



Inverness Rail East

New Station Initial Feasibility Study

HITRANS

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Quality information

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1. Introduction

1.1. Background

In February 2019, AECOM was commissioned by HITRANS to undertake an initial feasibility study for a new station in the East Inverness area.

East Inverness has developed rapidly over recent years, not only through the continued expansion of the communities around Cradlehall, Smithton, Westhill and Culloden, but also due to the development of key journey attractors such as the Inverness College UHI site and the Inverness Shopping Park becoming established alongside long-standing attractors such as Raigmore Hospital. The trunk roads (the A9 and A96) have traditionally acted as a barrier between this area and the centre of Inverness, which focusses movements on a number of critical junctions and crossing points. The only alternative to car use is the local bus service operated by Stagecoach Highlands – essentially two half-hourly services radiating out from the centre of Inverness. With two rail lines passing through the area, Highland Council’s Inverness East Development Brief has identified the potential for rail to serve the travel needs of the area, and possibly the wider region, via a new local connection to the rail network (i.e. a new station serving this area of East Inverness).

Three potential sites for a new rail station – at **Seafield**, **Stratton Farm**, and **Beechwood UHI** – have been identified for assessment, each providing a different overall ‘offer’ depending on which line they are located on and how close they are to the respective developments. As shown in Figure 1, Seafield and Stratton Farm are located on the Aberdeen-Inverness Line with the Beechwood UHI site located on the Highland Mainline to Perth near Inverness College UHI.

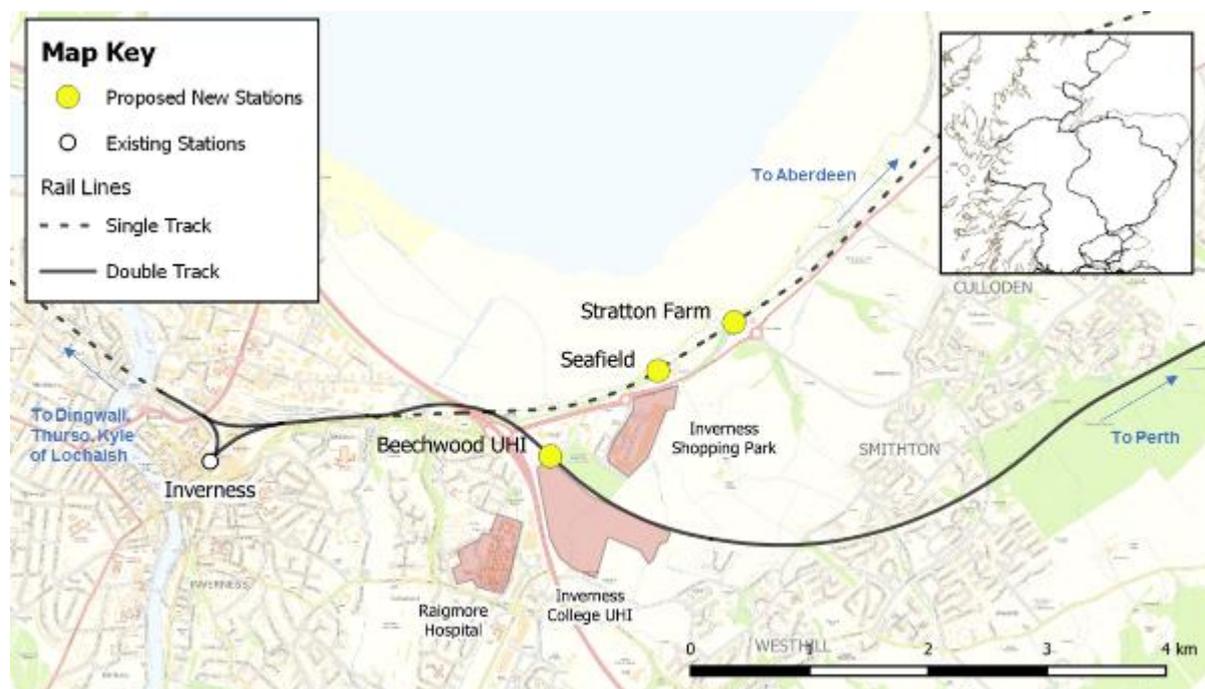


Figure 1: Study Area

Quoting from the Inverness East Development Brief¹, it is stated:

“Rail lines connecting to Aberdeen and Perth pass through the Brief area and offer an opportunity for a new, local rail halt to serve residents wishing to travel to the city centre and beyond but also commuters, shoppers and other visitors wishing to visit destinations within the Brief area. Over the next 10 years, both the Perth and Aberdeen lines are scheduled for major investment in line capacity and timetabling of services and therefore this an opportune time for a local connection to the rail network.

However, there are financial, physical and technical challenges to establishing a new rail halt within the Brief area. The Highland Council is working with The Highlands and Islands Regional Transport Partnership (HITRANS) to further investigate the feasibility of a rail halt at Seafield, the Campus or Stratton. This feasibility will assess: market demand for the facility; technical issues such as signalling, line curvature and gradient; the likely degree of support from funding agencies and rail operators, and; an indicative cost for the facility. This work will require to be informed by a wider appraisal based on the Scottish Transport Appraisal Guidance.”

This study responds to this commitment, with work at this early stage focussing on the feasibility of introducing new stations in the area. As alluded to in the Development Brief, any further work would require to be undertaken in line with Scottish Transport Appraisal Guidance (STAG) and respective guidance on the development of new stations to understand the potential business case for any new sites that emerge from this review.

1.2. Report Purpose

This report presents the findings from this study, focused on an assessment of feasibility of the proposed station sites from a technical, operational and commercial perspective. Collectively, the work is designed to provide HITRANS with a more informed position as to the relative merits of undertaking more detailed work to assist in making the case for introducing a new rail station to the east of Inverness.

1.3. Report Structure

Following this introduction, the remainder of this report is structured as follows:

- **Chapter 2 – Technical Feasibility Review:** This chapter presents the findings from a technical feasibility review of the proposed station sites, drawing on the findings from a review of engineering issues at each of the sites. Based on the issues identified, high level cost estimates for developing a new station at each of the sites is provided.
- **Chapter 3 – Operational Feasibility Review:** This chapter presents an initial analysis of the feasibility from an operations perspective of stopping services at the potential sites under consideration.
- **Chapter 4 – Commercial Feasibility Review:** This chapter outlines the methodology and findings from a demand forecasting exercise to understand potential passenger usage at each of the potential station sites.
- **Chapter 5 – Summary and Next Steps:** A summary of the work undertaken, including next step recommendations, is provided in Chapter 5

¹ The Highland Council, Inverness East Development Brief (Adopted June 2018). Available at https://www.highland.gov.uk/download/downloads/id/19287/inverness_east_development_brief_submission_to_ministers.pdf.

2. Technical Feasibility Review

2.1. Overview

This section focuses on the technical feasibility of the proposed station sites at Seafield, Stratton Farm and Beechwood UHI drawing on the findings from a review of engineering issues associated with each of the sites based on desktop study and on-site observations.

For clarity, the sites assessed are as follows:

- Seafield: Approx. 142m 0185yds on the Aberdeen to Inverness line, East of Inverness
- Stratton Farm: Approx. 141m 1640yds on the Aberdeen to Inverness line, East of Inverness
- Beechwood UHI: Approx. 116m 0734yds on the Highland Mainline, East of Inverness

In completing the technical review into potential station feasibility, consideration has been given to the following aspects:

- Suitability of existing track alignment;
- Topography/required earthworks;
- Available land;
- Additional infrastructure required; and
- Other potential constraints.

2.2. Standards Overview

The suitability of each of the proposed sites for a new station has been assessed with regard to the existing track curvature and gradient, in line with RSSB standard RIS-7016-INS, Issue One, June 2018.

Clause 2.1.1 states that new platforms should not be located on horizontal curves with radii less than 1000m. Section 2.2 sets out the limitations on gradients through stations. The previous requirement for a maximum gradient of 1:500 was removed from standard GI/RT/7016 following RSSB research report T815 'Limits on vertical track alignment through station platforms'. However, the European Technical Specifications for Interoperability (TSI) – Infrastructure (Cl. 4.2.4.4(1)) still imposes a maximum gradient of 1:400.

All three potential sites have a gradient steeper than 1:400 and would therefore strictly be non-compliant with the INF TSI. However, should the TSI criteria not be applicable, RIS-7016-INS and RSSB research report T815 suggest that potential sites may be risk assessed for any gradient.

In considering platform requirements, a minimum platform width of 3.5m has been assumed in accordance with GIRT7020, while a platform length of 160m has also been assumed based on rolling stock being similar to that used on the Aberdeen to Inverness line.

The following sections consider the technical feasibility of each station site in turn.

2.3. Seafield and Stratton Farm

Table 1 summarises the track geometry throughout the Seafield and Stratton Farm sites; identifying suitable platform locations for each site. Both sites are then discussed in detail in the subsequent text.

Table 1: Summary of Track Geometry at Seafield & Stratton Farm Sites

Mileage	Gradient	Horizontal	Notes
142m 0408yds	1:200	Transition	
142m 0353yds	1:170	Transition	UB 291/098
142m 0299yds	1:200	Transition	
142m 0244yds	1:200	Straight	<i>Seafield</i>
142m 0189yds	1:200	Straight	<i>Seafield</i>
142m 0135yds	1:250	Straight	<i>Seafield</i>
142m 0080yds	1:250	Straight	<i>Seafield</i>
142m 0025yds	1:250	Straight	<i>Seafield</i>
141m 1731yds	1:250	Straight	<i>Stratton Farm</i>
141m 1676yds	1:330	Straight	<i>Stratton Farm</i>
141m 1621yds	1:250	Straight	<i>Stratton Farm</i>
141m 1567yds	1:330	Straight	<i>Stratton Farm</i>
141m 1512yds	1:330	Straight	<i>Stratton Farm</i>
141m 1457yds	1:500	Straight	UB 291/097
141m 1402yds	1:500	Straight	UB 291/096
141m 1348yds	1:330	Straight	<i>Stratton Farm Alt.</i>
141m 1293yds	1:330	Straight	<i>Stratton Farm Alt.</i>
141m 1238yds	1:500	Straight	<i>Stratton Farm Alt.</i>
141m 1184yds	1:1000	Straight	<i>Stratton Farm Alt.</i>

It should be noted that there is a future aspiration for a 2-hour journey time between Aberdeen and Inverness and therefore future double-tracking through this area has been considered when exploring each site.

2.4. Seafield

2.4.1. Overview

The first potential station site at Seafield is located on the single-track Aberdeen to Inverness line running parallel with the A96 approximately 2 miles east of Inverness at approximately 142 miles 0225 yards. An overview plan of the area under investigation is shown in Figure 2.



Figure 2: Seafield & Stratton Farm Site Overview

2.4.2. Existing Track

The vertical alignment in this area is generally on a steep gradient leaving Inverness Station. The gradient local to the identified site is approximately 1:200. As identified in Section 2.2, this is not compliant with the Infrastructure TSI standard.

The horizontal alignment comprises mostly straight track with a short transition around Underbridge 291/098. The track is more aligned to the Up (North) side of the solum, as the area was previously double-tracked.

Table 1 provides a full overview of track geometry in the area.

2.4.3. Civil Engineering

The railway runs along the length of the site with a cutting on the Down (South) side and a small embankment on the Up (North) side, transitioning into a cutting further east. It is assumed that the fence line along the crest of the cuttings/toe of the embankment is the Network Rail boundary (shown as dashed lines in Figure 3).

The slopes on the Up side are narrower than the Down side at approximately 4m to fence line which would potentially require further land purchase to accommodate a 3.5m wide platform (the minimum platform width in accordance with GIRT7020) and any associated earthworks. The green arrow in Figure 3 indicates a potential platform location. The Up side is a preferred location for the proposed platform to not preclude future double tracking through the area.

The slope on the Down side is approximately 15m wide which provides more space for a platform, however as per the Beechwood UHI site, this would need to be built into the cutting with retention to the rear of the platform should this side be deemed more appropriate.

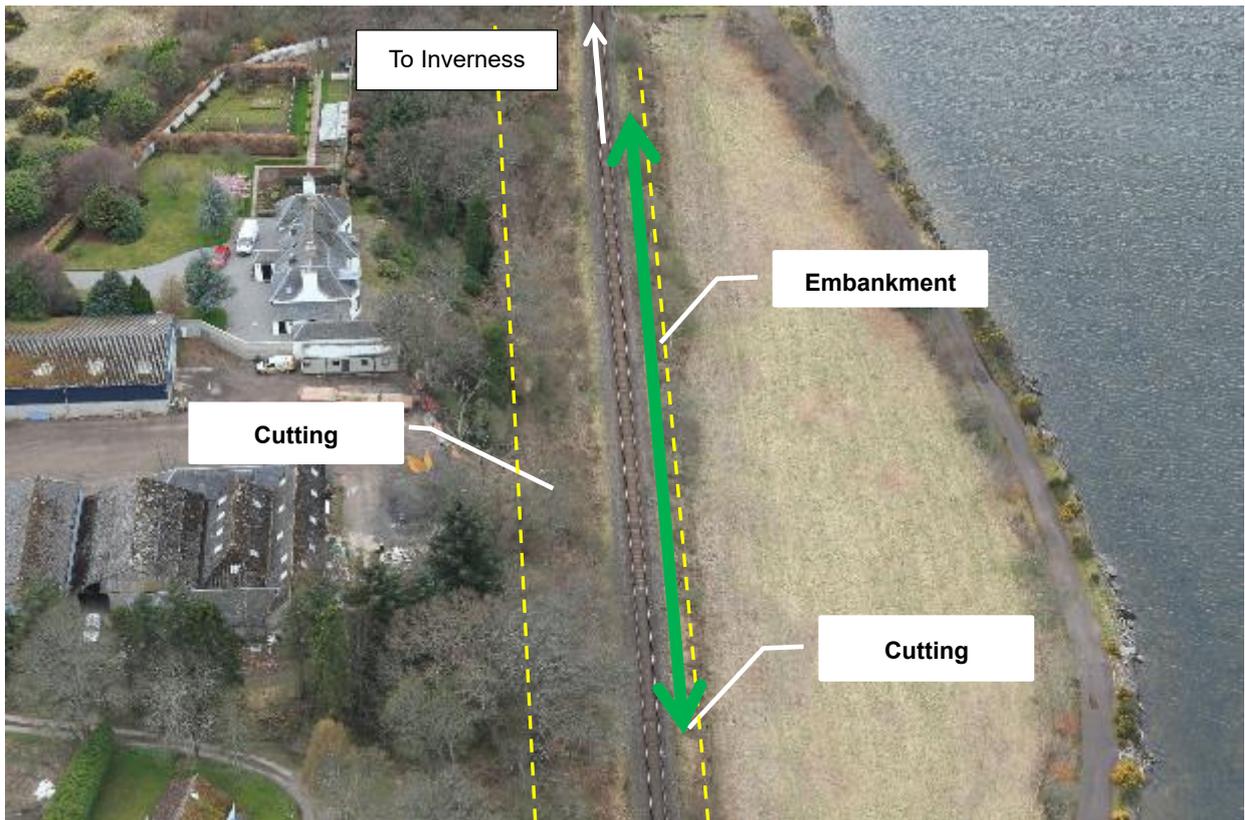


Figure 3: Seafield

Access to the station from the A96 could be provided via the unclassified carriageway between the railway and the Moray Firth which has been identified as a local authority core path. This carriageway is in poor condition and does not provide a through route and appears to be seldom used for vehicular traffic; it would therefore require significant upgrade to provide station access. The route's junction with the A96 is approximately 0.75 miles away (see Figure 2).



Figure 4: Underbridge for Alternative Access for the Seafield Site (UB 291/096)

There is an alternative historical access at Stratton Farm approx. 0.3 miles away which passes Underbridge 291/096 (141m 1419yds) shown in Figure 2. This path is heavily vegetated and currently

unsuitable for vehicular traffic however it could potentially be reinstated to provide a pedestrian access route to a new station.

Joining this alternative access with the A96 would have to consider the current proposal to dual this section of the main carriageway.

2.5. Stratton Farm

2.5.1. Overview

The second potential station site, also located on the single-track Aberdeen to Inverness line, is Stratton Farm; approximately 2 miles east of Inverness at approximately 141 miles 0731 yards (see Figure 2). An alternative location slightly further from Inverness has also been identified. Potential platform locations are indicated by green arrows in Figure 5 and Figure 6.

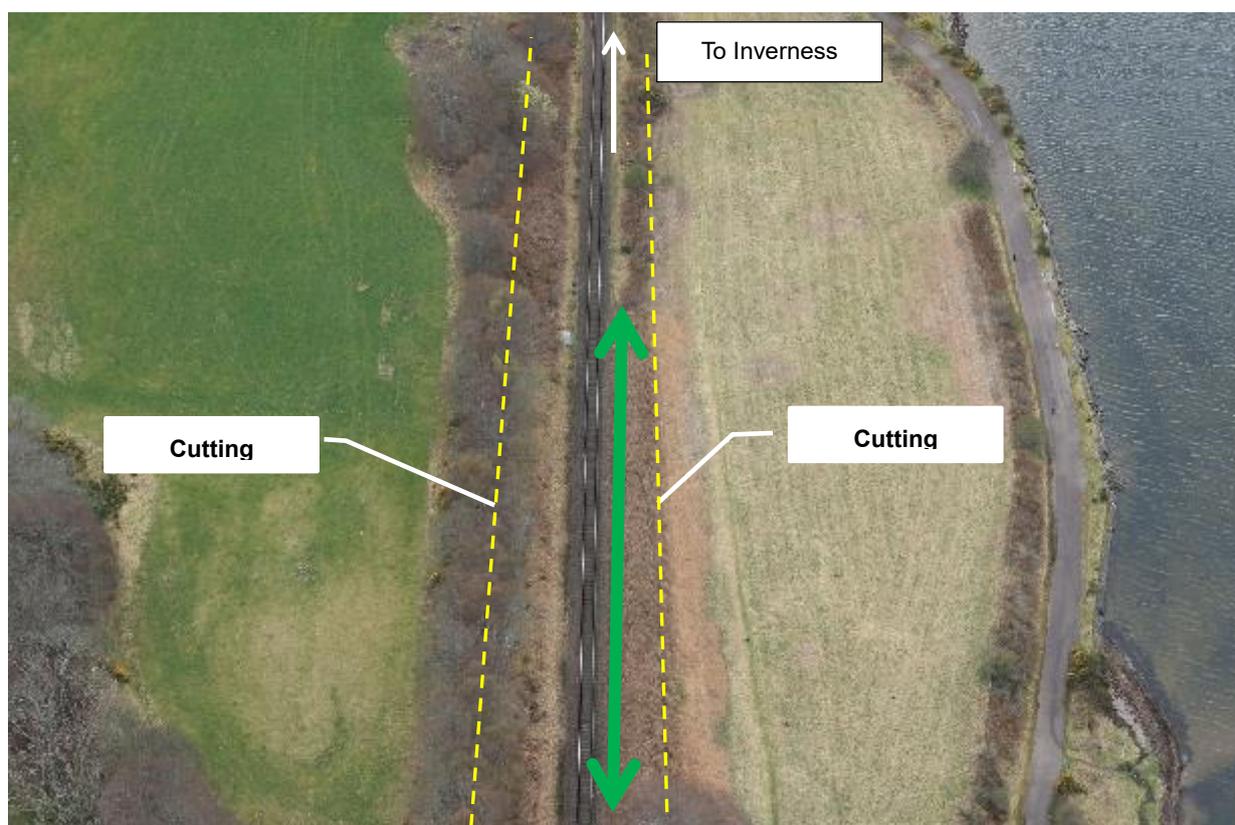


Figure 5: Stratton Farm

2.5.2. Existing Track

The vertical alignment in this area is generally on a gradient of around 1:250. As identified in Section 2.2, this is not compliant with the Infrastructure TSI standard. The horizontal alignment is straight and there is no S&C within the site. Similar to the Seafeld site; the track is more aligned to the Up side due to previous double-tracking. Table 1 summarises the track geometry throughout the Seafeld and Stratton Farm sites.

2.5.3. Civil Engineering

The railway runs along the length of the site with a cutting on both the Up and Down sides.

It is assumed that the fence line along the crest of the cuttings/toe of the embankment is the Network Rail boundary (shown as dashed lines in Figure 5). The Up side cutting is approx. 5m wide which would potentially require land acquisition for the 3.5m width platform and associated earthworks/retention. The cutting on the Down side is slightly wider however the fence line position is not clear from the available 'Routeview' imagery.

Similar to the Seafield site, access to the station from the A96 could be provided via the unclassified carriageway between the railway and the Moray Firth, with a possible alternative access at UB 291/096.

2.5.4. Alternative Site

Should the access route through UB291/096 be considered for use, platforms for a Stratton Farm station could potentially be sited closer to this access. An indicative platform position is shown as green arrows in Figure 6.

This alternative location has similar track geometry and land/earthworks requirements as the previously identified Stratton Farm location.

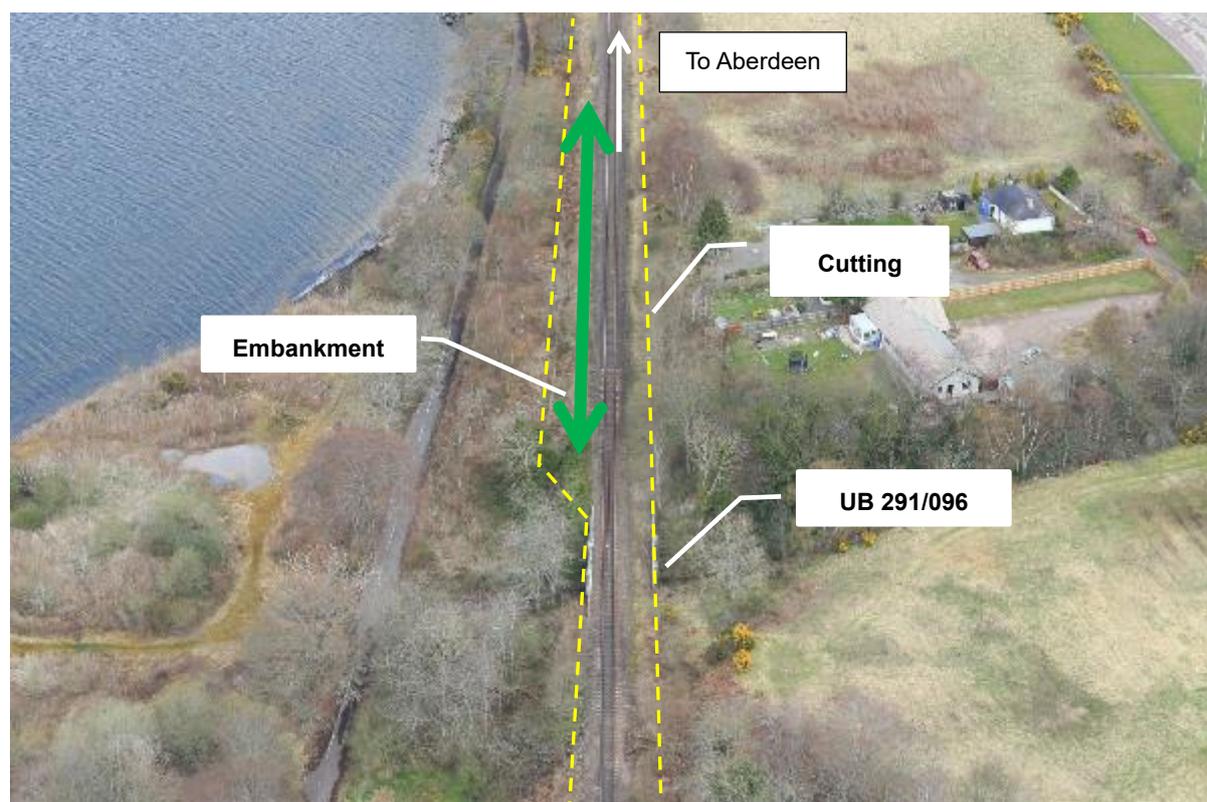


Figure 6: Stratton Farm Alternative Site

2.6. Summary

With the exception of track gradient compliance; the Seafield and Stratton Farm sites identified above appear suitable for siting a new twin platform station. Minor land acquisition may be required, along with earthworks and retention to platform rears.

Either site would require a pedestrian crossing or underpass at the A96 carriageway to link the new station and the developments on the south of the road. This would be a significant structure and would have to consider the proposed A96 Dualling upgrade.

2.7. Beechwood UHI

2.7.1. Overview

The Beechwood UHI site is located approximately 2 miles east of Inverness city centre on the double track Highland Mainline at approximately 116 miles 0734 yards. Figure 7 provides a site overview.

Inverness College UHI and associated student accommodation is adjacent to the site on the Down (South) side of the railway. The area immediately on the Up (North) side is currently under development to provide the new Her Majesty's Prison (HMP) Highland. A new public transport and

pedestrian overbridge is also under construction to provide access from the college/accommodation to the retail park north of the proposed prison site.

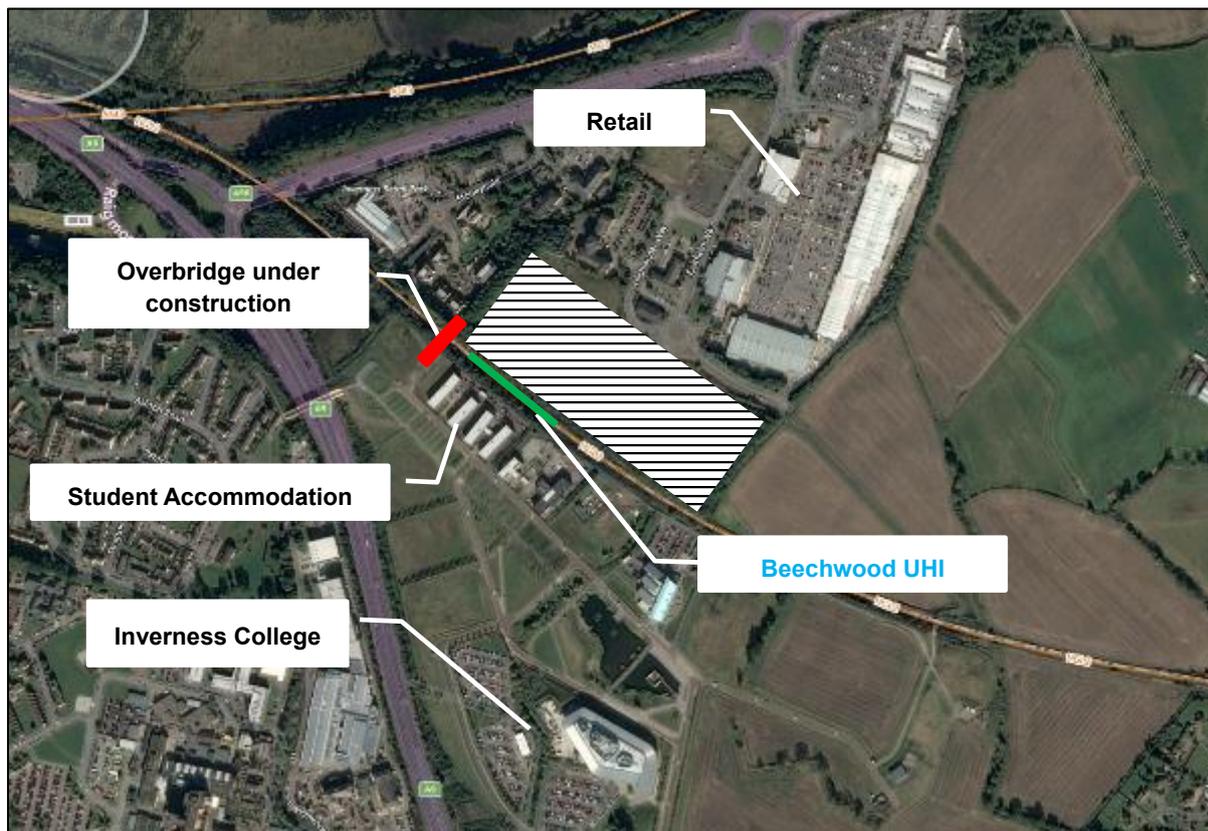


Figure 7: Beechwood UHI Site Overview

2.7.2. Existing Track

The vertical alignment in this area is generally on a steep gradient as the Highland Mainline falls towards Inverness Station. The gradient local to the identified site is approximately 1:60. As identified in Section 2.2, this is not compliant with the Infrastructure TSI standard.

The horizontal alignment comprises a short straight from the north transitioning to a 1620m curve approx. 170m south of the proposed overbridge. To avoid positioning the station on a transition, the 1620m curve is considered to be the most compliant section of track for a new station. Switches & Crossings (S&C) are positioned within the section of track under the proposed overbridge; any potential platforms would need to avoid this.

2.7.3. Civil Engineering

The railway is situated within a cutting approximately 5m high and 10m wide (~1:2 slope). It is assumed that the fence line along the crest of the cutting is the Network Rail boundary (shown as dashed lines in Figure 8 below).

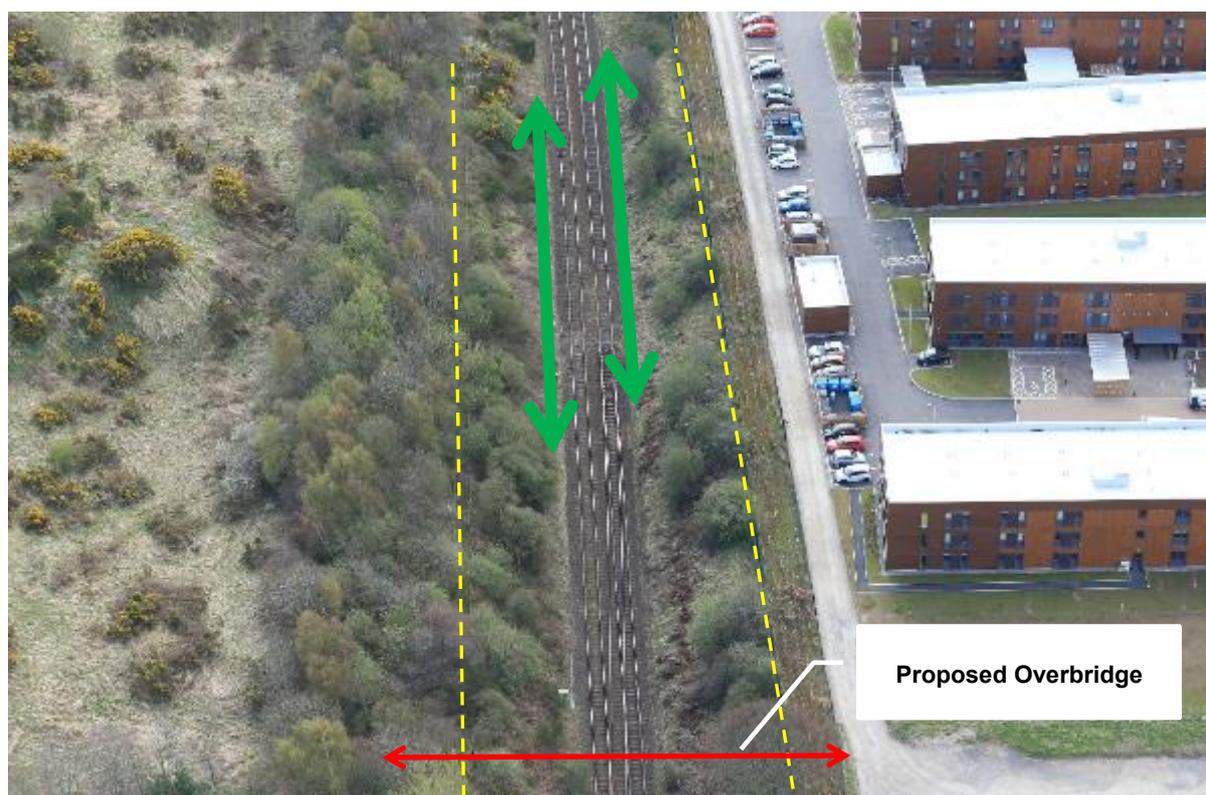


Figure 8: Routeview Capture of the Beechwood UHI Site (Facing East)

In order to provide an Up and Down platform at the site, the cutting will require retention to the rear of each platform. A minimum platform width of 3.5m is required in accordance with GIRT7020. Any additional width (if a footbridge was required, for example) would push the rear of the platform further into the cutting and increase the height of retention required.

Access down to each platform could be provided from the new overbridge (indicated above in red). A DDA compliant ramp may be viable to snake down the cutting but this would require significant retention. This would negate the requirement to provide a new footbridge between the Up and Down platforms (indicative platform positioning is shown above by the green arrows). Alternatively, DDA compliant lifts could be constructed to provide access, however as the platforms would be located a distance away from the overbridge, this would still require ramps to link the lifts and platforms, albeit at a lesser gradient.

2.7.4. Summary

Overall, with the exception of the non-compliant track gradients, the site is suitable for a new twin platform station. Two new platforms could be provided with either ramped access from the proposed overbridge or a new footbridge connecting the platforms, with ramped/stepped access up to road level.

Both options would require retention to the rear of the platforms unless additional land could be obtained behind the existing Network Rail boundary to regrade the cuttings.

Interfaces with the surrounding developments would require careful consideration to ensure that all designs are successfully integrated; particularly the overbridge.

2.8. Indicative Cost Estimates

Informed by the engineering assessment and associated assumptions, a costing exercise has been undertaken to develop a rough order of magnitude construction cost for each of the potential station sites, as presented in Table 2.

Table 2: Indicative Construction Cost Estimates

Item		Seafield	Stratton Farm	Beechwood UHI
Construction Cost (allowance)		£4,922,160	£4,922,160	£9,538,320
Sub-total		£4,922,160	£4,922,160	£9,538,320
Design Costs (incl.: Design, Project Management, Cost Management, Site Supervision)	10%	£492,216	£492,216	£953,832
Miscellaneous Client Costs and Project Burdens	-	Excluded	Excluded	Excluded
Sub-total		£5,414,376	£5,414,376	£10,492,152
Schedule 4 - Allowance for disruption to Network	6%	£324,863	£324,863	£629,529
Sub-total		£5,739,239	£5,739,239	£11,121,681
Network Rail Costs	10%	£573,924	£573,924	£1,112,168
Sub-total		£6,313,162	£6,313,162	£12,233,849
Optimism Bias	64%	£4,040,423.95	£4,040,423.95	£7,829,663.51
TOTAL		£10,353,586	£10,353,586	£20,063,513

It is to be emphasised that, in line with the preliminary stage of this study, the estimated costs are based on a large number of assumptions and importantly a number of exclusions apply. The full list of assumptions and exclusions are set out in Appendix A.

2.9. Summary

All sites identified, from an engineering feasibility point of view, appear to be technically feasible. The single issue of non-compliant track gradients would need to be considered by the rail industry however it should be noted that the track gradients at both Stow Station on the recently constructed Borders Railway and the proposed new Down platform at Dunbar Station are approx. 1:270. Caldercruix Station on the recently upgraded Airdrie to Bathgate line is on a 1:80 gradient which suggests that limits on track gradients at stations can be relaxed.

The excessively steep 1:60 gradient on the Highland Mainline could lead to operational constraints due to accelerating/braking trains and this would need to be carefully considered going forward.

The lesser gradients at Stratton Farm and Seafield make these options preferable from a compliance point of view. Stratton Farm appears to have slightly more clearance to the Up side boundary fence and also lies closer to two existing potential platform access routes than Seafield and would therefore appear to be the more technically feasible of the sites on the Aberdeen to Inverness line.

3. Operational Feasibility Review

3.1. Overview

The purpose of this section of the report is to analyse and identify potential operational constraints that could impact the feasibility of the proposed station sites. Given the pre-feasibility status of these proposals, the level of analysis has been based largely on qualitative observations of the railway in the area, as it currently stands (including committed schemes currently underway), supported by discussion with Abellio ScotRail, the current franchise holder, who provided further information and comments relating to committed schemes and the feasibility of calling services at the proposed sites.

3.2. Seafield/Stratton Farm

The Seafield and Stratton Farm station sites are situated on the Aberdeen to Inverness (A2I) route, which carries longer distance services between the two cities, as well as serving local intermediate markets. The route is currently undergoing a significant upgrade to accommodate new stations at Dalcross and Kintore, and reduce end to end journey times. As part of this, shortened High Speed Train (HST) sets are also being introduced to operate 'Inter7City' services on this route. At the time of writing, trains run almost hourly through the site in each direction, with eleven daily 'Inter7City' services in each direction between Inverness and Aberdeen, and a further six short services in each direction between Inverness and Elgin (Monday to Saturday). The services terminating at Elgin use different rolling stock to the 'Inter7City' HST sets, generally a class 158 DMU. There are future aspirations to achieve a half-hourly service between Inverness and Elgin² and in this scenario it should be the Elgin local services that pick up the hourly call at the new station therefore avoiding any journey time penalty for through passengers on the Inter7City services. If a new station is opened prior to a half-hourly service frequency being achieved, then it would likely require both the Elgin local and Inter7City services to call at the new station in order to provide an hourly service frequency.

The line at both Stratton and Seafield is on a relatively level gradient when compared to that at Beechwood (discussed below), with a 75/70mph speed limit (although trains will likely still be accelerating/decelerating at this point due to the proximity to Millburn Junction to the east of Inverness Station). The line consists of a bi-directional single line which extends to Nairn (around 15 miles to the east). This single line section as it stands is a constraint on timetabling. Any additional journey time required to make an extra call, estimated between 2 minutes (local services) and 2.5 minutes (HST's) in each direction, will further complicate timetabling. This journey time estimate allows 1.5 minutes of dwell time for HSTs at the new station, but for local services terminating at Elgin, the impact on running time is less, as dwell time is cut to approximately 45 seconds.

While not considered as a core option tested in this study, it is worth considering whether a new station on the Aberdeen to Inverness line could be served by a limited local service to/from Elgin, therefore significantly reducing the impact of the station on the Inter7city service between Aberdeen and Inverness to minor timetabling adjustments and/or performance impacts. Additionally, a new station at one of these sites may complement the planned new station at Dalcross (linked to Inverness Airport) which is currently anticipated to open in 2022. The opening of Dalcross Station is likely to promote an increase in 'local' journeys on the line which could be further supported by direct connectivity to Inverness East which has seen rapid expansion in recent years and is becoming a key attraction in Inverness for employment, education and medical facilities.

Whilst there are fewer operational and stakeholder constraints relating to calling a greater number of services at Stratton/Seafield when compared to Beechwood, there would still be potential timetabling issues relating to the single line section of route where the station would be situated and Inverness Station itself.

Analysis of the bid December 2019 timetable shows a number of instances where the additional time taken to call at a station situated to the east of Inverness would impinge upon single line occupancy, or potentially cause a knock-on impact in terms of minimum turnaround times. An example of this is shown in Figure 9. This shows existing timings at Nairn, Milburn Jn (where the single line from Nairn

² www.networkrail.co.uk/wp-content/uploads/2016/11/Scotland-Route-Study.pdf

joins the Highland Mainline into Inverness), and Inverness. Assuming other timetabling constraints exist to the east of Inverness, an additional 2.5 minutes run time results in services conflicting on the single line between Milburn Jn and the new station site.

Weekday 2019 timetable

Nairn	↓	17:31:00	↑	18:02:00
Milburn Jn		17:46:30		17:49:00
Inverness		17:49:00		17:48:00

Weekday 2019 timetable - with new timetable

Nairn	↓	17:31:00	↑	18:02:00
NEW STATION		17:48:00		17:48:30
Milburn Jn		17:49:00		17:46:30
Inverness		17:51:30		17:45:30

Figure 9: Example Impact of an Additional Station Call on the bid December '19 Timetable

It should also be noted that a previous study³ was undertaken to examine the potential for a new Junction between the Highland Main and the Aberdeen to Inverness line immediately to the east of the A9 road. A key benefit of this scheme would be that it would allow the dualling of the Aberdeen to Inverness line between Dalcross and Inverness which is otherwise restricted where the line runs beneath the A9 road in a long bridge which has no available width for doubling. If this scheme was delivered along with doubling of the track to Dalcross the issues of conflicts on the single-track section, highlighted above, would be alleviated.

³ Seafield: Proposed Station and Junction - Initial Considerations, Douglas Binns Limited, May 2014

3.3. Beechwood UHI

The Beechwood site near the Inverness College UHI are situated on the Highland Main Line (HML) to the south east of Inverness city centre. The route carries services from Inverness towards Perth and the Central Belt (Edinburgh/Glasgow) via Aviemore. The line is currently undergoing a number of improvements away from the Inverness area designed primarily to improve journey times between the Highlands and Central Belt, but also to improve capacity. Part of this involves the introduction of shortened and modernised HSTs cascaded from elsewhere on the network. These trainsets will provide improved journey times through improved acceleration due to their greater power to weight ratio, as well as an improved passenger environment and additional capacity compared to the diesel multiple unit trains that are being replacing.

The railway at the potential station sites consists of two bi-directional lines with speed limits of 55mph (away from Inverness) and 40mph (towards Inverness). The sites are situated at the base of a 1 in 60 gradient which allows the line to climb away from near sea level at Inverness towards the summit at Slochd (401m). Given that trains are currently accelerating away from Inverness when they pass through the station site, an additional call at the foot of the gradient and allowing for a 1.5 minute dwell time required by HSTs, would impose a non-trivial journey time penalty (early modelling estimates put this at 3 minutes in the Up direction, and 2 minutes in the Down direction). In addition, concern has been raised by the operator regarding the operational issues caused during adverse railhead conditions where trains may struggle to make headway up the bank from a standing start.

Current and committed frequency on the route is for a near hourly service throughout the day. This is constrained by the long sections of single-track route along the Highland Mainline which prevent additional frequency uplift, as well as the lack of demand for a more frequent service. Given the recognised desire of wider stakeholders and the rail industry to improve journey times and the work undertaken to do this, any additional in-vehicle time for through passengers caused by a call at a new station at Beechwood may not be acceptable. For example, recent upgrades of the Highland Main Line have led to average end-to-end journey time savings of approximately 10 minutes⁴, therefore assuming an average impact of 2.5 minutes from an additional station call at Beechwood, 25% of these recent journey time savings would be eroded. Assuming an average journey time between Perth and Inverness of 130 minutes, the overall impact on the end journey time is an increase of approximately 2%. Other alternatives, such as running a shuttle service to the site from Inverness would require the full burden of costs to fall upon this new service which may prove challenging given the size of the markets served.

3.4. Summary

Whilst analysis at this stage has not identified any “show stoppers” in terms of operational constraints, there are several non-trivial and potentially significant issues at both sites. Overall, the Beechwood site is more constrained in terms of both services and situation, here it may be difficult to deliver a sufficiently high frequency service to satisfy potential users. Whilst the Stratton/Seafield sites provide greater opportunity to provide a reasonable service in terms of frequency, there are still potential timetable issues relating to the single line sections on the route and turnaround times at Inverness. Whilst there is some opportunity to flex existing timings, more detailed timetable modelling and consultation would be necessary to confirm any impact relating to this.

⁴ <https://www.transport.gov.scot/projects/highland-main-line/project-details/>

4. Commercial Feasibility Review

4.1. Overview

This section presents the analysis undertaken to understand the potential commercial feasibility of the proposed station sites at Seafield, Stratton Farm and Beechwood UHI, drawing on the findings from a demand forecasting exercise which has focused on potential patronage that could be generated from the three identified market segments that could be served by a new station east of Inverness:

- Local journeys into Inverness from areas such as Westhill, Smithton and Culloden;
- Access to longer distance rail journeys to, for example, Perth, Aberdeen, Glasgow, etc. without the need to travel via the existing Inverness Station; and
- Direct access by rail to key local destinations such as UHI, Raigmore Hospital, LifeScan and/or the Inverness Shopping Park at Seafield.

Considering each in turn, local journeys into Inverness would be considered to be the market which offers the least potential out of the three potential markets. None of the three station sites is located within what would ordinarily be referred to as a 'walk-in catchment' serving the local resident population, although it is understood that the proposed Inverness College UHI station site may capture some walk-in demand across the west side of Cradlehall and new housing developments near Stratton Farm may increase the population 'walk-in catchment' for the Stratton Farm and Seafield sites. In all cases access to the station from areas such as Cradlehall, Westhill, Smithton or Culloden would require to be made by car, taxi or cycle – thus imposing an interchange between the access mode and rail. This is likely to make the overall journey into Inverness less attractive than by existing modes such as car or bus, especially once the whole 'generalised cost' of travel is considered. Stagecoach Highlands operate two services (the Service No.2 and No.3), both on a core half-hourly service frequency, that link this area of East Inverness with the centre of Inverness.

It is also considered that each of the proposed station sites offer limited park-and-ride potential (for journeys into Inverness from a longer distance catchment) because the level of service that would be provided at these stations is unlikely to be sufficient or attractive enough for travellers to consider a turn-up-and-go proposition. The current service patterns on both rail lines are broadly hourly, but by no means at the same time each hour. There are also some gaps in the hourly service pattern, particularly on the Highland Mainline.

The station sites could potentially provide an alternative access to the rail network rather than having to access Inverness Station. Inverness Station is a constrained site situated in the centre of the city and with limited car parking (only 60 spaces). The three station sites are located close to the A9 corridor and therefore have the potential to be an attractive station to use for those living north of Inverness and accessing the new station via the Kessock Bridge, without the need to travel into the centre of the city. The same function equally applies to a considerable proportion of the Inverness Station catchment area. Clearly the relative attractiveness of the three sites in this case will be dependent on which line the station is located on – thereby offering destinations towards Aberdeen or towards Perth/Glasgow and Edinburgh (rail journeys could still be made via interchange at Inverness Station). It is understood that there is not currently plans for these station sites to serve as parkway station and there is unlikely to be space for a substantial amount of car parking, however for completeness the scale of this potential market has also been assessed. The ability of each station to serve the local trip attractors, such as the UHI, the shopping park and LifeScan (approximate 1000 employees), will clearly depend on the actual location of the station and pedestrian and cycle access/egress routes. As trip attractors, this places a greater emphasis on the attractiveness of the 'walk-out' to the final destination from the station. Therefore, for example, a station located at Stratton Farm will be considerably less attractive to users of the UHI campus and LifeScan than a station located at Inverness College UHI. In addition, different developments can tend to be more/less attractive to the use of rail as an access mode than others. Education-related journeys to the UHI campus are likely to be more amenable to using rail than shoppers to a retail park.

4.2. Potential Demand Methodology

To estimate the potential usage of the new stations a set of high-level models, one for each of the market segments, has been developed. An overview of the methodology is presented in Figure 10.

Forecasts are presented for 2025. Growth in rail passenger numbers has been assumed to follow the midpoint of the four forecasts provided for ‘interurban’ markets (specified as covering corridors into Glasgow, Edinburgh, Aberdeen and Inverness) in Network Rail’s 2016 Scotland Route Study⁵. This means that growth rates have been assumed as 3.2% per annum for years 2012-2023, and 1.3% per annum for years 2023-43.

In Figure 10, the three market segments to the left of the dashed line estimate usage at the station, whereas the market segment to the right of the dashed line considers the impact that additional journey time will have on existing passengers to/from Inverness which is also an important impact that should be considered given the wider stakeholder aspirations to improve rail journey times, particularly between Inverness and the Central Belt. The proposed methodology and data requirements for each of the market segments are discussed further under individual headings below.

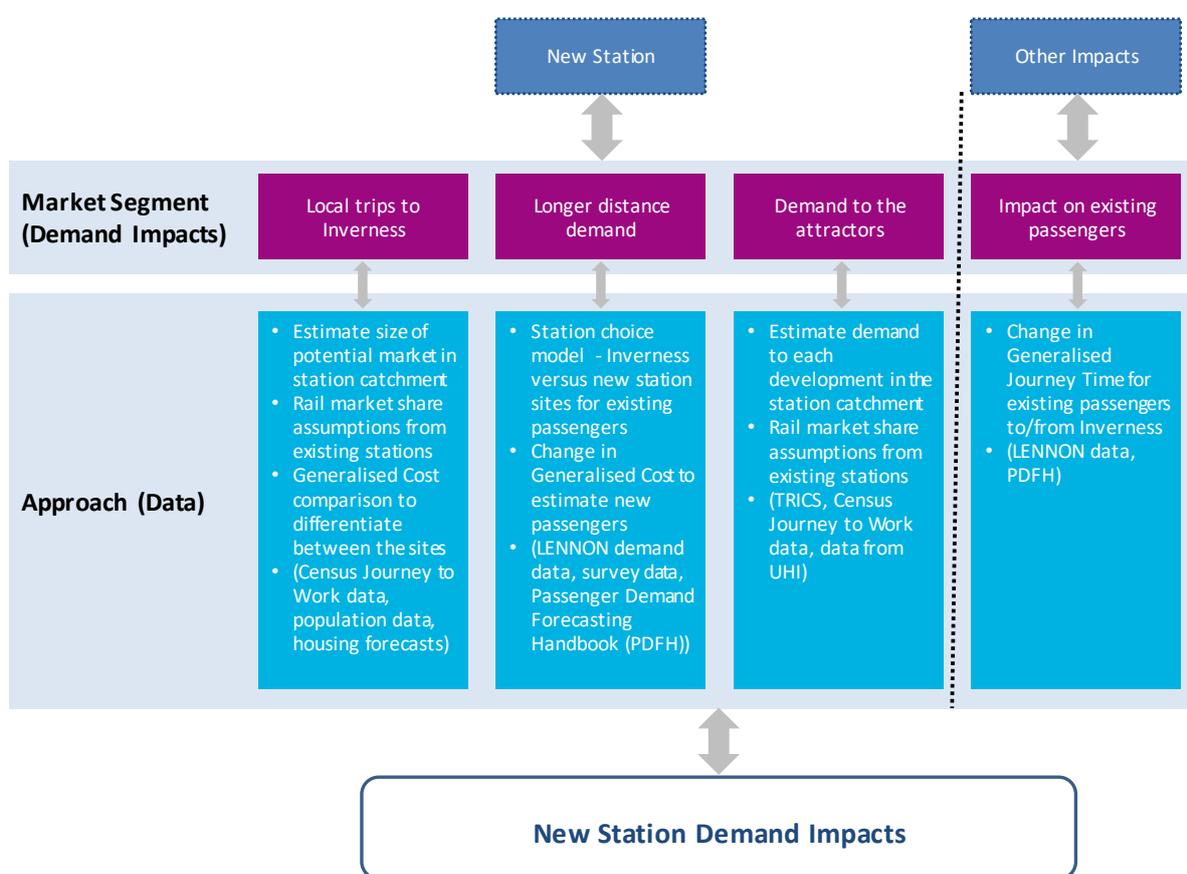


Figure 10: Demand Forecasting Methodology Overview

4.2.1. Local trips into Inverness

As set out above, one potential market for a new station would be trips from East Inverness into the centre of Inverness. This would particularly be the case for the Seafield and Stratton Farm sites, which are well-positioned to serve housing developments in Stratton.

Figure 11 outlines the approach to estimating this demand.

⁵ <https://cdn.networkrail.co.uk/wp-content/uploads/2016/11/Scotland-Route-Study.pdf>

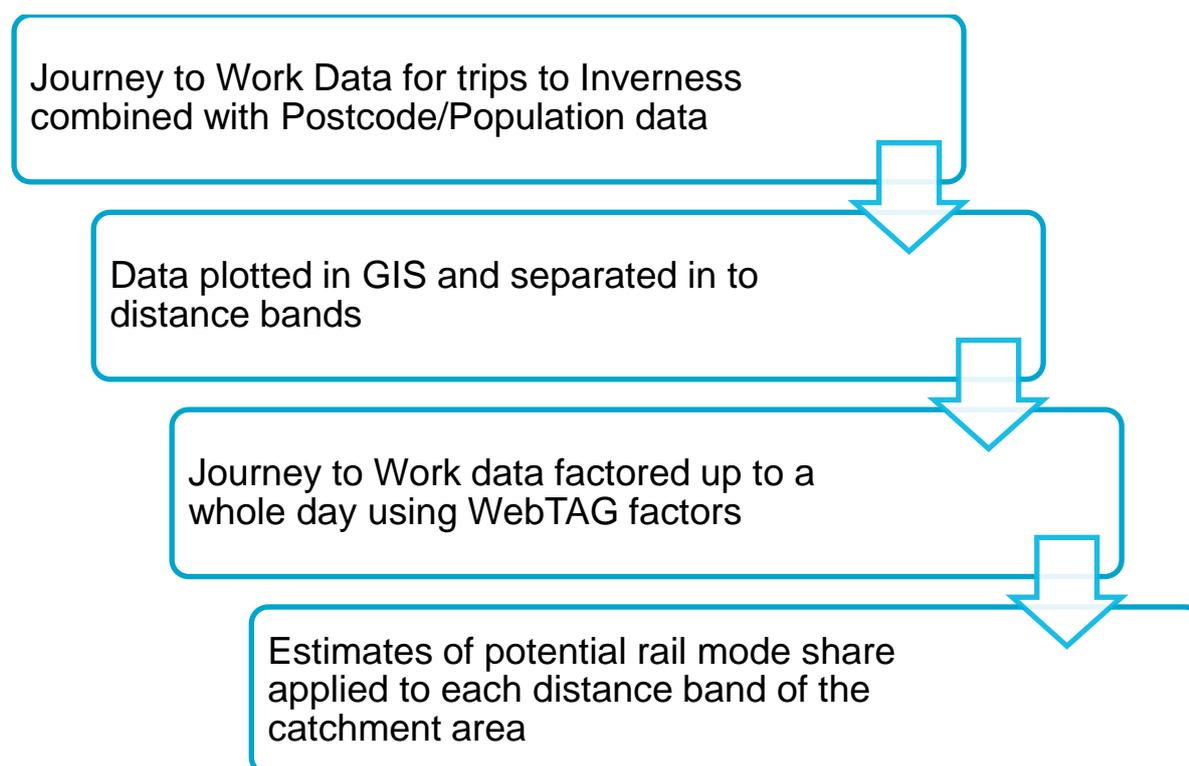


Figure 11. Local Trips to Inverness methodology overview

As set out, to assess this demand, commuting trips were estimated and factored up to a full day of trips using journey purpose splits before being annualised. Journey to Work (JTW) data was sourced from 2011 Census and provided the primary demand data for analysing the commuter market segment.

JTW data provided the origin and destination data for all modes (walk, cycle, bus, car) and was used to establish the size of the potential market for local commuting trips to Inverness from the Inverness East area. The JTW data was then filtered to only include trips with a destination in central Inverness as only these journeys could realistically use rail. As the JTW data is supplied at a relatively aggregated Output Area level, postcode population data was utilised to better estimate the distribution of the origins of trips in the study area. Due to additional housing currently being built in the Stratton area, assumptions on additional housing units and associated population were added to the Census population data.

The Highland Council Inverness East Development Brief, June 2018, states that the development in Stratton will amount to 2500 homes. Multiplying this by a household occupancy factor of 2.14 (sourced from Estimates of Households and Dwellings in Scotland, National Statistics, 2017, Table 3) results in an additional population of 5,350. Population growth is taken to be development driven, so no further population growth to 2025 is presumed other than that resulting from the Stratton housing development.

For each of the station sites, rail catchments in bands of 0-800m, 800-1200m, and 1200-1600m were drawn so that different mode shares could be calculated based on distance from the station. The modelled catchments are presented in Figure 12 to Figure 14.

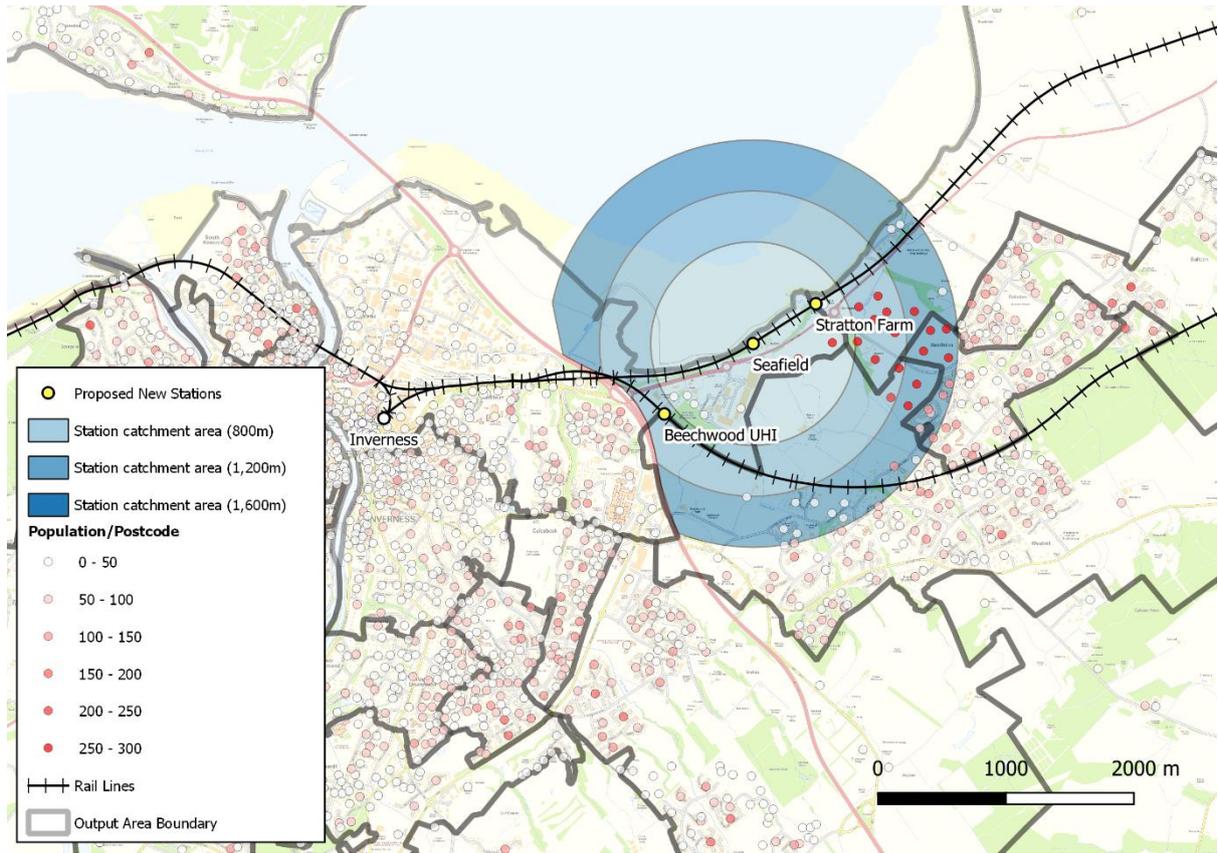


Figure 12: Seafield Buffer and Population, 2025

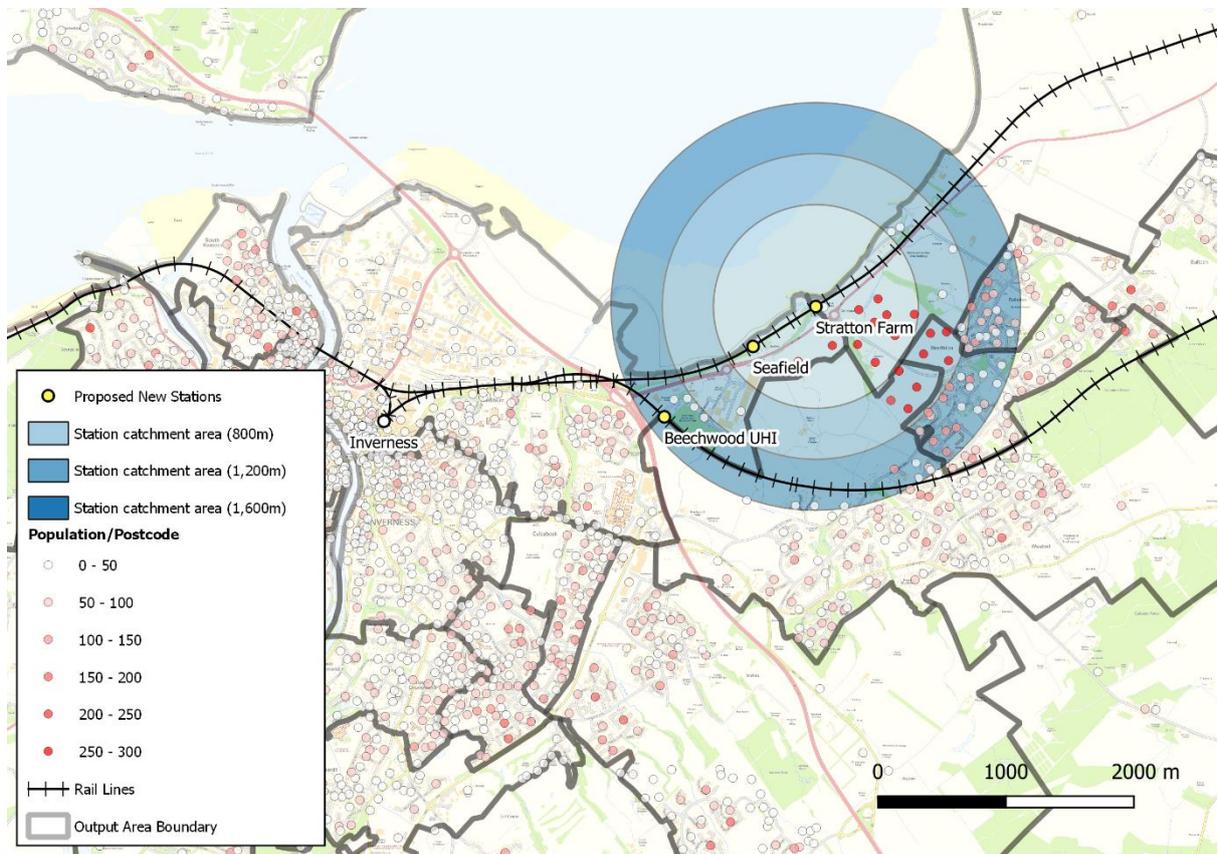


Figure 13: Stratton Farm Buffer and Population, 2025

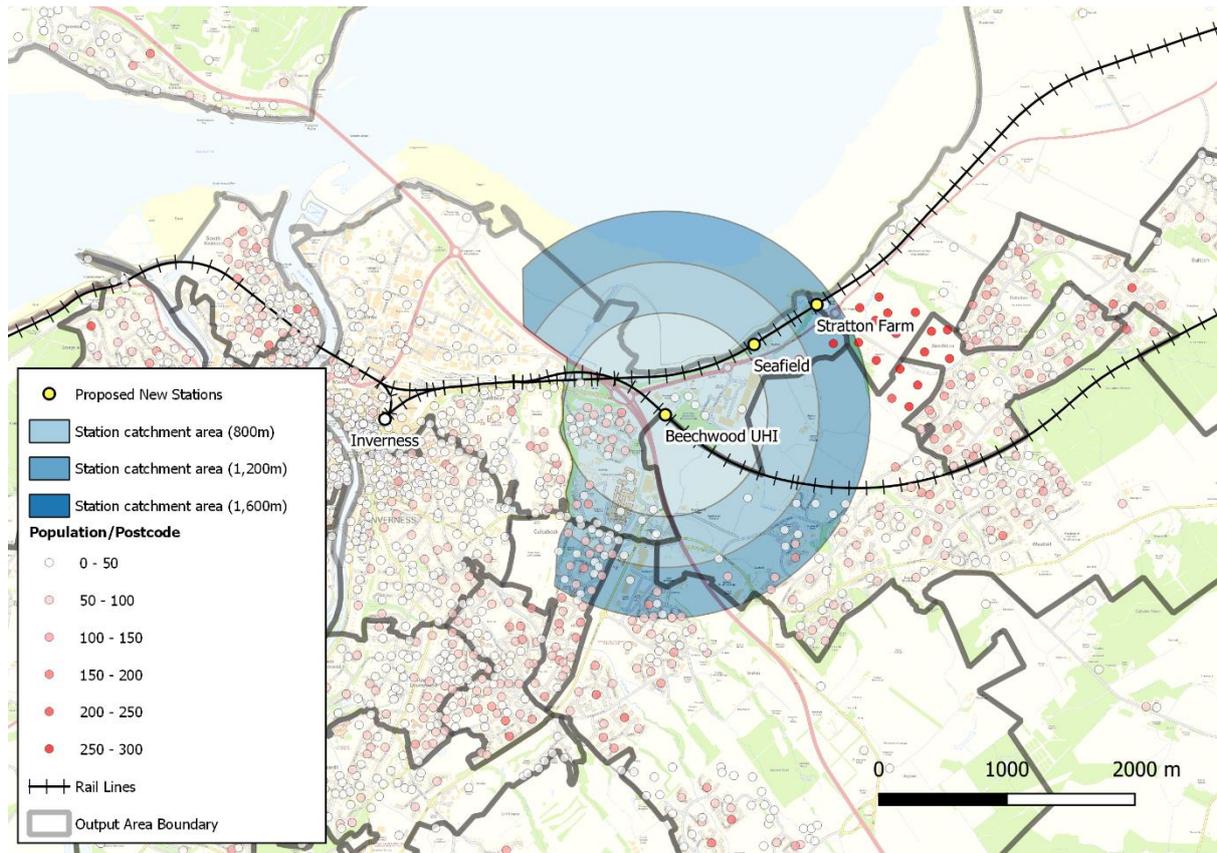


Figure 14: Beechwood UHI Buffer and Population, 2025

As can be seen above, the catchment bands were clipped to reflect the stations' proximity to both Inverness Station and Central Inverness. For the Seafield and Stratton Farm sites, it was considered that people living west of the A9 would be unlikely to travel out of Inverness towards the new station, to then come back on themselves on the train. Following a similar logic, the buffer for the Beechwood UHI site was clipped along a path following the B9006 and the boundary of Inverness Golf Course.

The proportion of the total Output Area population that fell into each band was calculated and used to adjust the journey to work demand. An example of this is presented in Table 3 below:

Table 3: Example Calculation of JTW Shares by Station Catchment Distance Band

Station Catchment Band	Population	Share of JTW Trips within Band
0-800m	800	40%
800-1200m	400	20%
1200-1600m	800	40%

The JTW trips were then factored up using journey purpose splits taken from WebTAG⁶, to provide an estimate of journeys for all journey purposes for a full day. The commuting proportion has been benchmarked against data from the National Rail Passenger Survey (NRPS) for other Scottish cities – this is shown in Table 4 alongside the WebTAG split. The benchmarking demonstrates that the proportion of commuting trips is similar in WebTAG and the NRPS data for Stirling and Aberdeen, while the proportion of business trips in WebTAG is much lower than the NRPS data. To factor up the results to all day demands it has been assumed that trips in the Journey to Work data are commuting trips. When factoring up the trips the proportions of business and other trips are added together, therefore the relative difference between the WebTAG and NRPS data for these two purposes does not impact on the forecasts produced.

⁶ WebTAG databook table A5.3.2

Table 4: Journey Purpose Assumptions (WebTAG Table A5.3.2, Journeys Outside the South East and Less than 25 miles)

Purpose	WebTAG Split	Stirling (NRPS)	Aberdeen (NRPS)
Commuter	38.83%	35.2%	38.1%
Business	2.74%	21.8%	23.6%
Other	58.44%	43.0%	38.3%

To estimate the number of local rail trips to Inverness that might be made via each of the proposed station sites, the rail mode share by distance band has been calculated. To calculate this likely mode share, evidence from JTW trips from areas which also have a station providing a rail option to the local centre was used. The evidence gathered considers various stations in both Scotland and England, and the values below (see Table 5) are calculated using a regression model which considers the distance from the station and the frequency of service that the station experiences (frequency for the new station sites considered here is assumed to be one train per hour).

Before applying the regression model, a rail mode share for one of the distance bands that could provide a fixed reference point need to be determined. This mode share was an average of several examples of areas that have a station of comparable distance to the city centre, as the potential sites examined in this study. JTW data indicated a 3% mode share for rail from zones up to 800m away from the station, to the relevant urban centre. Based on this the trend from the regression has been applied, fixing the 0-800m band at 3% mode share for rail. For these relatively short distance rail journeys, the regression analysis demonstrated that the rail mode share from origins more than 1600m from the station was negligible. Table 5 presents the mode shares that were calculated.

Table 5: Calculated Mode Share Assumptions

Distance from Station	Rail Mode Share
0-800m	3.0%
800-1200m	1.29%
1200-1600m	0.16%

By applying these mode shares to the population in the catchment of each station, the following forecast demands for 2025, expressed as station entries and exits, are shown in Table 6 below.

Table 6: Estimated Station Entries and Exits for Trips to/from Inverness

Station Site	Demand from Local Trips market segment (2025, entries/exits)
Seafield	13,258
Stratton Farm	29,222
Beechwood UHI	13,122

It can clearly be seen from the above that the Stratton Farm site benefits greatly from the entire population of the new housing development in the Stratton area falling within its catchment.

In addition, for each origin in the JTW data, the Generalised Cost (GC) of a journey via each of the station sites has been calculated to provide an indication of which site is most likely to attract the largest proportion of journeys for this market segment. Output Areas (OAs) included in this analysis are those that have fallen within the catchment areas of any of the four potential station sites. A map of the area with OA areas marked on it is shown in Figure 15.

Table 7: Average Generalised Cost Analysis (shown as 2019 values in 2010 prices)

Station Site to Inverness	Access Value of Time (£)	Service Interval Penalty Value of Time (£)	Estimated Fare to Inverness (£)	In-Vehicle Time Value of Time (£)	Total Generalised Cost (£)
Seafield	1.16	7.17	1.20	0.37	9.90
Stratton Farm	1.10	7.17	1.30	0.37	9.94
Beechwood UHI	1.27	7.17	1.00	0.37	9.81

The table demonstrates that the average GC of travelling to Inverness via the Beechwood UHI station is slightly cheaper than the other station site options primarily due to slightly cheaper fare. Stratton Farm is the closest site in terms of access to the largest population catchment, which aligns with the demand forecasts presented earlier.

4.2.2. Longer distance rail demand

While the longer distance rail travel market is not one of the key markets the station is planned to serve, the new stations under consideration could provide an alternative to travelling into the centre of Inverness to catch a train east towards Aberdeen or south towards the Central Belt.

To estimate the size of this potential market a simple probabilistic (Logit) station choice model has been developed. This model estimates the share of passengers that would choose to use the new station instead of the existing station in the centre of Inverness. This approach is based on the approach described and parameters provided in the PDFH. Data used in the station choice model alongside and a summary of the methodology applied is set out below, with a summary of the methodology in Figure 16.

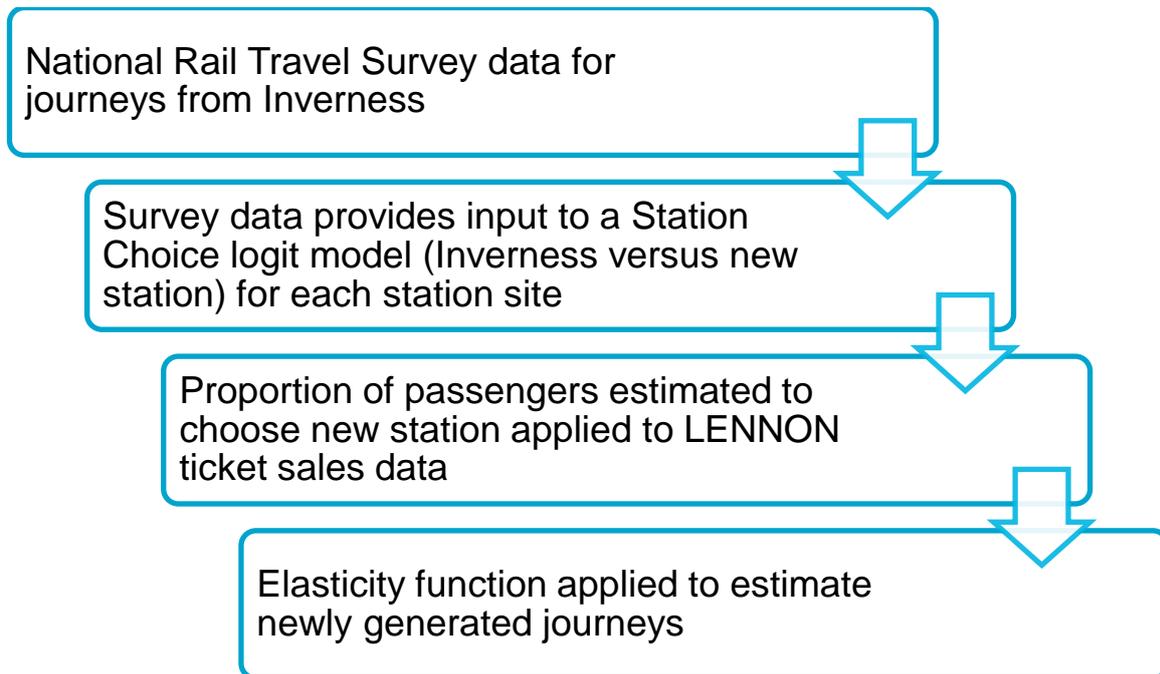


Figure 16. Longer distance rail demand methodology overview

To identify where the passengers currently travelling from Inverness have originated from, National Rail Travel Survey (NRTS⁹) data has been used. NRTS data is based on a sample of rail journeys with expansion factors applied to reflect the full market; while the data was collected several years ago (2005), in the absence of any more recent data it is deemed to provide a reasonable indication of trip origins for a feasibility study of this nature. The data was also filtered before being used in the model to ensure that only survey records concerning journeys using the Highland Mainline were

⁹ NRTS data was provided by the Department of Transport for use in this study.

considered for the Beechwood UHI site, and that only records concerning journeys using the Aberdeen to Inverness line were considered for the Seafield and Stratton Farm sites.

To adjust the data to better reflect the current mix of rail destinations, LENNON ticket sales data was obtained from ScotRail (2017). The station choice model was used to estimate the proportion of trips that would be taken via the new station instead of Inverness, and these shares were then applied to the LENNON data. The LENNON data had been extrapolated to 2025 using growth forecasts from the Network Rail Scotland Route Study published in 2016.

For each Origin-Destination pair, the journey time via Inverness Station, taking account of the access time to the station, the availability/cost of parking, the rail journey time, the fare and egress time, was calculated. The same calculation was then undertaken for the equivalent journey via each of the proposed station sites.

For each new station site in turn, the station choice model was used to estimate the proportion of demand for each flow that would choose to use the new station instead of Inverness Station which is currently the only option available. For the purposes of assessment, it has been assumed that the new stations would be relatively simple in design and facilities offered i.e. stations would require to be fully accessible but would not offer waiting facility or any park and ride provision; therefore the model has been set up so that passengers cannot switch to car from another access mode (walk, bus etc.) to access to the new station. It has also been assumed that due to no car park being available at the station, those passengers currently accessing Inverness by car will not be able to drive to the new station as an alternative, therefore unless the origin is within walking distance of the new stations then these passengers have been excluded from the station choice calculation.

Table 8 shows the proportion of the relevant subset of demand which could be anticipated to use the new station, instead of Inverness. (i.e. for Seafield and Stratton Farm, the subset of demand that uses the Aberdeen to Inverness Line, and for the Beechwood UHI site, the subset of demand that uses the Highland Mainline). This, therefore, is demand that has been abstracted from Inverness.

Table 8: Proportions of Demand Switching to New Station

New Station Site	Proportion of Demand now using new station	Proportion of Demand continuing to use Inverness
Seafield	6.7%	93.3%
Stratton Farm	8.0%	92.0%
Beechwood UHI	6.3%	93.7%

Table 9 shows the forecast demand for each station for this market, calculated by applying the percentage of demand abstracted above to the LENNON data (which has again been filtered according to which rail line has been used). Values are expressed as 2025 station entries and exits.

Table 9: Total Demand Abstracted from Inverness Station

New Station Site	Annual Demand for Long Distance segment abstracted from Inverness (2025 entries/exits)
Seafield	23,754
Stratton Farm	28,328
Beechwood UHI	49,208

The number of potential new journeys was estimated by applying an elasticity function to the change in the generalised cost for the journey via the new station compared to via Inverness Station. Additional demand from this source is shown in Table 10.

Table 10: New Journeys as a Result of the Improvement in Generalised Cost

Station Site	Annual Additional Demand (2025 entries/exits)
Seafield	82
Stratton Farm	36
Beechwood UHI	96

By adding together, the long-distance demand abstracted from Inverness Station and the additional demand, the complete demand for each site from the long distance market has been calculated, as shown in Table 11.

Table 11: Total Demand from Long Distance Market Segment

Station Site	Annual Demand for Long Distance market segment (2025 entries/exits)
Seafield	23,836
Stratton Farm	28,364
Beechwood UHI	49,304

4.2.3. Demand to attractors

The Inverness East area is expanding and becoming an important area of employment, education and medical facilities and as such rail is seen as a possible transport mode to provide access to these facilities, for employees, customers and visitors. Figure 18 and Table 12 detail the potential attractors which could be accessed via a station located at one of the three possible sites. A three-step approach has been utilised to estimate potential demand to these attractors, which is summarised in Figure 17.

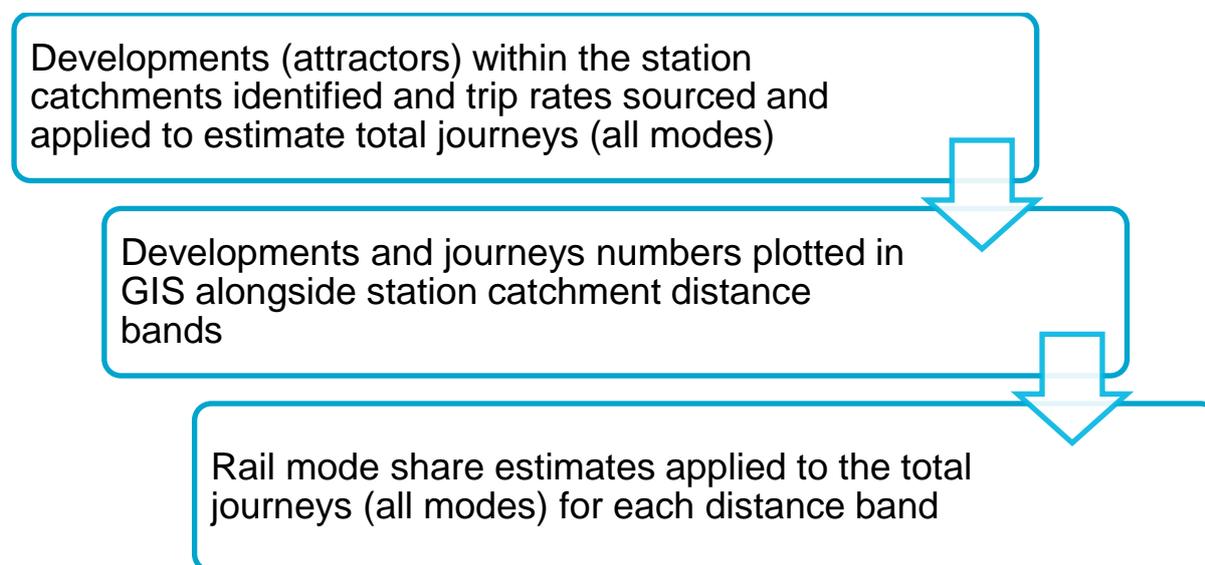


Figure 17. Demand to attractors methodology overview

Firstly, the total number of journeys (all modes) to each of the developments listed was established using the Trip Rate Information Computer System (TRICS¹⁰) database and for Inverness College UHI, the college provided survey data and student and staff numbers. The TRICS database provided estimates of the trip generation for each of the attractors based on evidence from existing developments of similar types and geographical locations.

The college student transport survey showed that 47.6% of journeys to the college originated from within the 2km catchment of a rail station. Therefore, in the absence of similar data for the other attractor sites, this proportion of the trips generated by an attractor was considered to be ‘in-play’ as one that could potentially be undertaken by rail.

Figure 18 and Table 12 shows the attractors’ locations, along with the estimated trips to that attractor and the approximate crow-fly distance to each potential station site (numbers on the map correspond to those in the table).

¹⁰ TRICS version 7.5.4 used

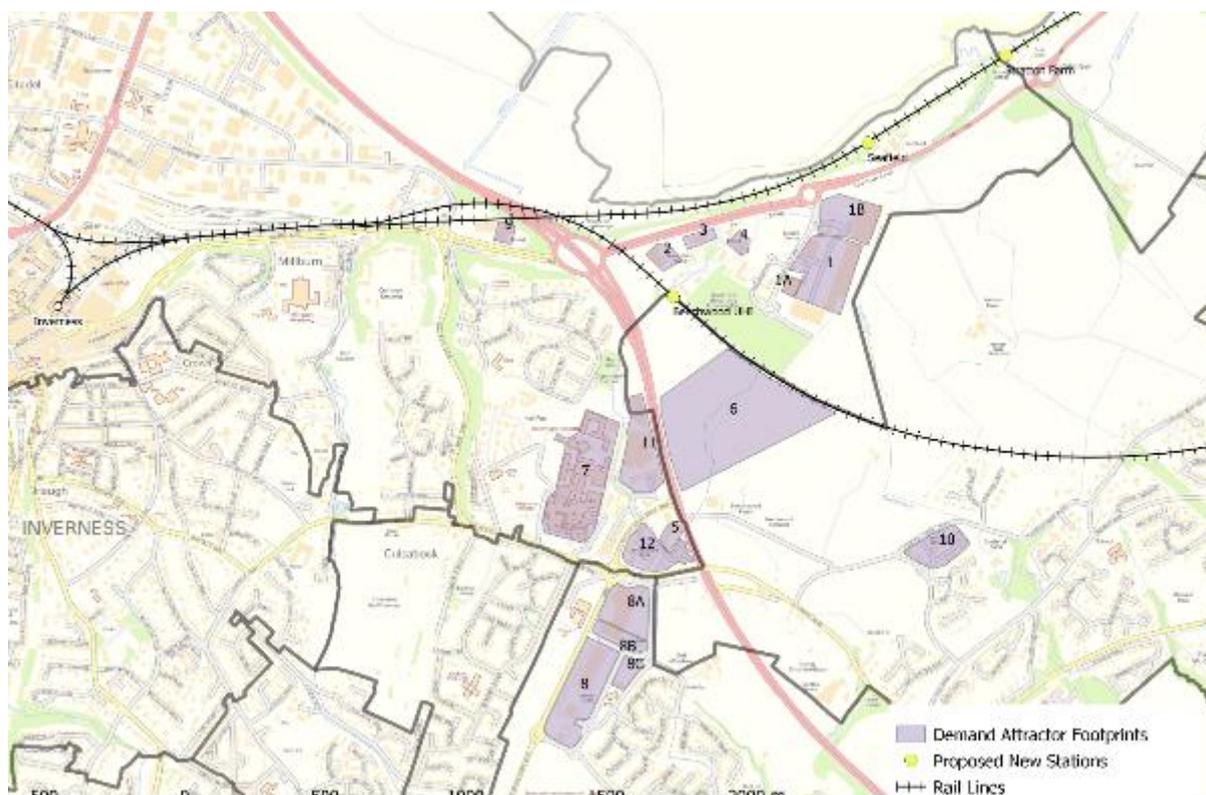


Figure 18: Map of East Inverness Demand Attractors

Table 12: Estimated Trips to Attractors (Daily), with Crow-Fly Distances to each Station Site

ID	Attractor	Total Arrivals per day (est. using TRICS)	Total Arrivals 'In Play' for rail	Seafield	Stratton Farm	Beechwood UHI
1	Inverness Shopping Park	3487	1660	460m	990m	550m
1A	Vue Cinema Inverness Shopping Park	67	32	580m	1120m	420m
1B	Tesco Extra Inverness Shopping Park	1744	830	280m	780m	720m
2	Howdens	130	62	850m	1430m	160m
3	Travelodge Inverness	45	22	690m	1270m	230m
4	Holiday Inn Inverness	57	27	580m	1160m	310m
5	Premier Inn Inverness East	50	24	1580m	2100m	860m
6	Inverness College UHI	735*	348	1090m	1620m	460m
7	Raigmore Hospital	3946	1878	1590m	2150m	740m
8	Inshes Retail Park	2781	1324	2200m	2720m	1437m
8A	Tesco Extra Inshes Retail Park	1129	538	1890m	2420m	1130m
8B	Dobbies Garden Centre Inshes Retail Park	210	100	1980m	2500m	1220m
8C	Aldi Inshes Retail Park	187	89	2110m	2620m	1380m
9	Jurys Inn Inverness	129	61	1340m	1900m	650m
10	Cradlehall Business Park	367	175	1480m	1790m	1310m
11	LifeScan (Scotland)	481	229	1400m	1950m	600m
12	Beechwood Business Park	599	285	1670m	2200m	930m

*Figures used for Inverness College UHI have been derived using travel survey information provided by the College.

Secondly, the catchments for the stations were plotted in bands of 0-800m, 800-1200m, and 1200-1600m, the same as those applied to calculate the station catchments for local trips to Inverness. The proportion of each site that fell into each band was calculated.

Thirdly, an assumption on the rail mode share was used to estimate the size of the potential market for rail journeys to these attractors, by applying it to the number of 'in play' trips to each attractor on a pro-rata basis dependant on how the footprint fell into the catchment distance bands. These assumptions varied by the type of attractor being considered e.g.:

- In line with National Travel Survey findings, it was assumed that rail would not be used by people travelling to supermarkets.
- It was assumed that there would be limited trips to the retail parks that would use rail. Given that both retail parks in the study area have been built on major roads with large car parks with the clear intent that they should be easy and convenient to access by car, and the fact that residents from North of Inverness would require a rail interchange it is considered unlikely that many of these users would switch from car or bus to rail to access a retail park. Taking these considerations into account the core assumption was to apply a reduced mode share for trips made by rail to the retail park, therefore 25% of the shares presented in Table 5 were applied to this market segment.
- It was assumed that no users of the garden centre would use rail, given that the large and bulky nature of the equipment used/items purchased would not lend themselves to being carried and transported easily on public transport.
- For all other attractors, in the absence of any other information, the rail mode shares outlined in Table 5 were applied. It must be noted that to achieve this proportion of rail mode share the rail to rail interchange time at Inverness Station would need to be short and reliable in order to compete with bus.

Consequently, the total demand forecast for this segment of the market is as follows in Table 13, expressed as a forecast of 2025 station entries and exits.

Table 13: Estimated Rail Demand to Attractors by Station Site

Station Site	2025 Entries/Exits from Demand Attractors Market
Seafield	22,313
Stratton Farm	16,412
Beechwood UHI	51,896

Two sensitivity tests with different mode share assumptions for the retail parks have been undertaken:

- Sensitivity Test 1 assumes 50% lower mode share for retail parks as the other attractors (i.e. the values in Table 5).
- Sensitivity Test 2 assumes the same mode share for retail parks as other attractors.

The results of these sensitivity tests are presented in Table 14.

Table 14: Retail Mode Share Sensitivity Test Results

Station Site	2025 Entries/Exits from Demand Attractors Market (% of mode share assumption)		
	Core Assumption (25%)	Sensitivity Test 1 (50%)	Sensitivity Test 2 (100%)
Seafield	22,313	27,964	39,267
Stratton Farm	16,412	18,842	23,702
Beechwood UHI	51,896	57,757	69,479

The existing layout at Inverness station means that there are no through services from the North of Inverness, therefore rail journeys from towns such as Dingwall would require an interchange. As such it is considered that journeys to the new station for leisure and shopping purposes would be at the lower end of the estimates. There are known aspirations for a new platform at Inverness on the Rose

Street Curve¹¹ that would enable through services and should this scheme be delivered then it is likely the rail mode shares to the retail parks would increase.

4.2.4. Impact on existing passengers

The operational analysis identified the potential journey time impact of including a call at a new station, which would in turn impact on the journey times of existing through passengers and make rail slightly less attractive. For the purposes of this assessment the following journey time assumptions have been applied:

- At Beechwood UHI, the expected additional time is approximately 3 mins in the up direction (Southbound) and 2 mins in the down direction (northbound) due to the steep gradient of the line impacting on acceleration.
- On the A2I line the journey time impact would be similar in both directions with approximately 2 mins added.

Although this additional journey time is not directly linked to the potential usage of a new station, the journey time would likely impact on passenger demand for flows through the site. As such, the impact that the extra journey time will have on the existing demand making these journeys has been calculated. This has been calculated by applying a Generalised Journey Time (GJT) elasticity (sourced from PDFH) to the change in GJT which produces a factor that is applied to the total affected market (sourced from LENNON data). The forecast also accounts for those passengers who will switch to use the new station as calculated earlier when assessing station choice for the longer distance rail market.

A summary of the methodology used to calculate the impact of the potential new station on existing passengers is shown in Figure 19.

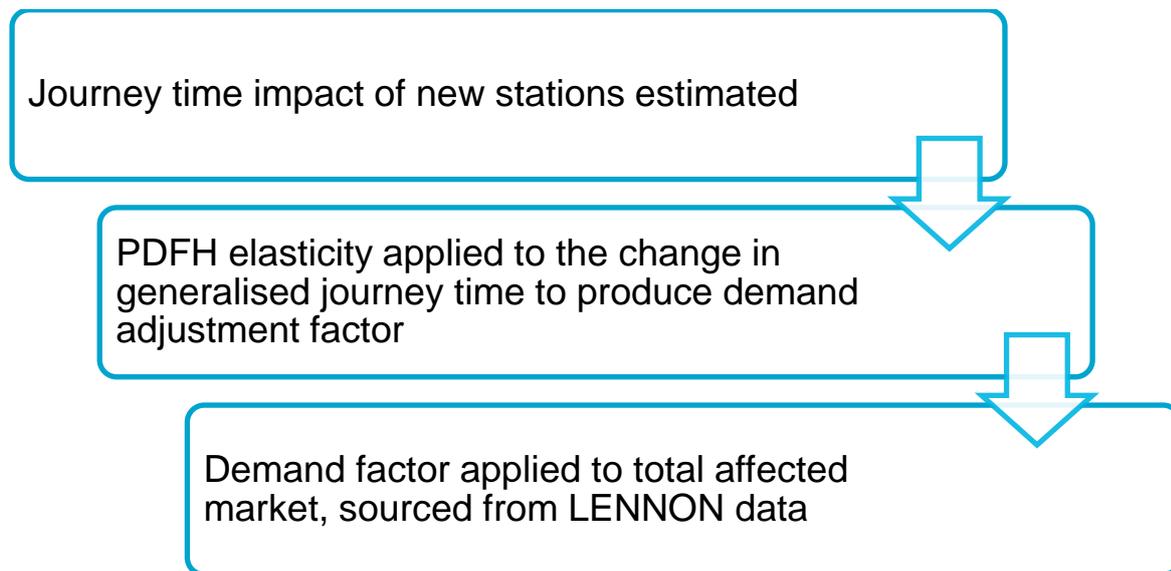


Figure 19. Impact on existing passengers methodology overview

Results of this analysis are presented in Table 15.

Table 15: Impact on Existing Passengers

Station Sites	Line	Impact on Rail Demand (2025)
Seafield/Stratton Farm	Aberdeen to Inverness	-15,364
Beechwood UHI	Highland	-10,020

¹¹ Inverness Station: Proposed New Platform on Rose Street Curve – Initial Considerations, Douglas Binns Limited, May 2014

4.2.5. Total Demand Estimates

The net forecast demand associated with each station site for 2025 (entries and exits) is shown in Table 16. These are high level estimates and could vary significantly should more detailed analysis be undertaken; however, the relative differences of the demand forecasts provide a reasonable estimation of how the sites compare against each other in terms of likely demand levels.

Table 16: Demand Estimates for 2025 (entries and exists unless stated otherwise)

Market Segment	Seafield	Stratton Farm	Beechwood UHI
Local trips to Inverness	13,258	29,222	13,122
Longer distance rail demand (abstracted from Inverness)	23,754	28,328	49,208
Longer distance rail demand (new journeys)	82	36	96
Demand to attractors	22,312	16,412	51,896
Total Station Demand	59,406	73,998	114,322
Longer distance rail demand at Inverness	-23,754	-28,328	-49,208
Impact on existing passengers	-15,364	-15,364	-10,020
Net demand impact for Rail	20,288	30,306	55,094

It can be seen from the above that demand is clearly forecast to be higher at the Beechwood UHI site on the Highland Mainline. This site benefits from being far closer to major attractors such as Inverness College UHI and Raigmore Hospital than the Seafield and Stratton Farm sites. Beechwood also has a greater forecast long-distance demand given that the Highland Mainline can be used to access a greater range of destinations (such as Perth, Glasgow, Edinburgh, and the various interchange opportunities as a result) than the Aberdeen line. It should be noted that the forecasts on local trips to Inverness for Seafield and Stratton Farm are contingent on the delivery of the large housing development at Stratton between the A96 and Smithton, for which building work has already commenced. The development will add to the population of the area significantly and falls within the catchment for these two station sites, particularly Stratton Farm (the potential station located geographically closest to this development).

4.3. Benchmarking

To provide some context to the demand forecasts for the proposed stations, observed station 2017/18 passenger entries and exits sourced from ORR¹² database at other stations in the Highland region are presented in Table 17. This is displayed alongside the 2025 station demand forecasts for the three potential station sites examined above. This analysis is only intended to provide a high-level comparison as there are many other factors that drive demand such as demand attractors, competing modes, local traffic conditions etc. which cannot be accounted for in this comparison.

Table 17: Station Entries and Exits for Other Stations in the Highland Region

Station	2025 Population within station catchment (<1,600m)	2017/18 Entries and Exits
Dingwall	5,103	86,276
Forres	9,347	118,036
Muir Of Ord	3,023	64,820
Nairn	9,502	112,142
Seafield	7,424	59,406*
Stratton Farm	8,573	73,998*
Beechwood UHI	5,727	114,322*

* denotes a station demand forecast for a new potential station (2025).

¹² <https://orr.gov.uk/statistics/published-stats/station-usage-estimates>

This benchmarking demonstrates that the demand forecasts fall within the range of other stations in the Highlands with similarly sized population catchments. Though Beechwood UHI appears an outlier in this respect, it should be noted that much of the demand for this station comes from the demand attractors located nearby, rather than from a large resident population.

4.4. Summary

This chapter has presented the results from the demand forecasting exercises undertaken to estimate potential levels of usage at each of the stations under consideration in this study. As shown, the patronage is forecast to be greatest at the Beechwood UHI site due to its proximity to major attractors such as Inverness College UHI and Raigmore Hospital. It is worth highlighting that to fully understand the commercial feasibility or viability of each of the stations under consideration, further work would be required to understand the full extent of benefits and costs associated with introducing a new station east of Inverness, as would be progressed through completion of appropriate studies in line with STAG and Transport Scotland's Business Case Guidance.

5. Summary and Next Steps

In response to the rapid growth of Inverness East in recent years, the Highland Council's Inverness East Development Brief has identified the potential for rail to serve the travel needs of the area and wider region, via a new local connection into the rail network.

In February 2019, AECOM were commissioned by HITRANS to undertake an initial study into the feasibility of three proposed new station sites from a technical, operational and commercial perspective, with a view to establishing a new station at one of the sites under consideration at Seafield, Stratton Farm and Beechwood UHI.

Before presenting the results from the assessment, it should be stated that the works undertaken at this early stage of the study have focussed on understanding the potential for introducing new stations from a technical, operational feasibility and demand perspective. As the study proceeds, future work will require to be undertaken in line with STAG and respective guidance on the development of new stations to understand the potential business case for any new sites that emerge from this review.

The technical feasibility review has identified that all sites, from an engineering feasibility point of view, appear to be technically feasible. The single issue of non-compliant track gradients would need to be considered by the rail industry, with the vertical alignment at the Beechwood UHI site on a particularly steep gradient of 1:60. The lesser gradients at Stratton Farm and Seafield make these options preferable from a compliance point of view. Stratton Farm appears to have slightly more clearance to the Up side boundary fence and also lies closer to 2 existing potential platform access routes than Seafield and would therefore appear to be the more technically feasible of the sites on the Aberdeen to Inverness line. In addition, due to the requirement for two platforms at the Beechwood UHI site, the initial construction cost is likely to be double that of the sites on the Aberdeen to Inverness line which is single track and therefore only requires a single platform to be built.

An operational assessment to understand the impact of an additional station call on journey times and whether this is likely to cause any conflicts has identified that there are a number of non-trivial and potentially significant issues at both sites. Overall, the Beechwood site is more constrained in terms of both services and situation; here it may be difficult to deliver a sufficiently high frequency service to satisfy potential users, and adding additional journey time to the route is in conflict with wider stakeholder aspirations for reduced journey times to the Central Belt. Whilst the Stratton/Seafield sites offer greater opportunity to provide a reasonable service in terms of frequency, there are still potential timetable issues relating to the single line sections on the route and turnaround times at Inverness. There is likely to be opportunity to flex existing timings, however, more detailed timetable modelling and consultation would be necessary to confirm any impact relating to this.

From a commercial perspective, a demand forecasting exercise has been undertaken to understand potential patronage at each of the proposed station sites. Forecasts suggest that Beechwood UHI site provides the best catchment for key facilities and businesses within the Inverness East Area and overall would have the largest forecast station demand of circa 115,000 passenger entries and exits per annum in 2025. The Stratton Farm site is in the best location to serve the local population, particularly the new housing development in the Stratton area, with circa 30,000 passenger entries and exits forecast for trips to Inverness and circa 75,000 passenger entries and exits in total by 2025. The Seafield site has the potential to attract more passengers to the station than Stratton Farm due to its closer proximity to the retail park and Inverness College UHI, but overall is forecast to have considerably fewer passenger entries and exits (circa 60,000) in 2025.

Overall the outcomes of the technical feasibility, infrastructure cost and operational assessment suggest sites on the Aberdeen to Inverness Line are likely to be the most feasible, whereas from a demand perspective the Beechwood site is the clear front runner. If any of these sites is to be progressed a decision will have to be made through consultation with the rail industry as to whether the technical and operational constraints at the Beechwood site can be overcome and if not whether the lower demand and relative lower cost for the sites on the Aberdeen to Inverness line are sufficiently attractive for the scheme promoter to further develop the scheme.

Appendix A – Cost Estimate Exclusions & Assumptions

Assumptions

- 1) Any contaminated excavated material will be localised.
- 2) The design/supervision fee is taken to be 10% of the base construction cost.
- 3) Costs assume daytime working except where they relate to the existing railway.
- 4) All works can be carried out without disrupting the existing service with the exception of planned possessions.
- 5) Works carried out in a sequential manner.
- 6) All items marked as provisional items are estimated allowances.
- 7) The rates have been reviewed to reflect the current prevailing market rates and prices.
- 8) Optimism Bias is set at 64%.
- 9) Costs include for contractor's possession/isolation staff.
- 10) Network Rail Possession costs include compensation for any disruptive possessions.
- 11) Assumed appropriate ground bearing capacity with no ground strengthening or piling necessary.
- 12) Estimate has no allowance for inflation, assumes start date of Q2 2019

Exclusions

- 1) VAT.
- 2) Inflation has been excluded due to the uncertainty of start date.
- 3) Significant ground improvements or soil stabilisation.
- 4) Flood risk prevention measures.
- 5) Survey of existing structure / services except where explicitly stated.
- 6) Replacement of life expired systems and components.
- 7) All operational risks and costs.
- 8) Planning costs.
- 9) Any Land Costs or property costs.
- 10) Information Technology (IT) upgrade including any telecoms required for station services such as customer information points.
- 11) Any works not within the scope of drawings provided to inform cost estimates.
- 12) Significant earthworks for widening of the existing solum or changing the level of rail track.
- 13) No allowance has been made for gradient of existing ground at this time and assumes it is acceptable to begin from existing levels.
- 14) No allowance has been made for additional access to the stations including either additional roads, upgrading of existing structures or any new parking.
- 15) No allowance has been made for any utility or service diversion that may be required.

Appendix B – Generalised Cost Analysis

Site	Origin Output Area	Access Value of Time (£)	Service Interval Penalty Value of Time (£)	Fare to Inverness (£)	In-Vehicle Time Value of Time (£)	Total Generalised Cost (£)
Seafield	Inverness Westhill	0.67	7.17	1.20	0.37	9.41
	Inverness Smithton	0.67	7.17	1.20	0.37	9.41
	Inverness Culloden and Balloch	1.11	7.17	1.20	0.37	9.86
	Inverness Inshes	1.05	7.17	1.20	0.37	9.79
	Inverness East Rural	2.12	7.17	1.20	0.37	10.87
	Inverness Drakies	0.84	7.17	1.20	0.37	9.58
	Inverness Hilton	1.11	7.17	1.20	0.37	9.85
Stratton Farm	Inverness Westhill	0.66	7.17	1.30	0.37	9.50
	Inverness Smithton	0.54	7.17	1.30	0.37	9.38
	Inverness Culloden and Balloch	0.93	7.17	1.30	0.37	9.78
	Inverness Inshes	1.21	7.17	1.30	0.37	10.05
	Inverness East Rural	2.05	7.17	1.30	0.37	10.89
	Inverness Drakies	1.03	7.17	1.30	0.37	9.87
	Inverness Hilton	1.29	7.17	1.30	0.37	10.13
Beechwood UHI	Inverness Westhill	0.76	7.17	1.00	0.37	9.30
	Inverness Smithton	0.91	7.17	1.00	0.37	9.45
	Inverness Culloden and Balloch	1.39	7.17	1.00	0.37	9.94
	Inverness Inshes	0.81	7.17	1.00	0.37	9.36
	Inverness East Rural	2.25	7.17	1.00	0.37	10.79
	Inverness Drakies	0.55	7.17	1.00	0.37	9.10
	Inverness Hilton	0.81	7.17	1.00	0.37	9.35

