:23	18:27	19:05	19:05	19:57	20:01	21:24	21:28		
Gretna Jn	*pass*	*17:35*	*17:33*	*18:27*	*18:31*	*19:09*	*19:09*	*20:02*	*20:05*	*21:30*	*21:32*		
Carlisle	arr	17:44	17:42	18:36	18:40	19:18	19:18	20:11	20:14	21:43	21:43		
	dep			18:38	18:42								
Newcastle	arr			20:17	20:18								

Table P.17: New Timetable: Glasgow - Carlisle with both Eastriggs and Thornhill: SX Dec 2017 (Table 4)

Business ID		1L61FG	1L61FG	2A22LC	2A22LC								
Orig. Dep. Time													
Orig. Loc. Code													
Dest. Loc. Code													
Dest. Arr. Time													
Timing Load		150	150	150	150								
		SX	SX	SX	SX								
		12336	12336	12336	12336								
Train Service Code		23579003	23579003	23579003	23579003								
Glasgow Central	dep	21:13	21:13	23:13	23:13								
Kilmarnock	arr	21:53	21:53	00:01	00:01								
	dep	21:53	21:53	00:02	00:02								
Auchinleck		22:10	22:10	00:20	00:20								
New Cumnock		22:18	22:18	00:30	00:30								
Kirkconnel		22:27	22:27	00:44	00:44								
Sanquhar		22:32	22:32	00:49	00:49								
Thornhill			22:47		*01:04*								
Dumfries	arr	22:59	23:01	01:15	01:17								
	dep	23:00	23:02										
Annan		*23:15*	*23:17*										
Eastriggs			23:22										
Gretna Green		23:24	23:28										
Gretna Jn	*pass*	*23:28*	*23:32*										
Carlisle	arr	23:37	23:41										
	dep												
Newcastle	arr												

P.6 Testing Outcomes Summary

P.6.1 This work has demonstrated that **either of the additional stations and both together can be introduced into the December 2017 timetable without structural alterations**.

P.6.2 There is **only one call that cannot be made: Eastriggs at about 10:46 in 1L51 08 37 Glasgow Central to Carlisle. This call was omitted because there are trains at 09:23 and 11:20, whereas the gap in the service at Thornhill would have been greater**.

Appendix Q Option 6 - Station Usage Surveys

Q.1 Introduction

Q.1.1 PBA commissioned ProTel Fieldwork to undertake a variety of surveys concerning existing usage of Sanquhar railway station in January 2018. The data collected was used to inform demand forecasting for the proposed railway station at Thornhill.

Q.1.2 This section describes the surveys undertaken and summarises findings.

Q.2 Surveys Undertaken

Q.2.1 Three types of surveys were undertaken in Sanquhar. These were as follows:

- Passenger Counts:
  - Survey teams undertook passenger counts from 0600-1300 on Tuesday 23rd and Wednesday 24th January 2018 and from 0830-1530 on Saturday 27th January.
  - Surveyors counted how many passengers boarded and alighted all trains which visited the station during the survey period.
  - These counts were primarily undertaken to allow a sample rate to be estimated for the platform surveys.
- Platform Surveys:
  - Survey dates and times were as per platform surveys
  - Researchers asked departing passengers about their current journey and wider usage of Sanquhar Railway Station. Where it was not possible to surveys all passengers during the time available, then passengers were handed a paper copy of the survey and a return envelope.
- Online Surveys:
  - Leaflets were also posted through the doors of all residential properties in Sanquhar, requesting that residents complete an online survey relating to their use of Sanquhar station. The questions in the online survey aligned closely with those in the platform survey, although they could not refer to a specific journey.

Q.3 Passenger Counts

Q.3.1 A total of 33 passengers boarded trains departing from Sanquhar and one passenger alighted at Sanquhar over the 21-hour survey period. However, it should be noted that all trains prior to 0900 were cancelled on the 24th, so the survey period was closer to 18 hours.

Q.3.2 Table Q.1 summarises passenger counts at Sanquhar.

Table Q.1: Railway Passenger Count Summary

Day	Time Period	No. Departing Passengers	No. Arriving Passengers	Origin/Destination to North
Tues 23rd	0600-1300	8	0	25%
Wed 24th	0900-1300	8	0	0%
Sat 27th	0830-1530	17	1	83%

Q.3.3 Figure Q.1 to Figure Q.3 illustrate the number of passengers arriving and departing on each service.

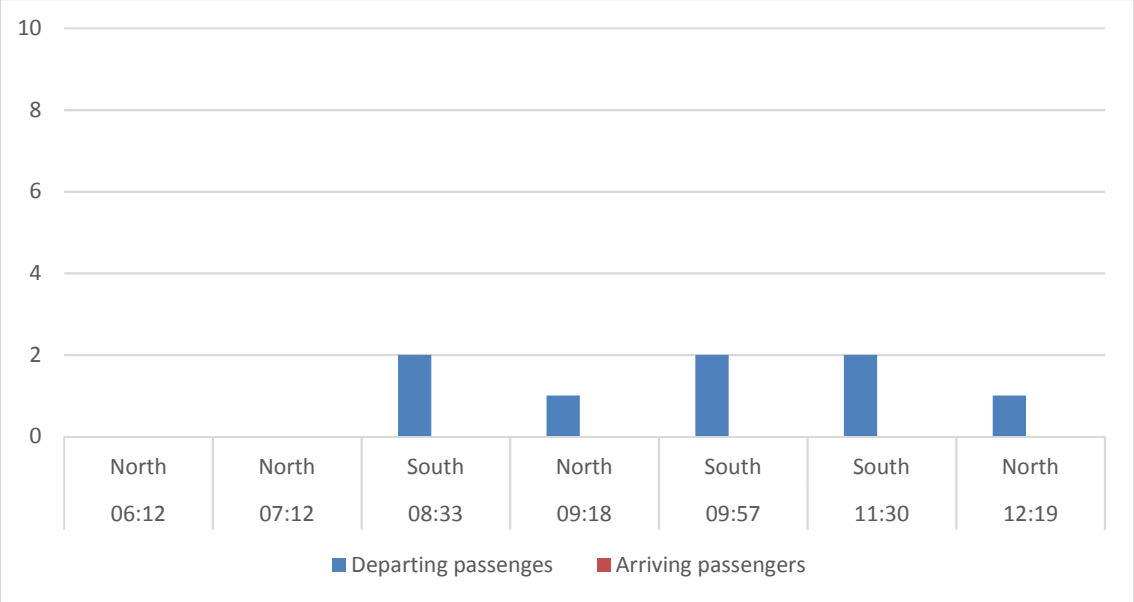

Figure Q.1: Sanquhar Station Passenger Counts – 23/01/18

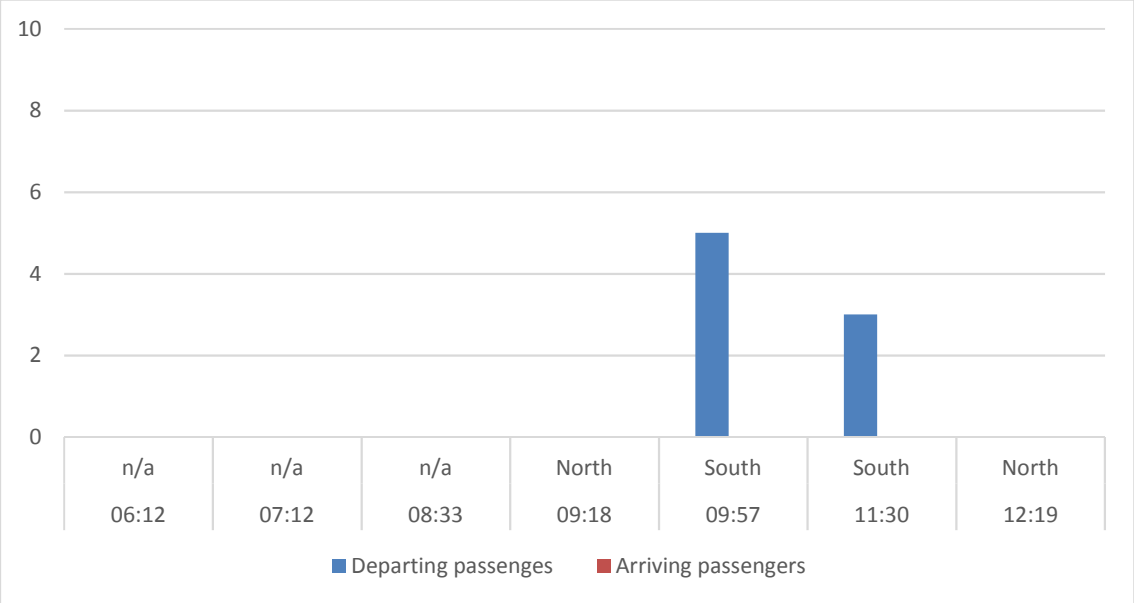

Figure Q.2: Sanquhar Station Passenger Counts – 24/01/18

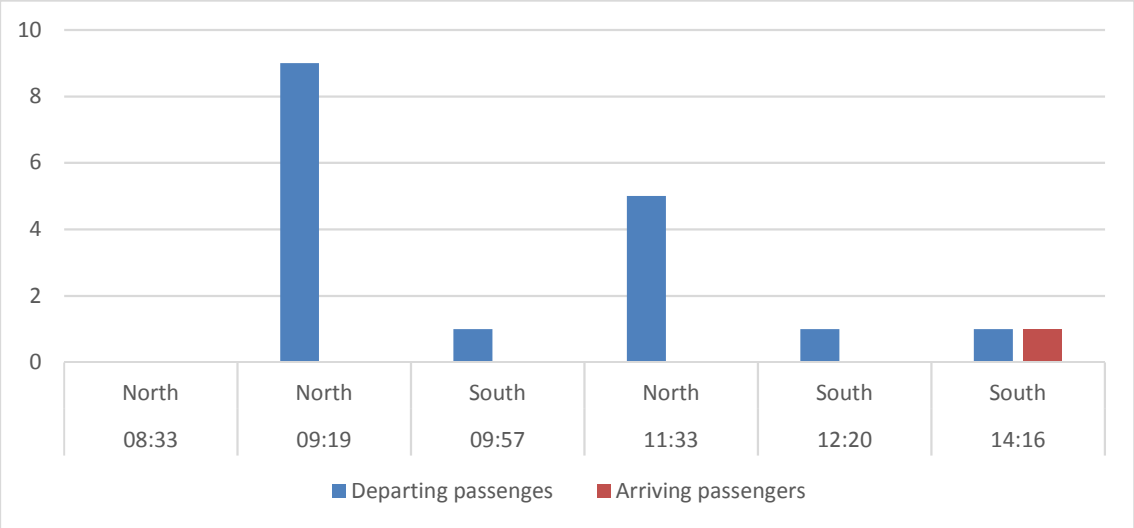

Figure Q.3: Sanquhar Station Passenger Counts – 27/01/18

Q.3.4 Points of note:

- The majority of trips are departures during the morning period, suggesting that Sanquhar is largely a producer, rather than an attractor of trips.
- Weekend demand is approximately twice as high as weekday demand. It is recognised that the three cancelled trains on the 24th may have affected demand, but no passengers used the first two services of the day on 23rd either, so this impact is likely to be small.
- During the week, the majority of trips are made to/from locations in the south (e.g. Dumfries), but at the weekend the majority of trips are made to/from location to the north (e.g. Glasgow).

Q.4 Platform Survey Findings

Q.4.1 This section considers the responses provided to key questions posed within the departing passenger survey undertaken at Sanquhar Station. Platform surveys were completed with a total of 26 departing railway passengers. This represents a sample rate of 79%.

Where are you coming from?

Q.4.2 Passengers were asked about where they were before they made their way to Sanquhar Station that day. 19 passengers reported origins in the vicinity of Sanquhar, 3 in/near Thornhill, 2 in/near Kirkconnel, 1 in Dumfries and 1 in Wanlockhead. Overall, 73% of respondents had origins within 2km of Sanquhar station, indicating that while Sanquhar is the closest train station for a very large area, the catchment is predominantly local.

Q.4.3 All passengers but two noted their origin location as their home, reinforcing the view that Sanquhar is a predominantly a generator rather than an attractor of trips. The two passengers who did not live locally reported an origin in Thornhill but residences in Staffordshire and Canada.

How did you access the station?

Q.4.4 Of those who answered this question, 58% said that they walked to Sanquhar station, 29% used the car, 8% travelled by taxi and 4% travelled by bus. Figure Q.4 illustrates how mode varies with origin location.

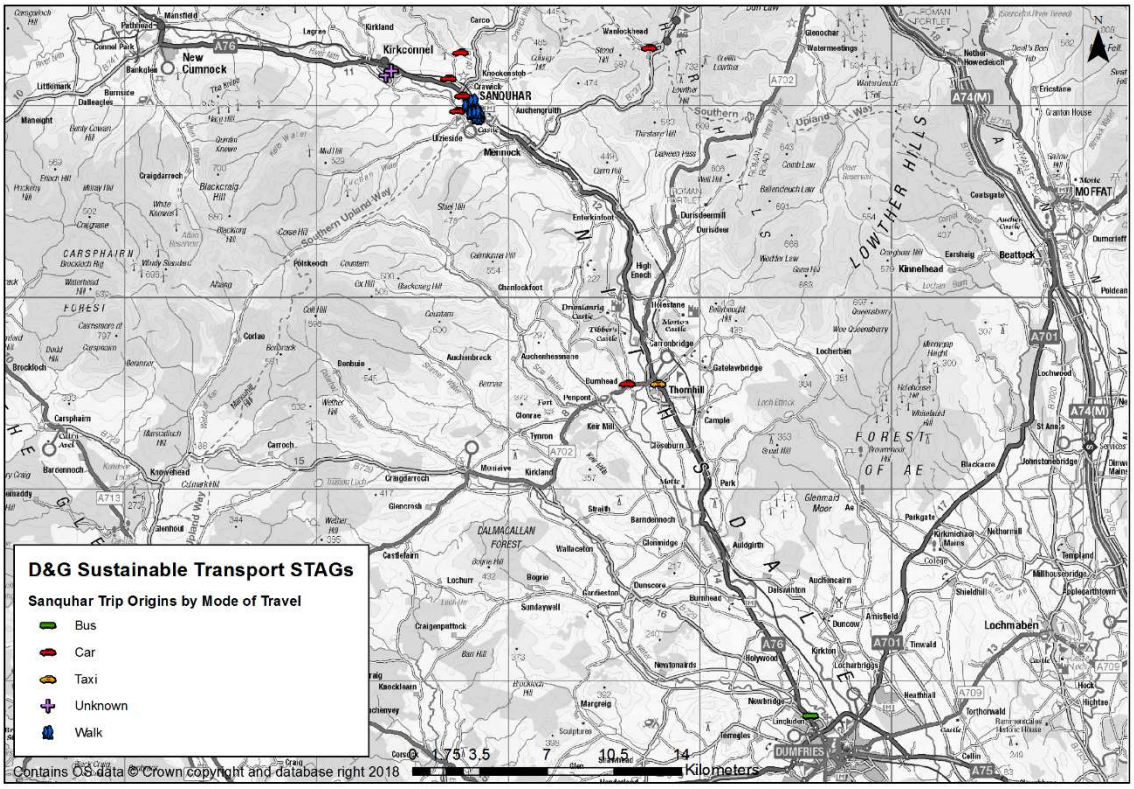

Figure Q.4: Sanquhar Trip Origins by Station Access Mode

Q.4.5 As expected, all those who walked came from origins within Sanquhar. Those from Thornhill village travelled by taxi.

Where are you going today?

Q.4.6 As we saw from the passenger count surveys, the platform survey also showed that the profile of destinations and the direction in which the majority of people were travelling varied by day of the week. Figure Q.5 compares the number of respondents travelling to each location during the working week and at the weekend. Note: only 25 of the 26 respondents provided their destination.

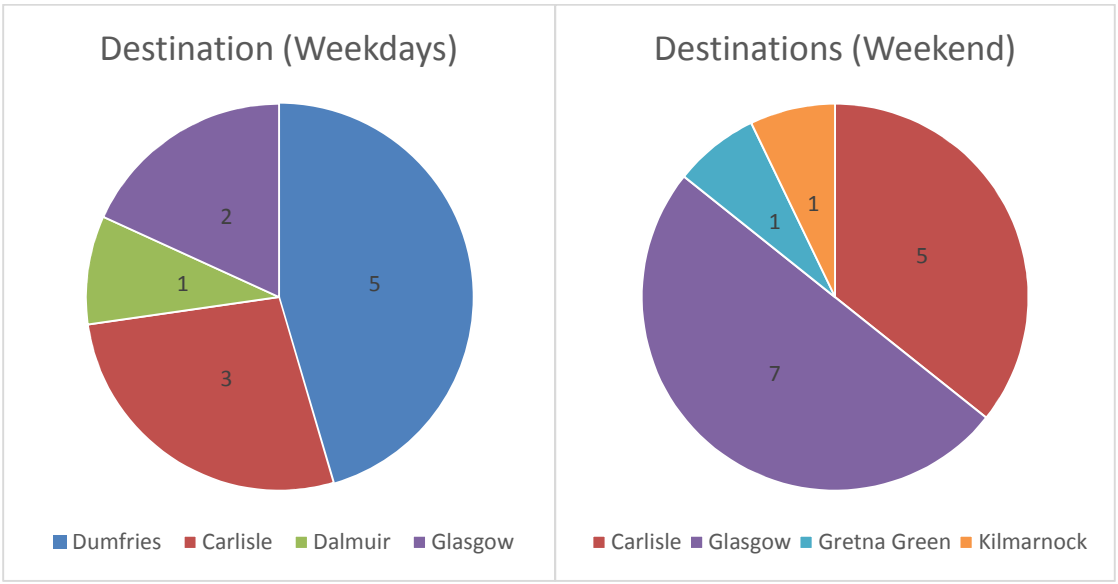

Figure Q.5: Weekday Destination Split (left) and Weekend Destination Split (Right)

Q.4.7 On the whole, it seems that Sanquhar passengers tend to make longer journeys at the weekend, often focussed on shopping destinations.

Why are you travelling?

Q.4.8 Overall, 84% of those surveyed noted that they were travelling by rail for leisure or personal business purposes (e.g. medical appointment or grocery shopping), and 16% were travelling for work or education. As might be expected, travel purpose was also found to vary by day of the week. Figure Q.6 provides a detailed breakdown of travel purposes, by weekday and weekend.

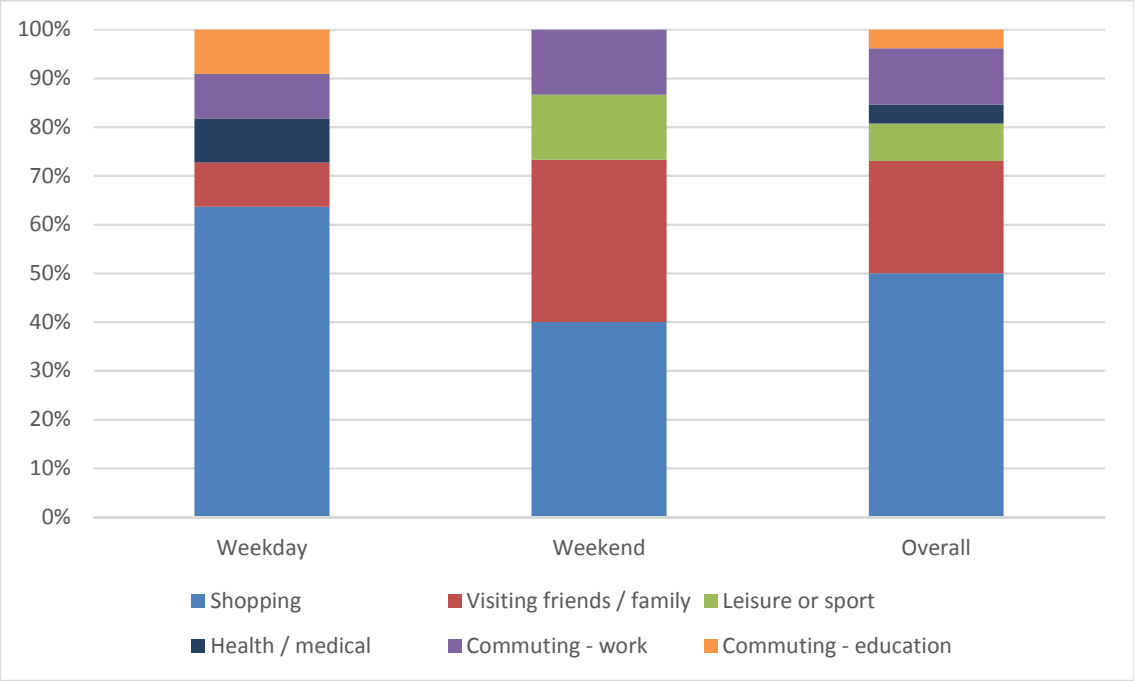

Figure Q.6: Travel Purpose across the Week

Q.4.9 Overall, shopping was found to be the most common rail travel purpose during the week (64%) and at the weekend (40%).

How frequently do you make this journey?

Q.4.10 Travellers were also asked how frequently they made the journey they were embarking upon at the time of the survey. Figure Q.7 shows the number of respondents falling into each frequency bracket. It is important to note that this question only gauges how frequently respondents make the same trip that they were making at the time of survey and does not account for rail travel to other destinations.

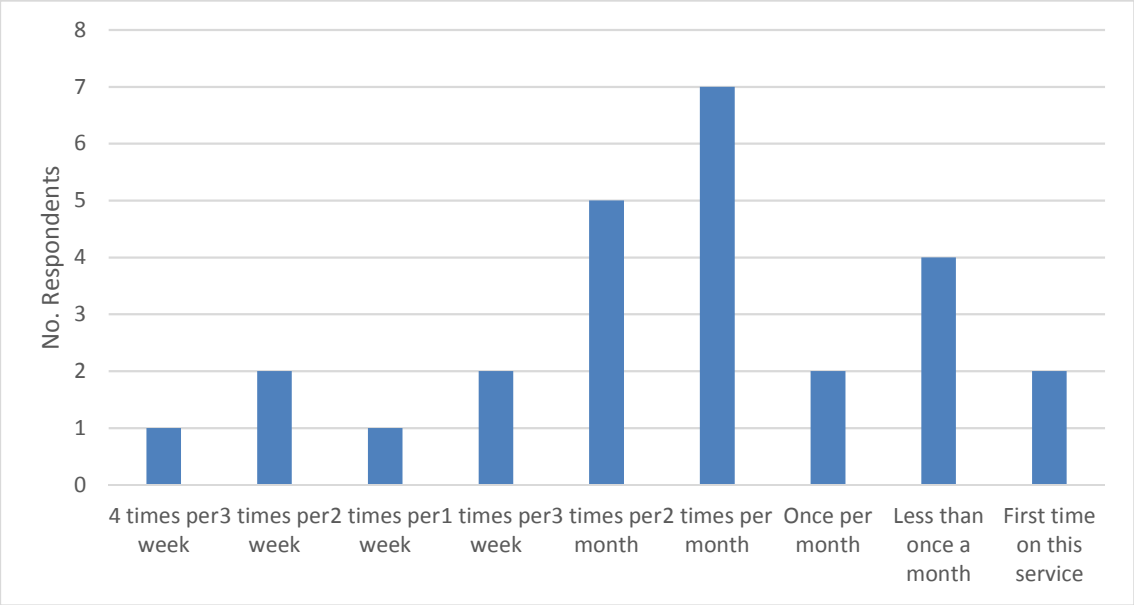

Figure Q.7: Trip Frequency at Sanquhar Station

Q.4.11 Multiplying the number of respondents by the indicated frequency, it is estimated that the 26 passengers recorded by the platform surveys generate circa 1000 outbound trips (and 1000 inbound trips) per year. This relates to circa 72 trips (inbound + outbound) per person per year on average.

Q.4.12 Data from the Office for Rail Regulation (ORR) indicates that there were 27,350 entries and exits through Sanquhar Station over 2016-17. If the survey captured 26 passengers making circa 2,000 trips per year, that represents approximately 7% of total annual trips to / from Sanquhar.

Q.4.13 Trip frequency is strongly affected by the purpose of the trip being undertaken. Figure Q.8 below illustrates trip frequency, broken down by travel purpose. Results for Sanquhar are largely as expected.

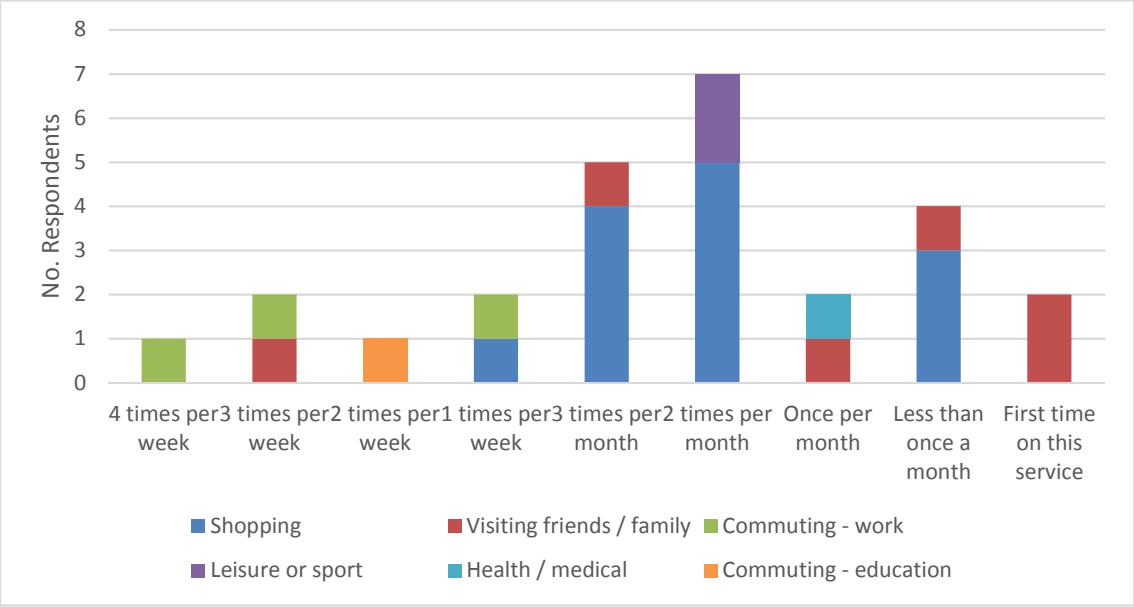

Figure Q.8: Trip Frequency by Purpose

Where else do you travel by train?

Q.4.14 The statistics above relate to how frequently passengers make the particular rail trip they were embarking upon at the time of the survey, but passengers were also asked about other locations they travel to by train.

Q.4.15 Figure Q.9 indicates the proportion of respondents who stated that they travel by train to each destination listed (i.e. this value takes account of their destination for the current journey and other destinations they access by rail). More than half of respondents highlighted that they travel by rail to Glasgow, Dumfries and Carlisle.

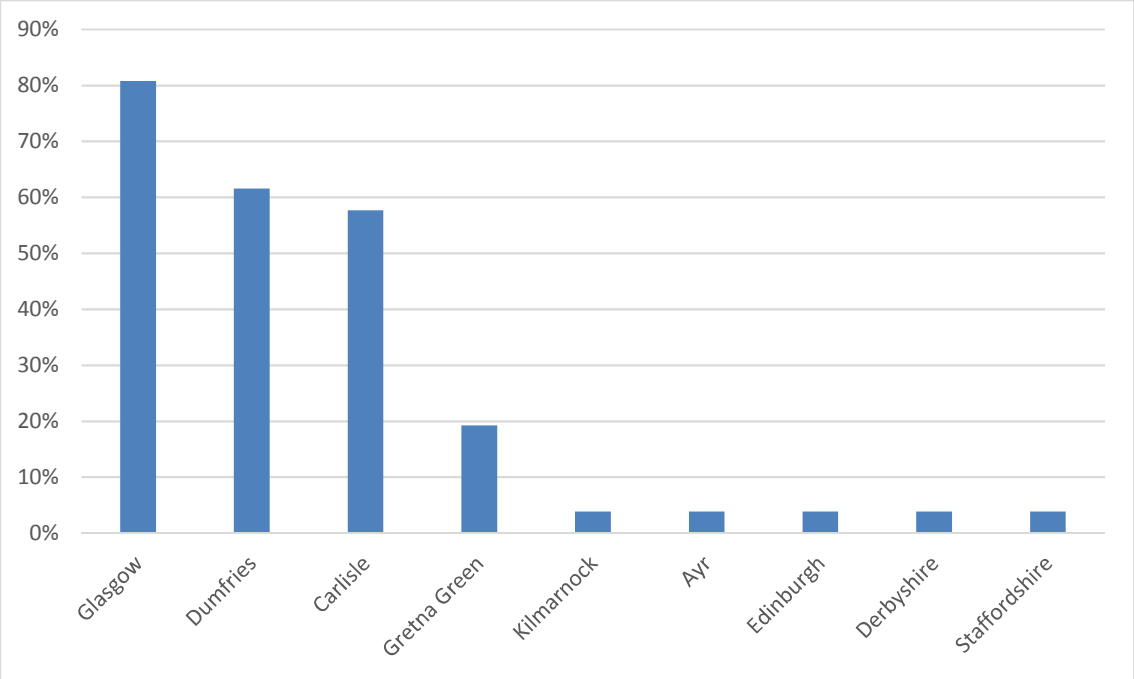

Figure Q.9: Proportion of Respondents Who Use the Train to access each Destination

Why did you choose to travel by train?

Q.4.16 Travellers were also asked about their reasons for using the train. The most common responses included:

- Quicker (65%);
- More comfortable (23%);
- No access to a car (19%);
- Cheaper (19%); and
- Convenience (12%).

How would you have made this journey, if the train was not running?

Q.4.17 Approximately half of respondents (46%) explained that they would not have made the journey that day if the train had not been an option, while 38% would have travelled by bus and 15% would have driven. This suggests that almost half of rail journeys from Sanquhar are made for non-essential purposes.

What is your employment status?

Q.4.18 Respondents were also asked about their employment status. 54% of respondents noted that they were in full- or part-time employment, 12% indicated they were in further education and 34% noted that they were not working. Figure Q.10 provides a detailed breakdown of employment statuses.

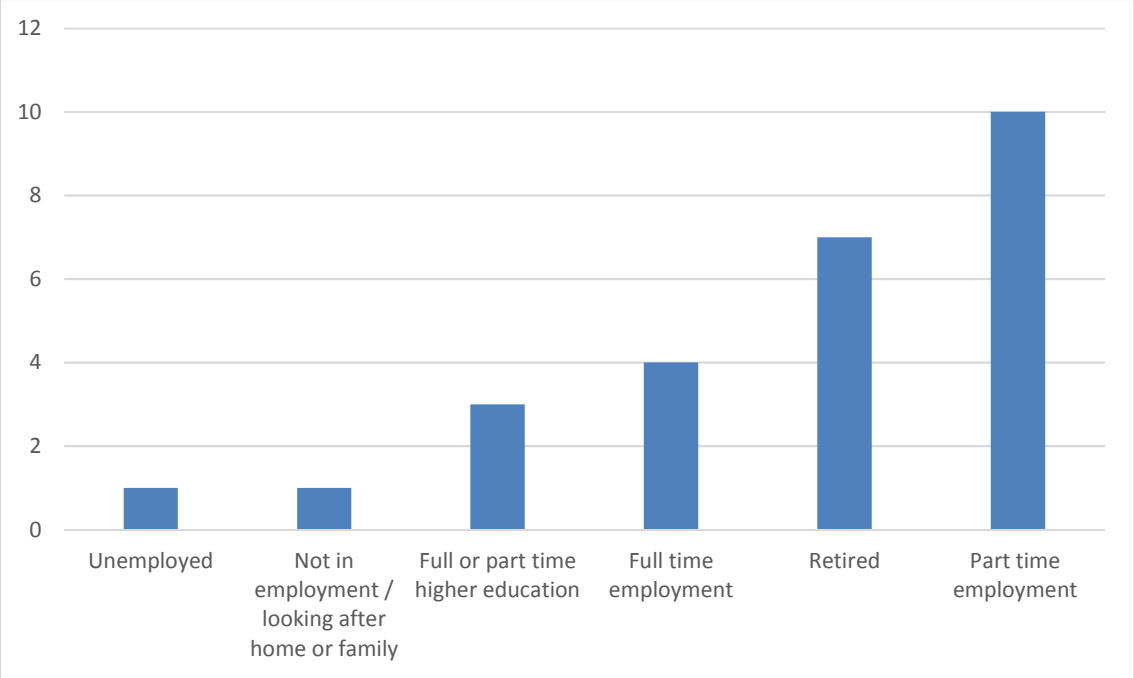

Figure Q.10: Employment Status of Survey Respondents

How many cars are there in your household?

Q.4.19 The 2011 census shows that approximately 67% of households in Sanquhar have one or more cars/vans. The platform survey found that among Sanquhar railway station users, approximately 69% had access to a car.

Do you hold a National Entitlement Card (bus pass)?

Q.4.20 Six of the 26 respondents explained that they hold a National Entitlement Card.

Q.5 Online Survey Findings

Q.5.1 Leaflets were posted to all properties in Sanquhar requesting that residents complete an online survey regarding their usage of Sanquhar Railway Station. Eight surveys were completed, and Sanquhar is home to approximately 890 households (2011 census).

Q.5.2 These surveys asked questions concerning resident's typical usage of Sanquhar Station.

How do you typically access Sanquhar Station?

Q.5.3 Of the 8 respondents, 4 said they walk to the station, 3 travel by car and one takes the bus. It is interesting that the proportion who walk to the station is lower than in the platform survey sample, despite the fact this survey specifically targeted those living in Sanquhar village. This may be a reflection of the small sample and/or demographics of those willing to complete an online survey in their spare time.

Where do you travel to by train?

Q.5.4 The survey asked respondents which locations they commonly travel to by rail. The results are as follows:

- 5 out of eight (63%) travel to Dumfries;
- 5 out of 8 (62.5%) travel to Glasgow;
- 4 out of 8 (5%) travel to Carlisle;
- 3 out of 8 (37.5%) travel to Kilmarnock; and
- 1 out of eight (12.5%) travels to Gretna Green.

The majority of respondents noted that their most commonly visited location was Glasgow (62.5%).

What is the typically the purpose of your rail trips?

Q.5.5 5 out of 8 (62.5%) respondents noted that their most frequently made rail trips were for the purposes of leisure or personal business, and 37.5% for work or education. A full breakdown is provided in Figure Q.11 below:

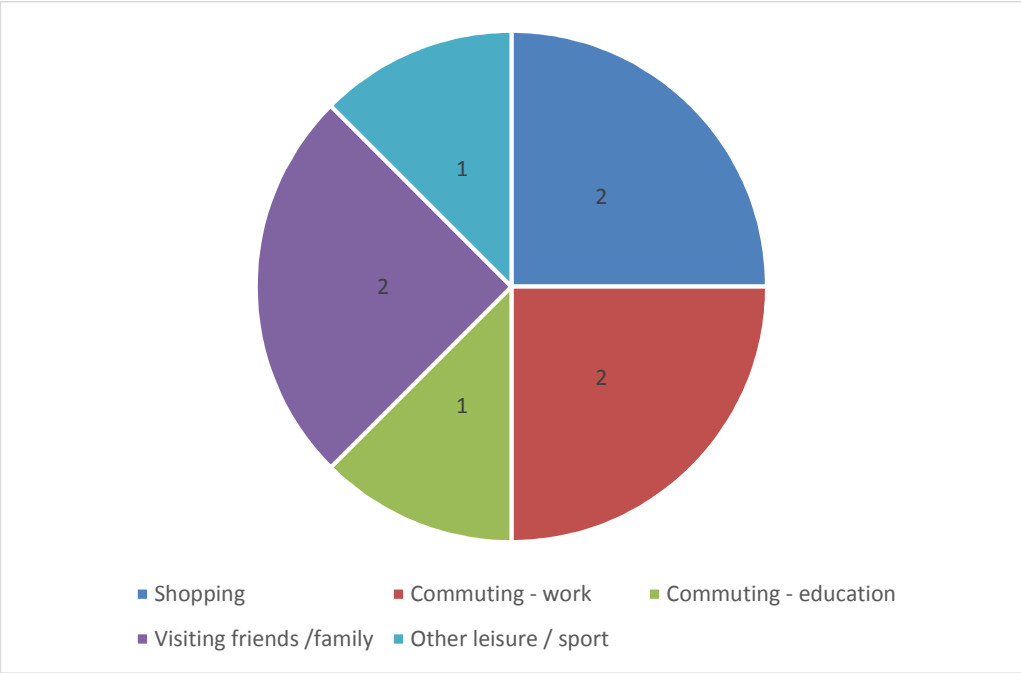

Figure Q.11: Online Survey – Trip Purpose Breakdown

How frequently do you travel by rail?

Q.5.6 Most respondents noted that they make less than one return rail trip per week. Figure Q.12 provides details of all responses. Note: this graph illustrates the frequency of all rail trips, not just the trip that respondents were making on the day of the platform survey as was shown in Figure Q.7.

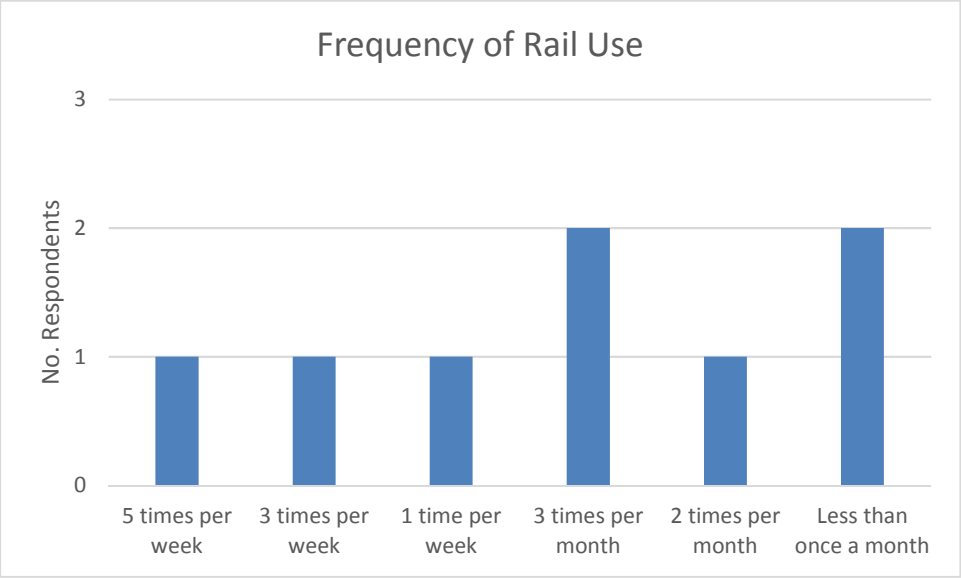

Figure Q.12: Online Survey – Rail Trip Frequency

Why did you choose to travel by train?

Q.5.7 Travellers were also asked about their reasons for using the train. By far the most common response was that it was quicker to travel by train (62.5% of respondents). One respondent in each case noted that they travelled by train given the greater comfort/convenience/cost of parking/train is better in bad weather/the train was fun for the children.

If rail was not an option for accessing the destination of your most frequent rail trips, how would you travel?

Q.5.8 75% of respondents said that they would drive if rail was not an option, and 25% say they would not make the trip.

What is your employment status?

Q.5.9 Respondents were also asked about their employment status. Seven out of eight (87.5%) noted that they were in full or part-time employment, and one said that they were in education (12.5%). None were retired, unlike the platform survey where just over a quarter of respondents identified that way. This profile is very different from that achieved through the platform surveys. Again, this may reflect the type of traveller who is willing to undertake an online survey.

How many cars are there in your household?

Q.5.10 The 2011 census shows that approximately 67% of households in Sanquhar have one or more cars/vans available to use, whereas approximately 88% of online survey respondents have access to a car.

Do you hold a National Entitlement Card (bus pass)?

Q.5.11 None of the respondents noted that they hold a National Entitlement Card. Again, this may reflect a lower level of engagement in the online survey by older rail users.

Key Findings

Q.5.12 This section highlights some of the key findings from the surveys undertaken at Sanquhar. We focus upon the passenger count and platform surveys due to concerns surrounding the representativeness of the very small online survey sample.

- Weekend demand is approximately twice as high as weekday demand.
- During the week, the majority of trips to/from Sanquhar station relate to destinations in the south (e.g. Dumfries), but at the weekend the majority of trips relate to destinations to the north (e.g. Glasgow).
- Approximately 80% of respondents noted origins within 2km of Sanquhar Station. This shows that while Sanquhar is the closest train station for a very large area, the catchment area is predominantly local.
- The majority of respondents walk to Sanquhar station (62%) and circa 30% use the car.
- More than 80% of rail trips from Sanquhar are made for leisure or personal business purposes.
- Glasgow is the most common destination for rail trips from Sanquhar, while more than half of respondents also report using the train to travel to Dumfries and Carlisle.
- The most commonly cited reason for using the train is that it is quicker than other options.
- Approximately half of respondents were in employment, and approximately half were not.
- Respondents had approximately the same level of access to cars as the rest of the Sanquhar population.

Appendix R Part 2: Transport Planning Objectives Appraisal

R.1 Transport Planning Objectives

R.1.1 Three transport planning objectives have been set for the study:

- **TPO 1:** Enable an effective day trip by public transport to key education, retail and social opportunities in Glasgow, Ayr, Edinburgh and Carlisle
- **TPO 2:** Provide public transport connectivity which enables travel to and from the area across the day and across the week
- **TPO 3**: Increase the inbound public transport catchment to support education, tourism and local businesses

R.2 Transport Planning Objective 1: Appraisal

Enable an effective day trip by public transport to key education, retail and social opportunities in Glasgow, Ayr, Edinburgh and Carlisle

R.2.1 In order to appraise the options, TRACC accessibility software was utilised to consider existing and 'with option' journey times in the morning period (08:00 – 12:00) from Thornhill to

- Glasgow;
- Ayr;
- Edinburgh; and
- Carlisle.

R.2.2 The reverse trip from the four strategic locations to Thornhill in the afternoon / evening period (16:00 – 20:00) was also considered. For Option 3, given the additional services are later running weekday services (as well as the weekend services), a period between 20:00 and 00:00 was considered to ensure the benefits were captured.

R.2.3 A similar assessment was also undertaken considering Sanquhar, in order to provide a similar comparator location.

R.2.4 The time periods considered sought to identify whether the transport option would enable an effective day trip to the strategic locations such that a suitable amount of time could be spent in undertaking activities in the visited location.

Option 1a

R.2.5 The results of the assessment for Option 1a are shown in Table R.1. Note that TRACC provides the fastest journey time available by public transport between the origins and destinations in the time period considered.

Table R.1: Appraisal against TPO1 – Option 1a

			Journey time (mins)					
			Existing Situation		With Option		Difference	
			Thornhill	Sanquhar	Thornhill	Sanquhar	Thornhill	Sanquhar
Between 08:00 - 12:00	To	Glasgow	123	87	113	87	-10	0
		Edinburgh	150	164	115	164	-35	0
		Ayr	150	108	150	108	0	0
		Carlisle	101	74	101	74	0	0
Between 16:00 - 20:00	From	Glasgow	138	88	110	88	-28	0
		Edinburgh	155	167	110	167	-45	0
		Ayr	149	99	149	99	0	0
		Carlisle	87	72	87	72	0	0

R.2.6 As the option provides greater accessibility to Lockerbie Station, it would be expected that the option would provide a reduction in travel time between Thornhill and Edinburgh and Glasgow, given the access at Lockerbie to the faster trains on the WCML.

R.2.7 The results, as expected, highlight the reduced journey times to Edinburgh and Glasgow, the greatest improvement being a 45-minute reduction in the journey time back from Edinburgh in the evening period.

R.2.8 Consideration of the comparable journey times between Sanquhar and Glasgow shows that in the existing situation, the travel time from Thornhill to Glasgow is around 35 minutes slower in the morning period and around 50 minutes slower in the evening period. With the addition of the option, travel from Thornhill is only around 25 minutes slower in the morning period and around just 20 minutes slower in the evening period.

R.2.9 The reduced journey time between Thornhill and Edinburgh and Glasgow is likely to enable more time in the strategic locations to undertake activities, enabling a more effective day trip to these locations, and therefore the option provides a positive benefit against this TPO.

R.2.10 There is no change in access time to either Carlisle or Ayr.

Option 3

R.2.11 The results of the assessment for Option 3 are shown in Table R.2. Note that TRACC provides the fastest journey time available by public transport between the origins and destinations in the time period considered.

Table R.2: Appraisal against TPO1 – Option 3

			Existing Situation		With Option		Difference	
			Thornhill	Sanquhar	Thornhill	Sanquhar	Thornhill	Sanquhar
Between 08:00 - 12:00	To	Glasgow	123	87	123	87	0	0
		Edinburgh	150	164	150	164	0	0
		Ayr	150	108	152	108	2	0
		Carlisle	101	74	101	74	0	0
Between 20:00 - 00:00	From	Glasgow	N/A	89	171	89	New opportunity	0
		Edinburgh	N/A	N/A	169	N/A	New opportunity	-
		Ayr	N/A	114	N/A	114	-	0
		Carlisle	N/A	73	155	73	New opportunity	0

R.2.12 As the option provides greater accessibility to Dumfries in the evenings, it would not necessarily provide reduced journey times, but may provide an increased ability to undertake a day trip.

R.2.13 As expected, given there are no additional morning services considered for this option, the results do not show any difference between the existing situation and the options.

R.2.14 The results show that at present, it is not possible to travel between any of the four strategic locations and Thornhill after 20:00. In the evening period however, the option provides three new opportunities to travel back from Glasgow, Edinburgh and Carlisle as the additional bus services provide connections from arriving trains into Dumfries back to Thornhill. As such, the option provides the connectivity required to extend the current time spent in the strategic locations and enables a more effective day trip to these places to undertaken activities.

R.2.15 The option therefore provides a positive benefit against this TPO.

Option 6

R.2.16 The results of the assessment for Option 6 are shown in Table R.3. Note that TRACC provides the fastest journey time available by public transport between the origins and destinations in the time period considered.

Table R.3: Appraisal against TPO1 – Option 6

			Existing Situation		With Option		Difference	
			Thornhill	Sanquhar	Thornhill	Sanquhar	Thornhill	Sanquhar
Between 08:00 - 12:00	To	Glasgow	123	87	97	87	-26	0
		Edinburgh	150	164	150	164	0	0
		Ayr	150	108	128	108	-22	0
		Carlisle	101	74	54	76	-47	2
Between 16:00 - 20:00	From	Glasgow	138	88	98	88	-40	0
		Edinburgh	155	167	155	167	0	0
		Ayr	149	99	112	99	-37	0
		Carlisle	87	72	54	74	-33	2

R.2.17 It can be seen from the results that in the morning period:

- It is currently over half an hour quicker to access **Glasgow** from Sanquhar compared to from Thornhill. This differential reduces to just 10 minutes with the option in place, bringing the journey time from Thornhill down from just over 2 hours to 1 hour 40 minutes.
- It is currently over forty minutes quicker to access **Ayr** from Sanquhar compared to from Thornhill. This differential reduces to 20 minutes with the option in place, bringing the journey time from Thornhill down from 2 hours 30 minutes to just over 2 hours.
- It is currently nearly 30 minutes quicker to access **Carlisle** from Sanquhar compared to from Thornhill, even though Thornhill is geographically close to Carlisle. With the option in place, it becomes over 20 minutes *quicker* from Thornhill than Sanquhar, bringing the journey time from Thornhill down from 1 hour 40 minutes to just 55 minutes. **This difference especially opens up opportunities for a more effective day trip to Carlisle.**
- Travel times to **Edinburgh** are unaffected. This is to be expected given a rail station at Thornhill would be on the GSWL, on which Edinburgh is not located.

R.2.18 In the PM period:

- It is currently 50 minutes quicker to return from **Glasgow** to Sanquhar compared to Thornhill. This differential reduces to just 10 minutes with the option in place, bringing the journey time to Thornhill down from 2 hours 20 minutes to 1 hour 40 minutes.
- It is currently 50 minutes quicker to return from **Ayr** from Sanquhar compared to Thornhill. This differential reduces to just 13 minutes with the option in place, bringing the journey time to Thornhill down from 2 hours 30 minutes to under 2 hours.

- It is currently 15 minutes quicker to return from **Carlisle** from Sanquhar compared to Thornhill, even though Thornhill is geographically closer to Carlisle. With the option in place, it becomes around 20 minutes *quicker* to Thornhill than Sanquhar, bringing the journey time to Thornhill down from around 1 hour 30 minutes to just 55 minutes. **This difference especially opens up opportunities for a more effective day trip to Carlisle.**

- Travel times to **Edinburgh** are unaffected. This is to be expected given a rail station at Thornhill would be on the GSWL, on which Edinburgh is not located.

R.2.19 The option therefore provides a major positive benefit against this TPO.

R.3 Transport Planning Objective 2: Appraisal

Provide public transport connectivity which enables travel to and from the area across the day and across the week

R.3.1 This TPO has been assessed through consideration of:

- The earliest available northbound and southbound connections from Thornhill in both the existing and 'with option' situations; and

- The earliest available northbound and southbound connections to Thornhill in both the existing and 'with option' situations.

R.3.2 The results of the appraisal are set out in Table R.4. Note that for Option 1a the analysis for the southbound direction considers increased access to Lockerbie, given the remit of the option.

The analysis shows:

- Option 1a provides 13 new connections to Lockerbie from Thornhill on a weekday/Saturday;

- Option 3 provides an extension of the operating day by 1 hour 30 minutes on weekdays, providing greater connectivity to Thornhill from Dumfries in the evenings;

- While Option 3 only increases the operating day on a Sunday by around 20 minutes, there are an additional 8 connections provided offering far greater flexibility in time of travel;

- The increase in weekday and Saturday northbound connections with Option 6 is in place, with the rail services providing 10 additional connections;

- The increase in operating hours for Option 6 for weekday, Saturday and Sunday travel, with:

  - An additional 5 hours' coverage during the weekday and Saturday in terms of access for northbound travel; and

  - An additional 1 hour 20 minutes and 3 hours 30 minutes coverage for southbound travel on a weekday/Saturday and Sunday respectively. Specifically, of note is the ability to travel from Dumfries to Thornhill on a Sunday at 23:43.

Table R.4: Appraisal against TPO2 – All options

		Northbound (to/from Sanquhar)						Southbound (to/from Dumfries or Lockerbie)					
	Scenario	Earliest Departure From	Latest Arrival Back	Operating Hours	Change in Operating Hours from Existing	Number of connections	Change in number of connections from existing	Earliest Departure From	Latest Arrival Back	Operating Hours	Change in Operating Hours from Existing	Number of connections	Change in number of connections from existing
Monday to Saturday	Existing	06:25	20:40	14:15	-	9	-	07:02	20:30	13:28	-	37	-
	1a	06:25	20:40	14:15	00:00	9	0	06:14	21:17	15:03	01:35	50	13
	3	06:25	20:40	14:15	00:00	9	0	06:14	22:00	15:46	02:18	39	2
	6	05:24	00:49	19:25	05:10	19	10	06:14	21:49	15:35	02:07	47	10
Sunday	Existing	11:00	21:25	10:25	-	4	-	10:22	20:30	10:08	-	5	-
	1a	11:00	21:25	10:25	00:00	4	0	10:22	20:30	10:08	00:00	5	0
	3	11:00	21:25	10:25	00:00	4	0	10:00	20:30	10:30	00:22	13	8
	6	11:00	21:25	10:25	00:00	6	2	10:00	23:43	13:43	03:35	7	2

R.4 Transport Planning Objective 3: Appraisal

Increase the inbound public transport catchment to support education, tourism and local businesses

R.4.1 In order to appraise the options, TRACC accessibility software was utilised to consider the number of people who can reach Thornhill within 1 hour, 2 hours and 3 hours, both in the existing situation and with the options in place in the morning and evenings periods. This provides an indication as to the accessibility of Thornhill for those coming into the area.

R.4.2 For Option 3, given the additional services are later running weekday services (as well as the weekend services), the evening period of between 20:00 and 00:00 has been used in the analysis to ensure the benefits were captured.

Option 1a

R.4.3 The analysis for Option 1a is presented in Table R.5.

Table R.5: Appraisal against TPO3 – Option 1a

		Population within reach of Thornhill			
	Within	Existing Situation	With Option	Difference	% Difference
Between 08:00 - 12:00	1 hour	53,625	55,729	2,104	4%
	2 hours	138,100	138,546	446	0%
	3 hours	1,325,471	1,387,893	62,422	4%
Between 16:00 - 20:00	1 hour	52,201	54,427	2,226	4%
	2 hours	178,025	195,566	17,541	9%
	3 hours	1,403,714	2,334,661	930,947	40%

R.4.4 The table shows an increase in people able to access Thornhill with the option in place, especially in the afternoon / evening period where there is an increase in the number of people able to access Thornhill in under 3 hours of 40%.

Option 3

R.4.5 The analysis for Option 3 is presented in Table R.6.

Table R.6: Appraisal against TPO3 – Option 3

		Population within reach of Thornhill			
		Existing Situation	With Option	Difference	% Difference
Between 08:00 - 12:00	1 hour	53,625	53,625	-	0%
	2 hours	138,100	138,100	-	0%
	3 hours	1,325,471	1,325,471	-	0%
Between 20:00 - 00:00	1 hour	39,948	41,421	1,473	4%
	2 hours	41,180	70,594	29,414	42%
	3 hours	41,180	141,812	100,632	71%

R.4.6 The table shows, as would be expected given, no change in the morning period given the option is focussed on evening and Sunday services. In the evening period there is marked increase in the number of people able to access Thornhill of 42% in under 2 hours and just over 70% in

under 3 hours. The greater ability for the increased number of people to access the town in the evenings may be especially beneficial from a tourism perspective in supporting locally based social activities (concerts, festivals etc.) in the study area.

Option 6

R.4.7 The analysis for Option 6 is presented in Table R.7.

Table R.7: Appraisal against TPO3 – Option 6

		Population within reach of Thornhill			
		Existing Situation	With Option	Difference	% Difference
Between 08:00 - 12:00	1 hour	53,625	79,302	25,677	32%
	2 hours	84,475	635,130	550,655	87%
	3 hours	1,271,846	2,419,831	1,147,985	47%
Between 16:00 - 20:00	1 hour	52,201	75,606	23,405	31%
	2 hours	178,025	465,160	287,135	62%
	3 hours	1,403,714	2,626,766	1,223,052	47%

R.4.8 The table shows the very significant increase in the number of people able to access Thornhill, with just over a 30% increase for those able to access the village in under an hour in both the morning and evening periods. There is also a significant increase in the number of people able to access Thornhill in under 2 hours. This has the potential to substantially increase the accessibility of the area to support education, tourism and local businesses.

Appendix S Part 2: Environmental Appraisal

S.1 Methodology

S.1.1 In order to provide a consistent and 'nested' approach to environmental appraisal in the local authority area, this appraisal has also utilised the framework developed for the Strategic Environmental Assessment of Dumfries and Galloway Council Local Development Plan 2 (LDP2)[16], published in 2017. This provides an additional robust and means tested framework that has been developed specifically for the local area. This assessment process also forms an appropriate starting point should any of the options require an Environmental Impact Assessment (EIA) or Strategic Environmental Assessment (SEA) at a later stage.

S.1.2 To assist with the LDP2 SEA assessment process, objectives were identified for each SEA topic to be considered when seeking to reach a conclusion on the potential impact of each strand of the LDP2 strategy. These objectives were identified through an analysis of the environmental problems, baseline data and other relevant plans, programmes and environmental protection objectives, and finalised through consultation with the relevant authorities.

S.1.3 This analysis considers the potential impact of each transport option under the STAG criteria and against the LDP2 objectives. The full assessment framework is presented in Table S.1

Table S.1: STAG Environmental Appraisal Criteria and LDP objectives

STAG Criteria	LDP Topic	Objective
Noise and vibration	N/A	▪ N/A
Global air quality – carbon dioxide (CO2)	Climatic Factors	▪ To contribute to the reduction of greenhouse gases and reduce energy consumption ▪ To promote sustainable energy technologies and energy efficiency ▪ To minimise / reduce the need for travel by car
Local air quality – particulates (PM10) and nitrogen dioxide (NO2)	Air Quality	▪ To maintain and, where possible, improve air quality
Water quality; drainage and flood defence	Water	▪ To manage and reduce flood risk and to support opportunities to do so through sustainable flood management (SuDS) ▪ To protect and enhance the state of the water environment

[16] Dumfries and Galloway Council Local Development Plan 2. Environment Report. January 2017

STAG Criteria	LDP Topic	Objective
Geology	N/A	▪ N/A
Biodiversity and habitats	Biodiversity, Flora and Fauna	▪ To conserve and enhance biodiversity
Landscape	Landscape	▪ To protect and enhance the character, distinctiveness and diversity of the region's landscape. ▪ To protect and enhance the landscape setting of settlements plus the landscape and scenic qualities of designated landscapes, areas of wild land, and important views
Visual amenity	N/A	▪ N/A
Agriculture and soils	Soil	▪ To safeguard the soil quality, geodiversity and improve contaminated land ▪ To reduce negative effects on peat and carbon rich soils ▪ To reduce and minimise soil and coastal erosion
Cultural Heritage	Cultural Heritage	▪ To protect and enhance the region's rich built and historic environment including its setting
Physical Fitness	Population & Human Health	▪ To improve the quality of life, human health, well-being and inclusion for all ▪ To increase the opportunities for access to, and enjoyment of, greenspaces and the wider landscape ▪ To encourage development within areas which are easily accessible by public transport as well as having

STAG Criteria	LDP Topic	Objective
		good pedestrian and cycle linkages
N/A	Material Assets	▪ To manage, maintain and promote the sustainable use of natural resources ▪ To reduce waste production and adopt sustainable waste management practices

S.1.4 The LDP2 SEA Environment Report includes a description of the relevant aspects of the current nature of the environment in Dumfries and Galloway and the environmental characteristics of areas likely to be significant affected by future development. There are outlined in Table S.2 below.

Table S.2: Key Environmental Issues as noted in Dumfries and Galloway LDP2 document

Topic	Key Environmental Issues/Problems
Noise and vibration	▪ N/A
Climatic Factors	▪ Anticipated that summers will be warmer and drier, autumn and winter will be milder and wetter, with an increase in intense rainfall, and rising sea levels. ▪ There are a significant number of renewable energy schemes installed throughout the region using a variety of technologies with wind and hydro being the main elements. ▪ Car ownership in the region is relatively high recognising the relatively sparse population and limited public transport options. ▪ Rail usage has increased in the region however overall the region is poorly served by rail routes. ▪ Observed climate changes have had impacts on many aspects of our environment, the resilience of our businesses, the health and well-being of our people and our infrastructure and these impacts will continue and even intensify in the projected future climate.
Air	▪ Air quality within the region is generally good. ▪ There are no Air Quality Management Areas within the region.
Water	▪ There are a number of watercourses that are subject to potential flood risk. ▪ The number of flood incidents has fluctuated over the years and appears to be directly related to rainfall. ▪ The condition of water bodies has generally improved over the long term but not in the short term. ▪ The quality of groundwater in the region is generally good but there appears to be a declining trend. ▪ The quality of the public water supply is generally high although there is a relatively high number of private water supplies.

Topic	Key Environmental Issues/Problems
	▪ Climate change may cause increased competition for water, as well as increased flood risks.
Geology	▪ N/A
Biodiversity, Flora and Fauna	▪ There are a number of international and national designations across the region. ▪ Of the 29 international designations, 10 have some element 13 that is in an unfavourable and declining state. ▪ Biodiversity generally is in decline but the rate of decline appears to be slowing. ▪ Invasive non-native species continue to spread. ▪ Approximately a third of the region is covered in woodland and forestry ▪ Climate change may rise in significance in the future, adding to existing pressures.
Landscape	▪ The region has a rich and diverse landscape and includes areas designated for their landscape and scenic qualities at both the national and local levels. ▪ SNH have identified two areas of wildland in the region. ▪ TPO records in the region are limited and require updating. ▪ The loss of larch and ash trees to Phytophthora ramorum and ash die-back is likely to have a significant impact on region's landscape. ▪ The changing climate is already altering our unique Scottish landscapes.
Visual Amenity	▪ N/A
Soil	▪ Only a small proportion of land is considered to be prime agricultural land. ▪ The region contains large areas of peatland. ▪ There are a number of sites with potential contaminated land issues that may require mitigation. ▪ There are issues of soil erosion particularly through flood events and in coastal areas.
Cultural Heritage	▪ The region contains a range of diverse historic assets there have been few changes to the number of designated historic assets. ▪ A significant number of historic assets are under-used or in poor condition. ▪ Within the region, there are potential restoration schemes for 15 of the buildings on the Buildings at Risk Register for Scotland. ▪ There are a relatively high number of designated archaeological sites throughout the region.
Population and Human Health	▪ Declining and older population with high life expectancy rates. ▪ The number of households is increasing although household size is predicted to decrease. ▪ Over a quarter of the region's population live in Dumfries but overall, the region has a relatively low population density of 23 persons per km^2. ▪ Overall, there are low levels of household income with a poorly performing labour market.

Topic	Key Environmental Issues/Problems
	▪ The region is diverse containing some of the most and least deprived areas of Scotland. ▪ There is high reliance on car ownership in the rural parts of the region although 20% of households do not have access to private transport. ▪ There is a wealth of recreational opportunities within the region.

S.1.5 All options taken forward to STAG Part 2 have been assessed in detail to identify the likely significant effects on the environmental objectives. The assessment of each option was undertaken on a pre-mitigation basis i.e. assuming full implementation of the option as stated and without the provision of additional policy safeguards or mitigation measures.

S.1.6 The assessment outcomes are shown for each option below.

Table S.3: Option 1a – Environmental Appraisal – Table 1

Environmental Aspect	Baseline Key Characteristics	Commentary	Score
Noise and vibration	• Thornhill village is situated on the A76 which provides a rural strategic link between Dumfries and Kilmarnock. • Trains (freight and passenger) operate on the GSWL, on which the (at present disused) Thornhill railway station is situated. However, the associated nosie and vibration impacts are minimal due to the distance of the rail line, 1.5km to the east of the village.	• The option includes the provision of additional bus services however this is unlikely to produce any significant additional noise and will not be operated on any new routes not already utilised by traffic. • The route will predominantly be through the rural countryside and as such their are limited noise receptors that would be affected	0
Global air quality – carbon dioxide (CO2)	• In 2015, the anticipated total CO2 emissions for Dumfries & Galloway was 715 kilotonnes (kt), 554 kt (77%) of which resulted from road transport	• Providing the additional bus services would directly help to encourage increased bus patronage in the area. This would support sustainable modal shifts and could reduce car dependency, especially for single occupancy journeys. This would help reduce car traffic and associated fossil fuel consumption and greenhouse gas emissions, resulting in a positive effect on Climatic Factors.	1
Local air quality – particulates (PM10) and nitrogen dioxide (NO2)	• There are no Air Quality Management Areas (AQMA) designated in Dumfries & Galloway. • Car ownership in Dumfries & Galloway is increasing, exacerbating pressure on the network and contributing to poor public health through poor air quality, noise and inactivity.	• Providing the additional bus services would directly help to encourage increased bus patronage in the area. This would support sustainable modal shifts and could reduce car dependency, especially for single occupancy journeys. This would help reduce car traffic and associated air pollution, resulting in a positive effect on Air Quality.	1
Water quality; drainage and flood defence	• The principle watercourses in the area are Cample Water, Crichope Linn and the River Nith. • To the south of the study area is the Solway Firth and Estuary which is site of various SSSI and other environmental designations.	• This option would utilise existing roads and infrastructure and would not require acquisition of new land or construction of new facilities. There is therefore no clear relationship between this option and Water.	0

Table S.4: Option 1a – Environmental Appraisal – Table 2

Environmental Aspect	Baseline Key Characteristics	Commentary	Score
Geology	• There are no land based SSSI or other designations surrounding the proposed station site. • Thornhill the surrounding area of Dumfries is listed as Prime Agricultural Land.	• This option would utilise existing roads and infrastructure and would not require acquisition of new land or construction of new facilities. There is therefore no clear relationship between this option and Geology.	0
Biodiversity and habitats	• Thornhill and the surrounding area is designated as a Biospere Reserve. • There are several SSSI in the surrounding area, including: Shiel Dod, Chanlockfoot, Black Loch, Locharbriggs Quarry	• This option would utilise existing roads and infrastructure and would not require acquisition of new land or construction of new facilities. There is therefore no clear relationship between this option and Biodiversity.	0
Landscape	• The study area is characterised by urban towns (Thornhill and Dumfries) with large areas of agricultural land and green space and the coastline providing diversity. • The landscape is characterised in the main as “Middle Dale”. • There are no Garden and Designed Landscape (GDL) areas or Country Parks located within the study area	• This option would utilise existing roads and infrastructure and would not require acquisition of new land or construction of new facilities. There is therefore no clear relationship between this option and Landscape.	0
Visual amenity		• This option would utilise existing roads and infrastructure and would not require acquisition of new land or construction of new facilities. There is therefore no clear relationship between this option and Visual Amenity.	0
Agriculture and soils	• There are no land based SSSI or other designations surrounding the proposed station site. • Thornhill the surrounding area of Dumfries is listed as Prime Agricultural Land.	• This option would utilise existing roads and infrastructure and would not require acquisition of new land or construction of new facilities. here is therefore no clear relationship between this option and agriculture and soils.	0

Table S.5: Option 1a – Environmental Appraisal – Table 3

Environmental Aspect	Baseline Key Characteristics	Commentary	Score
Cultural Heritage	• There are a large number of listed buildings (Category A to C) within Thornhill and Dumfries town Centre. • The village of Thornhill is listed as a Conservation Area. • Dumfries town Centre is listed as a Conservation Area.	• This option would utilise existing roads and infrastructure and would not require acquisition of new land or construction of new facilities. There is therefore no clear relationship between this option and Cultural Heritage.	0
Physical Fitness	• The population of Dumfries & Galloway at 2011 Census was 151,324. • 21.8% of the total population is people aged 65 years and over. • Life expectancy in Dumfries & Galloway in much in line with the Scotland average with life expectancy at birth being 78.1 for males and 81.3 for females.	• Improvements to bus services would support greater bus use for all demographic groups in the areas, and improve access to a great range of social and employment opportunites hence promoting social inclusion for those without a car. As such, positive health effects are predicted. • This option provide would support increased bus patronage in the area which would improve accessibility to recreational activities and open spaces especially for those without a car. • A modal shift towards public transport would also reduce air pollution and noise in urban areas that is usually associated with vehicular traffic. This option would therefore have a positive effect on health.	1

Table S.6: Option 3 – Environmental Appraisal – Table 1

Environmental Aspect	Baseline Key Characteristics	Commentary	Score
Noise and vibration	• Thornhill village is situated on the A76 which provides a rural strategic link between Dumfries and Kilmarnock. • Trains (freight and passenger) operate on the GSWL, on which the (at present disused) Thornhill railway station is situated. However, the associated nosie and vibration impacts are minimal due to the distance of the rail line, 1.5km to the east of the village.	• The option includes the provision of additional bus services however this is unlikely to produce any significant additional noise and will not be operated on any new routes not already utilised by traffic. • The route will predominantly be through the rural countryside and as such their are limited noise receptors that would be affected	0
Global air quality – carbon dioxide (CO2)	• In 2015, the anticipated total CO2 emissions for Dumfries & Galloway was 715 kilotonnes (kt), 554 kt (77%) of which resulted from road transport	• Providing the additional bus services would directly help to encourage increased bus patronage in the area. This would support sustainable modal shifts and could reduce car dependency, especially for single occupancy journeys. This would help reduce car traffic and associated fossil fuel consumption and greenhouse gas emissions, resulting in a positive effect on Climatic Factors.	1
Local air quality – particulates (PM10) and nitrogen dioxide (NO2)	• There are no Air Quality Management Areas (AQMA) designated in Dumfries & Galloway. • Car ownership in Dumfries & Galloway is increasing, exacerbating pressure on the network and contributing to poor public health through poor air quality, noise and inactivity.	• Providing the additional bus services would directly help to encourage increased bus patronage in the area. This would support sustainable modal shifts and could reduce car dependency, especially for single occupancy journeys. This would help reduce car traffic and associated air pollution, resulting in a positive effect on Air Quality.	1
Water quality; drainage and flood defence	• The principle watercourses in the area are Cample Water, Crichope Linn and the River Nith. • To the south of the study area is the Solway Firth and Estuary which is site of various SSSI and other environmental designations.	• This option would utilise existing roads and infrastructure and would not require acquisition of new land or construction of new facilities. There is therefore no clear relationship between this option and Water.	0

Table S.7: Option 3 – Environmental Appraisal – Table 2

Environmental Aspect	Baseline Key Characteristics	Commentary	Score
Geology	• There are no land based SSSI or other designations surrounding the proposed station site. • Thornhill the surrounding area of Dumfries is listed as Prime Agricultural Land.	• This option would utilise existing roads and infrastructure and would not require acquisition of new land or construction of new facilities. There is therefore no clear relationship between this option and Geology.	0
Biodiversity and habitats	• Thornhill and the surrounding area is designated as a Biospere Reserve. • There are several SSSI in the surrounding area, including: Shiel Dod, Chanlockfoot, Black Loch, Locharbriggs Quarry	• This option would utilise existing roads and infrastructure and would not require acquisition of new land or construction of new facilities. There is therefore no clear relationship between this option and Biodiversity.	0
Landscape	• The study area is characterised by urban towns (Thornhill and Dumfries) with large areas of agricultural land and green space and the coastline providing diversity. • The landscape is characterised in the main as “Middle Dale”. • There are no Garden and Designed Landscape (GDL) areas or Country Parks located within the study area	• This option would utilise existing roads and infrastructure and would not require acquisition of new land or construction of new facilities. There is therefore no clear relationship between this option and Landscape.	0
Visual amenity		• This option would utilise existing roads and infrastructure and would not require acquisition of new land or construction of new facilities. There is therefore no clear relationship between this option and Visual Amenity.	0
Agriculture and soils	• There are no land based SSSI or other designations surrounding the proposed station site. • Thornhill the surrounding area of Dumfries is listed as Prime Agricultural Land.	• This option would utilise existing roads and infrastructure and would not require acquisition of new land or construction of new facilities. here is therefore no clear relationship between this option and agriculture and soils.	0

Table S.8: Option 3 – Environmental Appraisal – Table 3

Environmental Aspect	Baseline Key Characteristics	Commentary	Score
Cultural Heritage	• There are a large number of listed buildings (Category A to C) within Thornhill and Dumfries town Centre. • The village of Thornhill is listed as a Conservation Area. • Dumfries town Centre is listed as a Conservation Area.	• This option would utilise existing roads and infrastructure and would not require acquisition of new land or construction of new facilities. There is therefore no clear relationship between this option and Cultural Heritage.	0
Physical Fitness	• The population of Dumfries & Galloway at 2011 Census was 151,324. • 21.8% of the total population is people aged 65 years and over. • Life expectancy in Dumfries & Galloway in much in line with the Scotland average with life expectancy at birth being 78.1 for males and 81.3 for females.	• Improvements to bus services would support greater bus use for all demographic groups in the areas, and improve access to a great range of social and employment opportunites hence promoting social inclusion for those without a car. As such, positive health effects are predicted. • This option provide would support increased bus patronage in the area which would improve accessibility to recreational activities and open spaces especially for those without a car. • A modal shift towards public transport would also reduce air pollution and noise in urban areas that is usually associated with vehicular traffic. This option would therefore have a positive effect on health.	1

Table S.9: Option 6 – Environmental Appraisal – Table 1

Environmental Aspect	Baseline Key Characteristics	Commentary	Score
Noise and vibration	• Thornhill village is situated on the A76 which provides a rural strategic link between Dumfries and Kilmarnock. • Trains (freight and passenger) operate on the GSWL, on which the (at present disused) Thornhill railway station is situated. However, the associated nosie and vibration impacts are minimal due to the distance of the rail line, 1.5km to the east of the village.	• The option does not consider the provision of additional rail services, but that existing services incur an additional rail stop at Thornhill. Currently trains (freight and passenger) pass the proposed site without stopping. The only impact on the local noise environment will be the noise associated with passenger trains pulling away from the proposed platform. • The old station house is situated adjacent to the former station and Nosie mitigation measures would be required should the former station site be retained for the new station. There are a number of residential properties (less than 10) to the north of Former Cattle Auction Mart who would be impacted by increased noise levels if the station were to be located to the north of the rail overbridge (slightly north of the former site). Again, Nosie mitigation measures would be required should the this station site be utilised for the new station site. • Final station design should ensure these noise impacts are minimised through the incorporation of appropriate Nosie barriers. • The principal source of vibration will be that associated with train movements. As the GSWL is already utilised by trains, no new types of vibration will be introduced by the option. As vibration increases with train speed, the additional halt at Thornhill which will reduced the train speed, will lessen the vibration impact.	-1
Global air quality – carbon dioxide (CO2)	• In 2015, the anticipated total CO2 emissions for Dumfries & Galloway was 715 kilotonnes (kt), 554 kt (77%) of which resulted from road transport	• This option would directly help to encourage increased rail patronage in the area. This would support sustainable modal shifts and could reduce car dependency, especially for single occupancy journeys. This would help reduce car traffic and associated fossil fuel consumption and greenhouse gas emissions, resulting in a major positive effect on Climatic Factors. • It is assumed that construction works would follow good site practices to avoid pollution of the water environment.	1

Table S.10: Option 6 – Environmental Appraisal – Table 2

Environmental Aspect	Baseline Key Characteristics	Commentary	Score
Local air quality – particulates (PM10) and nitrogen dioxide (NO2)	• There are no Air Quality Management Areas (AQMA) designated in Dumfries & Galloway. • Car ownership in Dumfries & Galloway is increasing, exacerbating pressure on the network and contributing to poor public health through poor air quality, noise and inactivity.	• This option would directly help to encourage increased rail patronage in the area. This would support sustainable modal shifts and could reduce car dependency, especially for single occupancy journeys. This would help reduce car traffic and associated air pollution, resulting in a major positive effect on Air Quality. • It is assumed that construction works would follow good site practices to avoid pollution of the water environment.	1
Water quality; drainage and flood defence	• The principle watercourses in the area are Cample Water, Crichope Linn and the River Nith. • To the south of the study area is the Solway Firth and Estuary which is site of various SSSI and other environmental designations.	• A detailed flood assessment would need to be considered at a later design stage to understand how a new station may impact on localised flooding. • It is assumed that construction works would follow good site practices to avoid pollution of the water environment.	0
Geology	• There are no land based SSSI or other designations surrounding the proposed station site. • Thornhill the surrounding area of Dumfries is listed as Prime Agricultural Land.	• The station is not predicted to affect any designated geological sites. This would need to be confirmed at later stages of design and assessment when more specific alignment information was available.	0

Table S.11: Option 6 – Environmental Appraisal – Table 3

Environmental Aspect	Baseline Key Characteristics	Commentary	Score
Biodiversity and habitats	Biodiversity • Thornhill and the surrounding area is designated as a Biospere Reserve. • There are no land based SSSI or other designations immediately surrounding the proposed station site, however there are several SSSI in the surrounding area, including: Shiel Dod, Chanlockfoot, Black Loch, Locharbriggs Quarry • There are areas Forest Plans and Native Woodland surrounding the proposed station site	• This option would require the construction of a new rail station near the village of Thornhill which would require land acquisition. This permanent development on previously undeveloped land could potentially affect a range of species as a result of habitat loss/fragmentation and displacement including protected species such as badger, red squirrel, otter and bats. Further protected species surveys would need to be undertaken to inform a more specific appraisal of potential impacts. • Mitigation measures would need to be employed to ensure that disturbance works and impacts such as habitat loss from permanent development did not adversely affect conservation objective of surrounding designation sites, and measures were taken to avoid affecting the water quality of nearby watercourses. Depending on the potential for likely significant effects, Habitats Regulations Appraisal (HRA) would be required.	0
Landscape	• The study area is characterised by urban towns (Thornhill and Dumfries) with large areas of agricultural land and green space and the coastline providing diversity. • The landscape is characterised in the main as “Middle Dale”. • There are no Garden and Designed Landscape (GDL) areas or Country Parks located within the study area	• Construction works for the station are predicted to have the potential for some localised landscape and visual impacts however they would be temporary for the duration of the works and mitigated through adoption of good construction practices. • This option’s impact on Landscape is therefore considered to be neutral.	0

Table S.12: Option 6 – Environmental Appraisal – Table 4

Environmental Aspect	Baseline Key Characteristics	Commentary	Score
Visual amenity	Thornhill lies within a designated regional scenic area.	• This option requires the acquisition of new land and the construction of new facilities. • The station is not not close to any recognised sites such as national parks, national scenic areas, natural heritage zones, areas of great landscape value, country parks or other similar locations. • Given the small development envisaged to reinstate the station, the station is not anticipated to have any significant impact on the local landscape or visual amenity. • The station would provide increased opportunity for visitors to access the local landscape.	1
Agriculture and soils	• There are no land based SSSI or other designations surrounding the proposed station site. • Thornhill the surrounding area of Dumfries is listed as Prime Agricultural Land.	• Construction works for the station has the potential to permanently affect soils from earthworks, excavations and compression of soils as well as loss of soil resources. • There is some minor potential for construction to affect areas of potentially contaminated land which may be associated with former industrial areas, e.g. at the edges of built up areas and this would require more detailed investigation, assessment and, if appropriate, remediation at later design stages • It is assumed that appropriate measures would be adopted during physical works to prevent pollution of the environment.	0
Cultural Heritage	• There are a large number of listed buildings (Category A to C) within Thornhill and Dumfries town Centre. • The village of Thornhill is listed as a Conservation Area. • Dumfries town Centre is listed as a Conservation Area.	• There are a number of Listed Buildings within 1km of the proposed station site and construction works could affect the setting of these sites depending on the final design of permanent infrastructure. • Construction works for permanent infrastructure works are predicted to have the potential to encounter as yet unrealised archaeology and it is assumed that mitigation measures, such as watching briefs and appropriate trial trenching works would be undertaken in key areas, without significant adverse impacts.	0

Table S.13: Option 6 – Environmental Appraisal – Table 5

Environmental Aspect	Baseline Key Characteristics	Commentary	Score
Physical Fitness	• The population of Dumfries & Galloway at 2011 Census was 151,324. • 21.8% of the total population is people aged 65 years and over. • Life expectancy in Dumfries & Galloway in much in line with the Scotland average with life expectancy at birth being 78.1 for males and 81.3 for females.	• Improvements to rail infrastructure would reduce journey times for all demographic groups in the areas to essential facilities and services (in Dumfries and Carlisle) promote social inclusion for those without a car. As such, positive effects are predicted. • This option provide would support increased rail patronage in the area which would improve accessibility to recreational activities, open space and healthcare facilities, especially for those without a car. • A modal shift towards public transport would also reduce air pollution and noise in urban areas that is usually associated with vehicular traffic. This option would therefore health a major positive effect on health.	1

Appendix T Part 2: Safety Appraisal

Table T.1: Option 1a – Safety Appraisal – Table 1

Safety Criteria	Sub-criteria	Relative Importance	Vulnerable Groups of Society affected	Commentary	Score
Accidents	The user groups affected by improvements and the anticipated change in the balance of accidents, for example fewer fatalities or serious injury accidents, but an increase in slight injury accidents	Low	• Road Users	It is anticipated there be minor reductions in those using the roads between Thornhill and Lockerbie (i.e. A76, A75 and B709) if there is some modal shift to bus. This is however likely to only have a very minor impact on accident rates. It is unlikely that there would be any specific change in the balance of accidents (minor, serious or fatal) as a result of option implementation.	0

Table T.2: Option 1a – Safety Appraisal – Table 2

Safety Criteria	Sub-criteria	Relative Importance	Vulnerable Groups of Society affected	Without Strategy	With Strategy	Commentary	Score
Security	Site perimeters, entrances and exits	Low		Moderate	Moderate	These options will utilise existing bus stops whose perimeters have varying levels of clarity depending on where they are sited. Some bus stops in the area offer a covered shelter for passengers with a marked stopping area in the road where appropriate. The option will remove the need to interchange between buses (in Dumfries) to access Lockerbie Railway Station. As such the wait time at the bus station in Dumfries will be removed - reducing security concerns for those waiting in an unsecure environment.	0
	Formal surveillance	Medium		Poor	Poor	Bus stops and services do not offer formal CCTV surveillance facilities.	0
	Informal surveillance	High		Moderate	Moderate	Whilst often in remote locations away from retailers or activity, bus stops in Dumfries & Galloway are made of transparent materials that allow for open visibility from site surrounds.	0
	Landscaping	Low		N/A	N/A	There is no clear relationship between the effect on landscaping and the perceived security of this option.	0
	Lighting and visibility	High		Poor	Poor	There is no dedicated lighting for bus stop facilities in the study area.	0
	Emergency call	Medium		Poor	Poor	There is no provision of emergency phones, help points or public telephones associated with this option.	0

Table T.3: Option 3 – Safety Appraisal – Table 1

Safety Criteria	Sub-criteria	Relative Importance	Vulnerable Groups of Society affected	Commentary	Score
Accidents	The user groups affected by improvements and the anticipated change in the balance of accidents, for example fewer fatalities or serious injury accidents, but an increase in slight injury accidents	Low	• Road Users	It is anticipated there be minor reductions in those using the A76 between Thornhill and Dumfries if there is some modal shift to bus. This is however likely to only have a very minor impact on accident rates. It is unlikely that there would be any specific change in the balance of accidents (minor, serious or fatal) as a result of option implementation.	0

Table T.4: Option 3 – Safety Appraisal – Table 2

Safety Criteria	Sub-criteria	Relative Importance	Vulnerable Groups of Society affected	Without Strategy	With Strategy	Commentary	Score
Security	Site perimeters, entrances and exits	Low		Moderate	Moderate	The option will utilise existing bus stops whose perimeters have varying levels of clarity depending on where they are sited. Some bus stops in the area offer a covered shelter for passengers with a marked stopping area in the road where appropriate.	0
	Formal surveillance	Medium		Poor	Poor	Bus stops and services do not offer formal CCTV surveillance facilities.	0
	Informal surveillance	High		Moderate	Moderate	Whilst often in remote locations away from retailers or activity, bus stops in Dumfries and Galloway are made of transparent materials that allow for open visibility from site surrounds.	0
	Landscaping	Low		N/A	N/A	There is no clear relationship between the effect on landscaping and the perceived security of this option.	0
	Lighting and visibility	High		Poor	Poor	There is no dedicated lighting for bus stop facilities in the study area.	0
	Emergency call	Medium		Poor	Poor	There is no provision of emergency phones, help points or public telephones associated with this option.	0

Table T.5: Option 6 – Safety Appraisal – Table 1

Safety Criteria	Sub-criteria	Relative Importance	Vulnerable Groups of Society affected	Commentary	Score
Accidents	The user groups affected by improvements and the anticipated change in the balance of accidents, for example fewer fatalities or serious injury accidents, but an increase in slight injury accidents	Low	• Road users • Pedestrians	It is anticipated there be minor reductions in those using the roads between Thornhill and Annan/Gretna if there is some modal shift to rail. This is however likely to only have a very minor impact on accident rates. Given the station access to the north-east of the village (requiring the crossing of the A76), there are likely to be a greater number of pedestrians crossing the A76. This may increase the potential for accidents on this stretch of road. The road is however not heavily trafficked and is within a 30mph zone within the village. Existing pedestrian refuges already exist at the A76 / East Morton Street (leaving to Manse road which leads to the station) roundabout enabling a safe pedestrian crossing point on route to the station. There is likely to be some increase in the number of cars on East Morton Street by users accessing the railway station - given its distance from the village. This may increase the potential accidents on the rural route from the village to the station. Any school children from the Wallace Hall Academy who are utilising the station will be required to cross Manse Road. In order to ensure their safety, a suitable pedestrian crossing will be required. It is unlikely that there would be any specific change in the balance of accidents (minor, serious or fatal) as a result of option implementation.	0

Table T.6: Option 6 – Safety Appraisal – Table 2

Safety Criteria	Sub-criteria	Relative Importance	Vulnerable Groups of Society affected	Without Strategy	With Strategy	Commentary	Score
Security	Site perimeters, entrances and exits	Medium	• Lone travellers • The Elderly • Children	Moderate	High	The proposed station site would be clearly marked with site perimeters/exists.	2
	Formal surveillance	Medium		Poor	Medium	Whilst the proposed station is unlikely to be staffed, it is assumed that a CCTV system will be installed to ensure a formal surveillance. No such surveillance system currently exists for bus stops in the area. The proposed station is located around 1.5km from the centre of the village. Access to the station by foot or cycle would be along the rural East Morton Street / Manse Road which is not under any formal surveillance. As such, there is a security risk for those accessing the station by foot. Lighting and surveillance could be provided along the route but would be costly.	-1
	Informal surveillance	High		N/A	Low	The final design of the station site is still to be determined, however will be arranged in a manner that allows informal surveillance across platforms and from the surrounding street. As noted above, the distance of the station from the village centre poses a security risk for rail users accessing the station by foot or cycle. There are no overlooking properties along the last 700m from the edge of the village to the station.	-1

Table T.7: Option 6 – Safety Appraisal – Table 3

Safety Criteria	Sub-criteria	Relative Importance	Vulnerable Groups of Society affected	Without Strategy	With Strategy	Commentary	Score
Security	Landscaping	Low	• Lone travellers • The Elderly • Children	N/A	High	The final design of the station site is still to be determined however it is assumed will utilise a positive use of landscaping features to contribute to visibility and deter antisocial behaviour.	1
	Lighting and visibility	High		Moderate	Low	The final design of the station site is still to be determined, but it is assumed will feature sufficient lighting in passenger areas. The lighting in the station environment is likely to be of a better quality than existing lighting at bus stops in the area, leading to real and perceived security improvements for public transport users. However, as noted above, the distance of the station from the village centre poses a security risk for rail users accessing the station by foot or cycle. There is currently no lighting along this stretch of the road and providing lighting would be costly.	-1
	Emergency call	Medium		Poor	High	The proposed station would have an emergency phone on site alongside appropriate information on emergency help procedures. No such emergency help exists at current bus stops in the area.	2

Appendix U Part 2: Economy Appraisal

U.1 Option 6

Demand and Revenue Forecasting

U.1.1 A demand forecasting exercise has been undertaken to estimate the passenger demand and revenue generated by a new railway station at Thornhill. This exercise also considered the knock-on effects of a new station upon demand and revenue at the adjacent Sanquhar and Dumfries stations, in addition to the journey time costs borne by through traffic on the line. This allowed calculation of a net base year impact in terms of journeys and revenue – i.e. how many additional rail journeys would be generated overall and how much additional revenue would this raise if the station were to open today.

U.1.2 The approach taken to the calculation of these impacts is discussed in the sections below, and split into the following elements:

- Outbound demand at Thornhill Station;
- Inbound demand at Thornhill Station;
- Transfer of existing rail passengers to Thornhill Station;
- Journey time impacts on through passengers.

U.1.3 Other similar studies have argued that there will also be the creation of a new rail passenger market between the new station and existing nearby stations. However, in this case, the impact is considered to be negligible. A comparable pair of stations to Thornhill and Sanquhar would be Kirkconnel and Sanquhar. Trips between these stations are equivalent to circa 1% of trips to/from Sanquhar. As such, this has not been examined as part of this exercise.

Outbound Demand and Revenue at Thornhill

U.1.4 Demand for travel from a new Thornhill Station was estimated primarily on the basis of demand profiles seen at the existing station at Sanquhar.

U.1.5 Firstly, the catchment areas for the existing station at Sanquhar and the proposed Thornhill stations were specified. It was assumed that the outermost extents of the respective catchments corresponded with the area over which each station is the closest station available (per STAG Part 1). See Figure U.1 for illustrations of the existing station catchment areas and the future station catchment areas if Thornhill is constructed.

U.1.6 Sub-catchments of 0-800m, 801-5000m and 5001m+ buffers of the station were then defined to identify which output areas had centroids within each of the catchment bands to provide an estimate of the population living within each catchment band (2001 census Table KS101SC).

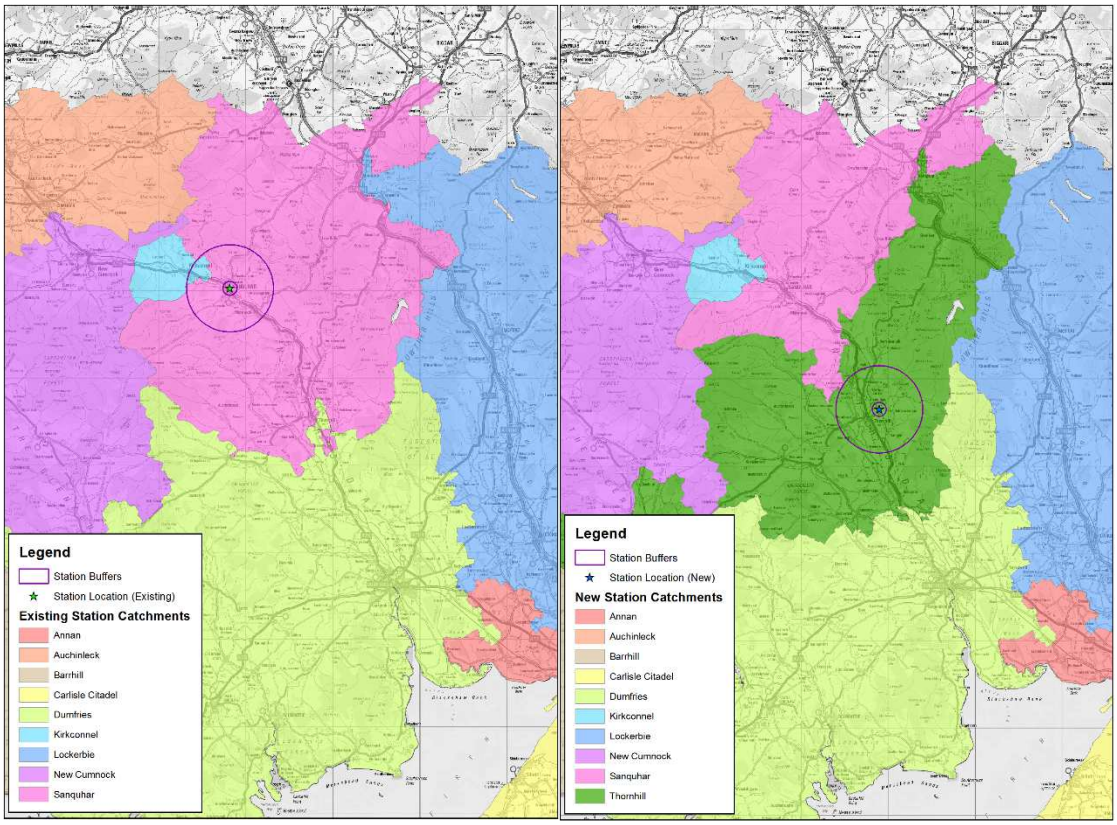

Figure U.1: Existing Station Catchments (left) and Future Station Catchments with Thornhill (right)

U.1.7 The proportion of outbound Sanquhar railway station trips which were recorded as being made from each of the catchments from the January 2018 Platform Interview surveys were then similarly identified. These proportions were applied to the total annual outbound journeys from Sanquhar, as per MOIRA estimates (taking account of additional services which began operating along the route in December 2017) to calculate the annual outbound rail journeys being made by residents of each catchment.

U.1.8 Table U.1 summarises the values used in this calculation.

Table U.1: Outbound Demand and Revenue Calculation

Element	Catchment Band		
	0-800m	801-5000m	>5000m
Sanquhar population	1,381	1,046	6,651
Sanquhar respondents estimated annual journeys	385	356	144
Catchment split	44%	40%	16%
Annual outbound journeys from Sanquhar	8,696	8,030	3,260
Estimated trip rate based on Sanquhar survey data	6.30	7.68	0.49
Average trip rate (Annan + Gretna Green)	9.38	5.11	0.37
Thornhill population	0	3,278	3,168

Element	Catchment Band		
	0-800m	801-5000m	>5000m
Thornhill annual outbound demand	-	16,742	1,171
Thornhill average outbound yield (2018 Prices)	£6.29		
Thornhill annual outbound revenue (2018 Prices)	£112,694		

U.1.9 A trip rate was then calculated by dividing annual outbound trips from each catchment band by total population. However, the resultant trip rates suggested higher trip making by those living within the 801m-5000m catchment band than the 0-800m catchment band, which is counter intuitive and inconsistent with other data sources. It is considered that this is unlikely to be a true reflection of Sanquhar trip making activity and probably results from the small passenger survey sample. Instead it was decided to use an average of the trip rates calculated for the nearby stations at Annan and Gretna Green where over 130 responses were received. These trip rates were then applied to the population totals for the Thornhill Station catchment bands to estimate outbound demand from Thornhill.

U.1.10 The corresponding revenue was then calculated by multiplying estimated outbound demand from Thornhill Station by an estimated average yield for Thornhill Station. The average yield from Thornhill was calculated based on existing yields and demand between Sanquhar/Kirkconnel and destinations to the north/south:

- Matrix outputs were obtained from MOIRA indicating journeys and revenue from Sanquhar and Kirkconnel to all possible destinations.
- Destination stations were then identified as lying to the north or south of Sanquhar/ Kirkconnel. Average yields were then calculated for travel between Sanquhar/Kirkconnel and destinations to the north and to the south.
- A relationship was derived in terms of the distance between the stations and yield (i.e. difference in yield per km). Based on this relationship and the distance between Sanquhar and Thornhill stations, yields were estimated for travel from Thornhill to the north/south.
- As the proportion of people travelling to destinations in the north/south will vary as you travel along the line, a relationship was similarly derived in terms of the distance between the existing stations and the balance of travel to destinations in the north/south.
- This relationship was then applied to estimate the relative proportions of travel in each direction from Thornhill station, and these weightings were applied to the north and south yield estimates for Thornhill to calculate the overall average yield.

Inbound demand and revenue at Thornhill

U.1.11 To calculate the demand and revenue associated with inbound trips to Thornhill, a ratio was obtained of inbound to outbound trips at Sanquhar station and the factor applied to the forecast outbound trips to estimate inbound demand.

U.1.12 The same approach as was used to calculate outbound revenue was to taken to calculate inbound revenue, except using inbound values from MOIRA for both Kirkconnel and Sanquhar stations.

Table U.2: Inbound Demand and Revenue Calculation

Element	Value
Ratio of Outbound to Inbound journeys at Sanquhar	73:27
Annual Inbound Journeys at Thornhill	6,709
Thornhill average inbound yield (2018 Prices)	£8.68
Thornhill annual inbound revenue (2018 Prices)	£58,237

Transfer of Passengers from Existing Stations

U.1.13 The new Thornhill station will also attract passengers who currently travel by rail but use other stations, specifically Sanquhar and Dumfries, which sit to the immediate north and south respectively.

U.1.14 The number of Sanquhar user likely to be abstracted from Sanquhar was calculated as follows:

- Identification of the proportion of outbound Sanquhar station journeys which are made by users who reported that they live within the new Thornhill Catchment area (i.e. closer to Thornhill than Sanquhar station), as illustrated in Figure U.1. This value was then applied directly to annual Sanquhar outbound demand to calculate the number of existing outbound rail journeys which will be lost from Sanquhar;
- As inbound passengers at Sanquhar were not surveyed, there was no available information on the distribution of their destinations. However, it was assumed that the rate of inbound transfer will be approximately half of that for outbound transfer;
- As there were not passenger surveys undertaken at Dumfries Station it was not possible to take the same approach. Instead the population of output areas for which the nearest station is currently Dumfries but will become Thornhill was calculated. This value was then divided by the total population of the current Dumfries catchment area to gain the proportion of Dumfries outbound trips we assume will transfer to Thornhill. This value was then applied to Dumfries outbound demand to calculate the number of outbound journeys which will be lost;
- 0% transfer of inbound passengers from Dumfries to Thornhill was again assumed; and
- In each case we multiplied the number of passengers transferred by the average yield for outbound journeys (obtained from MOIRA) at each station to calculate the revenue lost.

U.1.15 Table U.3 presents the values used in the above calculation.

Table U.3: Passenger Transfer Calculation

Element	Sanquhar	Dumfries
Assumed proportion of outbound journeys transferred to Thornhill	16%	1%
Existing outbound demand	19,999	230,084
Existing inbound demand	7,486	132,998

Element	Sanquhar	Dumfries
Change in outbound demand	-3,125	-2,544
Change in inbound demand	-585	-735
Average existing outbound yield (2018 Prices)	£6.33	£8.65
Average existing outbound yield (2018 Prices)	£9.28	£13.40
Change in revenue (2018 Prices)	-£57,078	

U.1.16 Overall, it was estimated that 6,989 passenger journeys will be lost from Sanquhar and Dumfries stations because of the construction of a new station at Thornhill. This will result in a loss of £57,078 in revenue at these stations.

Journey Time Impacts on Demand and Revenue

U.1.17 The addition of Thornhill Station to the Glasgow South West line will increase journey times experienced by all those travelling through the new station. Elongating journeys will have two key impacts – greater inconvenience to passengers and making it more difficult to achieve short connections.

U.1.18 MOIRA Timetable Manager provides a means of comparing an existing timetable with an alternative timetable. A 'Do Something' timetable was developed which takes account of the additional services added to the line in December 2017, in additional to extending journey times by 2 minutes for all destinations north/south of Thornhill and requested that MOIRA calculate the change in journeys and revenue that would result in the Do Something case relative to the Do Minimum.

U.1.19 It is estimated that the addition of a stop at Thornhill Station would result in a reduction in passengers using the South West Line of 1,855 journeys and a loss of £8,833 in revenue (in 2018 Prices). Note: MOIRA cannot take account of the transfer of Sanquhar and Dumfries passengers to Thornhill. Therefore, this is a conservative estimate as a small proportion of total passengers on the Glasgow South West Line would not be affected by this journey time increase, i.e. if they were one of the passengers who transferred from Sanquhar or Dumfries to Thornhill.

Base Year Results

U.1.20 Combining the various demand and revenue impacts explored above, it is estimated that if Thornhill Station was to open in 2018, it would have an overall net impact of increasing rail passenger journeys by 15,778 per annum and bringing an additional £105,020 in revenue. A full breakdown by market segment is provided in Table U.4.

Table U.4: Base Year Results

Market Segment	Journeys	Revenue
Outbound Demand	17,912	£112,694
Inbound Demand	6,709	£58,237
Thornhill Station Usage	**24,622**	**£170,931**

Market Segment	Journeys	Revenue
Transfer from Adjacent Stations	-6,989	-£57,078
Impact on Through Pax	-1,855	-£8,833
Overall Net Impact	**15,778**	**£105,020**

Benefit Cost Ratio

Benefits Calculations

U.1.21 In order to calculate a Benefit Cost Ratio (BCR) for the potential station re-opening, the calculated anticipated demand and revenue impacts have been estimated over the 60-year appraisal period along with the costs the overall financial impacts have been discounted to 2010.

U.1.22 The associated journey time benefits have been calculated and to 2010, to then generate an overall BCR for the option.

U.1.23 To calculate the benefits, the following steps were undertaken:

- The demand figures calculated above comprised of:
  - **'Station Switchers'** - Those switching from another station (Sanquhar or Dumfries). Travel time savings (and hence the benefits associated with these) for these users were estimated based on an assumption on journey purpose. The journey purpose split assumptions were estimated based on the platform surveys undertaken at Sanquhar station (discussed in Appendix Q) with journey purpose identified as either Commuting; Business or Other travel purposes.
  - **New rail trips**, either:
    - Entirely new trips;
    - Those switching from car; or
    - Those switching from public transport.

  The proportions were estimated on the basis of the platform surveys where people were asked how they would have made that journey in the absence of a train service
- For trips switching from other modes,
  - LENNON data was utilised to consider the distribution of these trips based on trip origins and destinations at Sanquhar and Dumfries stations; and
  - Time savings from these trips was estimated to determine the benefits based on the assumptions on journey purpose.
- Overall demand was projected forward for 30 years using a 2.5% per annum growth rate (based on recent local trends in rail passenger growth), with no further growth for the following 30 years;
- The volume of through passengers was estimated from the LENNON data, with each affected passenger assigned a 2-minute travel time disbenefit (again based on an assumed purpose split)

- The figures were combined to provide an estimate of the overall net benefits assuming an opening year of 2023;

- The benefits were then discounted to a base year of 2010 to provide the Present Value of Benefits (PVB).

Revenue Calculations

U.1.24 Revenue for the station was calculated as discussed above. It was assumed that, as per the railway industry Passenger Demand Forecasting Handbook, there would be a station demand 'ramp up' from the opening year (53% in Year 1, 78% in Year 2, 90% in year 3, 100% thereafter).

- The revenue figures assumed from assuming an opening year of 2023 for 60 years and were discounted to a base year of 2010 to provide the Present Value of Revenue (PVR).

U.1.25 The anticipated revenue was added to the Present Value of Benefits to provide an adjusted BRC figure.

Station Cost Calculations

U.1.26 The station costs were estimated as set out in Appendix J . Optimism Bias of 44% was added to the figures (although it should be noted that the station costs were based on station ***outturn*** costs as and such already make allowance for optimising bias).

U.1.27 Station build costs were split:

- 50% in 2021; and

- 50% in 2022.

U.1.28 The costs were discounted to a base year of 2010 to provide the Present Value of Costs (PVC).

Calculating a BCR

U.1.29 Table U.5 sets out the estimated Benefit Cost Ratio assuming a station cost of:

- £11m – the higher end of the estimated range;

- £8m – the lower end of the estimated range;

- £5m and £2m - to account for a level of optimism bias already inherent in the cost figures as they are based on other station build ***outturn*** costs.

Table U.5: Option 6 Benefit-Cost Ratio

Station Costs (£m)		PVC (£m)	PVB (£m)		BCR (£m)	
Base	With optimism bias	With optimism bias	Without revenue	With revenue	Without revenue	With revenue
£11.00	£15.84	£10.67	£1.05	£3.55	0.10	0.33
£8.00	£11.52	£7.76	£1.05	£3.55	0.13	0.46
£5,.00	£7.20	£4.85	£1.05	£3.55	0.22	0.73
£2.00	£2.88	£1.94	£1.05	£3.55	0.54	1.83

U.1.30 It is noted that a shuttle bus would be required to provide suitable connectivity from the centre of Thornhill to the station site (approx. 1.5km from the village centre). A cost for this has been estimated at around **£145k** annually (in order to provide a service to meet all the arriving and departing trains).

Appendix V Part 2: Integration Appraisal

V.1.1 The STAG integration criteria focuses on three key integration elements:

- Transport integration;
- Transport and Land-use Integration; and
- Policy Integration

V.1.2 Appraisal was undertaken at the Part 1 stage of the study, focussing on the transport integration elements of the integration criteria, and specifically focussing on the bus options.

V.1.3 At this stage of the appraisal, a full appraisal against all three elements of the integration criteria has been undertaken, drawing on the work at the Part 1 stage.

Option 1a

Transport Integration

V.1.4 In terms of transport integration, Option 1a was appraised in great detail during the Part 1 appraisal when the reduction in walk and wait time between bus and rail services due to the option was analysed in detail. The analysis is presented in Appendix L presenting the detailed analysis. In summary, the analysis highlighted that the option had the potential to:

- Substantially reduce bus journey times to meet Lockerbie rail departures and arrivals;
- Facilitate access to seven rail services to/from Lockerbie that were previously inaccessible by public transport; and
- Reduce the journey from Thornhill to Lockerbie Railway station by an average of circa 40 minutes.

V.1.5 It should be noted that the option has altered since this analysis and Option 1a now considers a direct rail link between Thornhill and Lockerbie (i.e. only serving the WCML and not the GSWL at Dumfries). As such, no benefits in terms of reduced interchange time would be felt with regards to train services on the GSWL. However, the bus would now be timed to ensure good integration with WCML services at Lockerbie alone – whereas before, it was trying to ensure connections with trains on both lines which meant some compromise. In this regard, integration between bus and rail at Lockerbie could be managed to be as seamless as possible.

V.1.6 The option would not provide any improvements in terms of ticketing and would utilise existing buses and bus stop infrastructure.

Transport and Land-Use Integration

V.1.7 Thornhill has been identified as an attractive market town and District Centre in the *Dumfries Housing Market Area* in the *2014 Dumfries and Galloway Local Development Plan*. The most easily accessible parts of the village have now been developed and in order to open up additional areas for development it is necessary to consider numerous road safety issues, including linkages to the wider settlements. In this light, the option may allow further development to be considered, or considered sooner, particularly to the south of the settlement.

Policy Integration

V.1.8 Improving the public transport network and transport integration supports the aims of the National Transport Strategy, SWestrans Regional Transport Strategy, the Bus Action Plan and the Local Transport Strategy. The option is therefore aligned with the broader policy goals included within key national, regional and local policy documents.

V.1.9 STAG's Policy Assessment Framework (PAF) has been used to appraise how well the option fits with national policy objectives. The outcomes of this assessment is shown in Figure V.1 and Figure V.2. Note that for comparative purposes, these diagrams also contain the scores for Option 6. The assessment shows Option 3 scoring either neutrally or positively against all national objectives and sub-objectives.

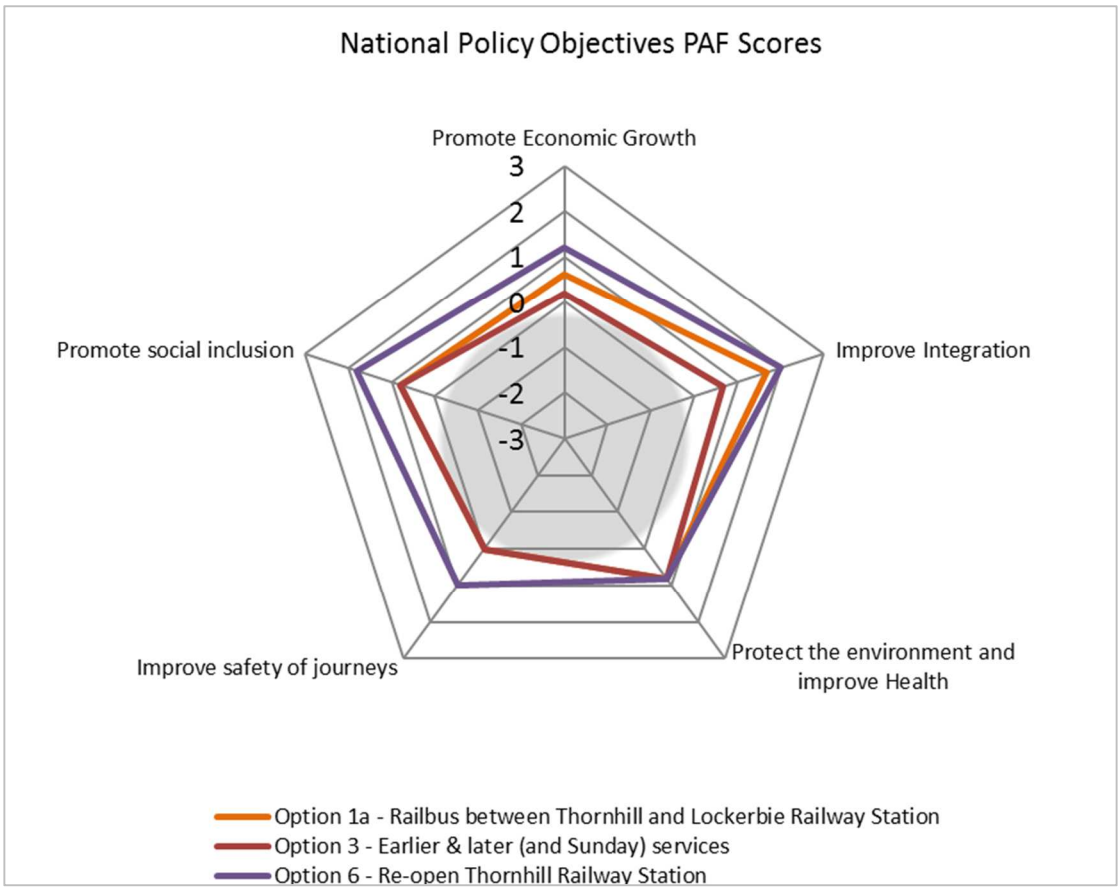

Figure V.1: Policy Assessment Framework – National Policy Objectives – PAF Scores (Option 1a and 6)

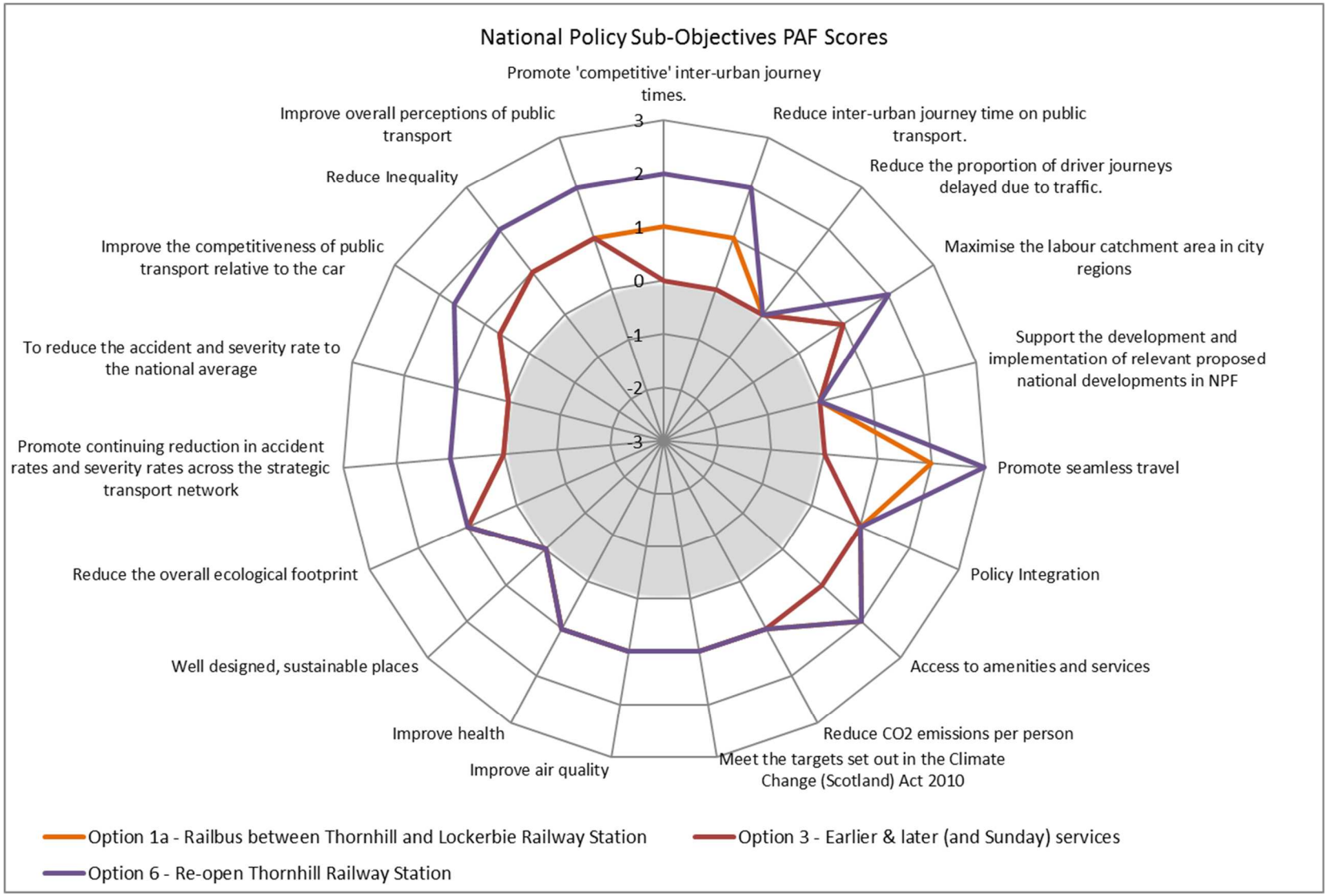

Figure V.2: Policy Assessment Framework – National Policy Sub-Objectives – PAF Scores (Option 1a and 6)

Option 3

Transport Integration

V.1.10 In terms of transport integration, Option 3 would offer increased accessibility to both later running bus and rail services from Dumfries, enabling access both from and to the study area later in the evening and at weekends.

V.1.11 The option would not provide any improvements in terms of ticketing and would utilise existing buses and bus stop infrastructure.

Transport and Land-Use Integration

V.1.12 Thornhill has been identified as an attractive market town and District Centre in the *Dumfries Housing Market Area* in the *2014 Dumfries and Galloway Local Development Plan*. The most easily accessible parts of the village have now been developed and in order to open up additional areas for development it is necessary to consider numerous road safety issues, including linkages to the wider settlements. This option provides increased later evening and weekend service not only linking Thornhill and Dumfries, but en-route serving smaller local communities such as Moniaive, Kirkton and Auldgirth. As such this may help tackle some of the road safety issues by reducing traffic, to some extent, on the roads around Thornhill.

Policy Integration

V.1.13 Improving the public transport network and transport integration supports the aims of the National Transport Strategy, SWestrans Regional Transport Strategy, the Bus Action Plan and the Local Transport Strategy. The option is therefore aligned with the broader policy goals included within key national, regional and local policy documents.

V.1.14 STAG's Policy Assessment Framework (PAF) has been used to appraisal how well the option fits with national policy objectives. Figure V.1 and Figure V.2 presented the option appraisal against STAG's Policy Assessment Framework (PAF). The assessment shows Option 3 scoring either neutrally or positively against all national objectives and sub-objectives.

Option 6

Transport Integration

V.1.15 In terms of transport integration, Option 6 was not appraised in the same detail as Option 1a during the Part 1 appraisal. However, the high-level Part 1 appraisal against this criterion has been revisited and developed into greater detail at Part 2.

Transport and Land-Use Integration

V.1.16 As noted above, Thornhill has been identified as an attractive market town and District Centre in the *Dumfries Housing Market Area* in the *2014 Dumfries and Galloway Local Development Plan*. The most easily accessible parts of the village have now been developed and in order to open up additional areas for development it is necessary to consider numerous road safety issues, including linkages to the wider settlements.

V.1.17 Proposed housing in the Local Development Plan is predominantly to the south and west of the village. As such, the railway station is not ideally situated to serve these new areas of housing as they will be the furthest from the station site. The area between the village and station site (around 700m from the edge of the village) does not offer a particularly safe or secure pedestrian access route to the station, given the lack of residential properties along the route. There may be an opportunity to consider expanding the village to the north-east if the station were re-opened as this would offer the best rail access opportunities which may help increase the rate of development for the village.

Policy Integration

V.1.18 Improving the public transport network and transport integration supports the aims of the National Transport Strategy, SWestrans Regional Transport Strategy, the Bus Action Plan and the Local Transport Strategy. The option is therefore aligned with the broader policy goals included within key national, regional and local policy documents.

V.1.19 STAG's Policy Assessment Framework (PAF) has been used to appraise how well the option fits with national policy objectives. Figure V.1 and Figure V.2 presented the option appraisal against STAG's Policy Assessment Framework (PAF). The assessment shows Option 6 scoring well against all national objectives and sub-objectives.

Appendix W Part 2: Accessibility and Social Inclusion Appraisal

W.1 Option 1a

Community Accessibility

Public transport Network Coverage

W.1.1 The option provides increased public transport coverage for the area with the new direct link to Lockerbie. This enables improved connectivity and reduced access time to the West Coast Main Line rail network for travel to / from further afield. The new service enables access to first three rail departures and four additional rail arrivals from Lockerbie Railway Station.

Local Accessibility

W.1.2 The option is strategic in nature and does not provide any additional opportunities to walk to cycle to services and facilities. No severance arises from the proposed option.

Comparative Accessibility

People groups

W.1.3 The option is particularly beneficially to those without a private car or unable to drive. This includes:

- Those on lower incomes for whom owning a car is not possible due to the costs involved;
- Those less-abled for whom driving is not an option;
- The elderly who have stopped driving;
- Those seeking Higher Education opportunities;
- Children under the age of 17.

W.1.4 In terms of those on lower incomes and the less-abled, the increased accessibility may open up new job opportunities further afield as well as enabling better access to social and recreational activities in Edinburgh and Glasgow. For the elderly, the improved access may enable improved accessibility to the major hospitals in Edinburgh and Glasgow.

W.1.5 In terms of education, the improved accessibility to Edinburgh and Glasgow may benefit those for whom living away from home is not affordable. The increase in access to two of Scotland's major cities may enable travel from home on a part-weekly basis (many university courses now run as 3-full days rather than spread across the week). Students may be able to stay at home to continue their education.

W.1.6 Particularly for school children, the option would provide an increased ability to travel independently, providing access to a greater range of extra-curriculum and social activities in which to participate.

Geographical Location

W.1.7 Thornhill is located in a very rural location. The improved access to the WCML would connect the community to trains offering travel to much further afield. This may help combat feelings of community isolation.

W.2 Option 3

Community Accessibility

Public transport Network Coverage

W.2.1 The option does not provide increased geographical coverage for the area but does provide increased coverage in terms of the times over which services are operational.

Local Accessibility

W.2.2 The option is strategic in nature and does not provide any additional opportunities to walk to cycle to services and facilities. No severance arises from the proposed option.

Comparative Accessibility

People groups

W.2.3 As with Option 1a, the option is particularly beneficial to those without a private car or unable to drive. This includes:

- Those on lower incomes for whom owning a car is not possible due to the costs involved;
- Those less-abled for whom driving is not an option;
- Children under the age of 17.

W.2.4 In terms of those on lower incomes and the less-abled, the increased accessibility to Dumfries may open up new job opportunities which require shift or weekend working as well as enabling better access to social and recreational activities in Dumfries which have a finish time later than 20:30 (the current time of the last bus back to Thornhill).

W.2.5 Particularly for school children, the option would provide an increased ability to travel independently, providing access to greater range of extra-curriculum and social activities in which to participate in Dumfries.

W.2.6 The option may also help support local businesses, especially those connected to the tourism industry, by enabling people to visit the area in the evenings, attending local events.

Geographical Location

W.2.7 As noted for Option 1a, Thornhill is located in a very rural location. The improved access to Dumfries would enable the community to participate in a greater range of activities in the region's biggest town. This may help combat feelings of community isolation.

Option 6

Community Accessibility

Public transport Network Coverage

W.2.8 The option provides increased public transport coverage for the area with new direct access to the rail network. This enables improved connectivity and reduced access time to locations on the GSWL including Glasgow, Dumfries and Carlisle.

Local Accessibility

W.2.9 The option is strategic in nature and does not provide any additional opportunities to walk or cycle to services and facilities. It should be noted that the re-opening of the station in Thornhill may impact on operating bus services between Thornhill and Dumfries, potentially reducing. This would impact on smaller communities between Thornhill and Dumfries, for whom the rail station at Thornhill would not be immediately accessible, and whom would experience a reduction in bus service offering, reducing the connectivity from these communities.

Comparative Accessibility

People groups

W.2.10 As with Option 1a, the option is particularly beneficial to those without a private car or unable to drive. This includes:

- Those on lower incomes for whom owning a car is not possible due to the costs involved;
- Those less-abled for whom driving is not an option;
- The elderly who have stopped driving;
- Those seeking Higher Education opportunities;
- Children under the age of 17.

W.2.11 In terms of those on lower incomes and the less-abled, the increased rail accessibility may open up new job opportunities. This may be particularly true for opportunities in Carlisle, for which the travel time with the option reduces to less than hour, which could be considered a satisfactory commute time. It should be noted that the train would in fact be quicker than the private car to both Dumfries and Carlisle.

W.2.12 Particularly for school children, the option would provide an increased ability to travel independently, providing access to a greater range of extra-curriculum and social activities in which to participate in both Dumfries and Carlisle. The comments made by pupils of Wallace of Hall Academy particularly reflected the opportunities that existed for them in Carlisle. Access to social activities (including concerts) would be possible without the need for a late night parental pick-ups from Sanquhar station. In addition, the station may enable some of Wallace Hall's Academy's pupils to access school by rail.

W.2.13 For the elderly, the improved access may enable improved accessibility to the major hospitals in Edinburgh and Glasgow.

W.2.14 The option may help support local businesses, especially those connected to the tourism industry, by enabling people to more easily visit the area. The existence of a rail station does tend to place a location 'on the map'.

W.2.15 It should be noted that the station is located 1.5km outside of the village, which presents an accessibility issue for those less abled and the elderly. As such, as shuttle bus would be required and the cost for this has been calculated. The shuttle bus would also create an interchange requirement in accessing the train which may not be easy or desirable for some.

Geographical Location

W.2.16 As noted for Option 1a, Thornhill is located in a very rural location. The improved access to Dumfries would enable the community to participate in a greater range of activities across a much wider area. In particular, given the fragility of the bus network and uncertainty surrounding future provision, the more permanent fixed nature of direct access to the rail network from the village may help combat feelings of community isolation and may support the long term sustainability of the village.