Technical Note

Document:	Review of Rail Issues associated with Potential Garden Village at Morton
Project:	Bassetlaw Local Plan
Client:	Bassetlaw District Council
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1.0 Overview

1.1 This Technical Note provides an assessment of the implications of providing a new railway station associated with the creation of a new settlement at Morton in Bassetlaw. The station would be located midway between Retford and Worksop on the Sheffield to Lincoln line and would be served by trains operating between the two cities.

1.2 This Technical Note focuses on:

- **Strategic Case** – The strategic case for the station, including an estimate of the level of patronage it could generate.
- **Case Studies** – Precedents set for new stations associated with major new settlements elsewhere in the country.
- **Service Provision** – Options through which the new station could be served and the implications on respective line capacities.
- **Potential Demand** – An estimate of the popularity of the new station, impacts on overcrowding and the revenue it would generate.
- **Views of Stakeholders** – Initial perceptions of key stakeholders critical to the delivery of the new station.
- **Level Crossings:** The potential for the closure of up to three level crossings and the associated transport and access issues that this could raise.

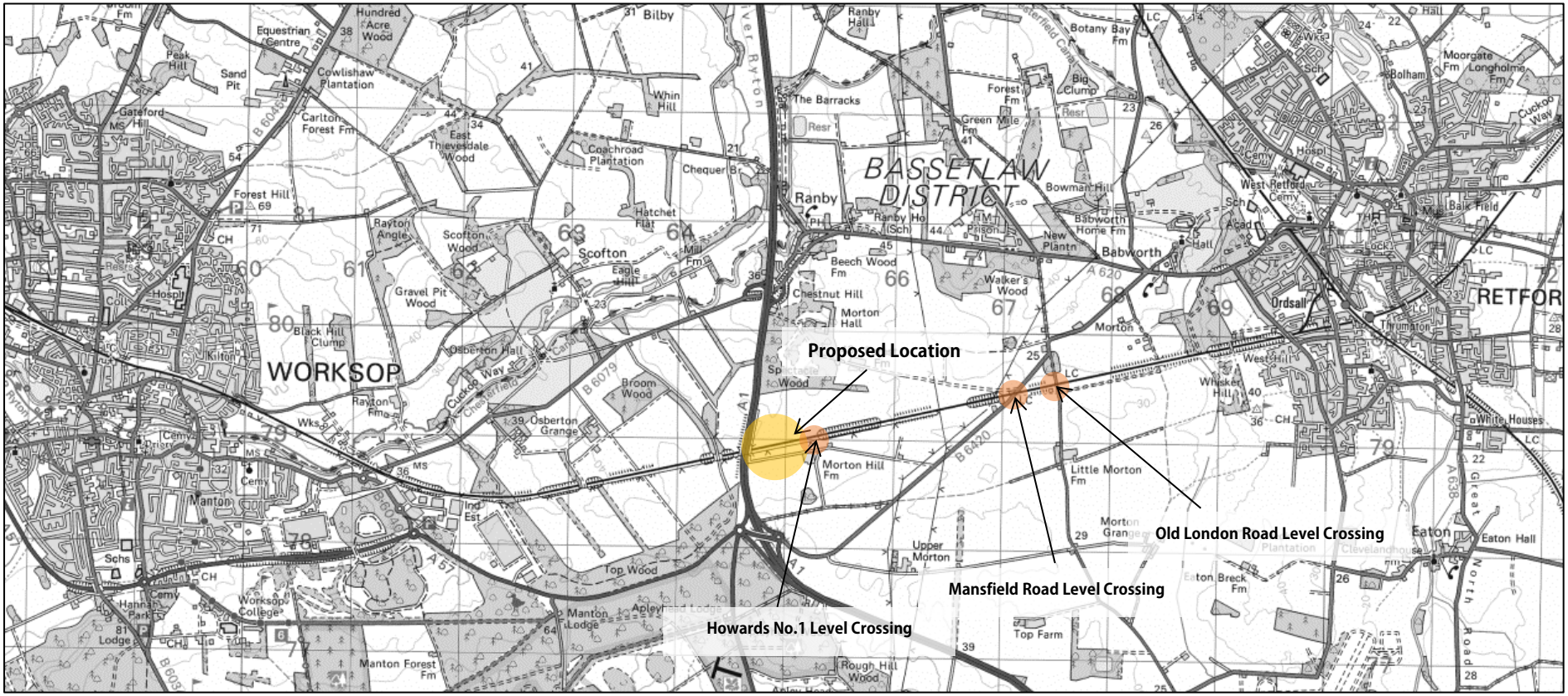
1.3 This Technical Note has been produced with the support of The Railway Consultancy, who are experts in railway planning. Their area of expertise includes operational and demand planning, simulation, track access charging, the management of passenger boarding and alighting, demand forecasting, scheme appraisal and railway business planning.

2.0 Location

2.1 The proposed location for the station is on the Sheffield to Lincoln line, midway between Retford and Worksop, immediately to the east of the A1, and to the north of Morton Hill Farm (see **Figure 1**). The site was previously the location of a station called Checker House which was closed in 1931 to passengers, and in 1963 to freight.

2.2 Access to the station would be achieved via the B6420 (Mansfield Road) with convenient connectivity to the strategic road network via the nearby Apleyhead (Five Lanes End) junction of the A1 and A57.

Figure 1: Location of Potential New Station & Existing Level Crossings



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3.0 Strategic Case

3.1 A station at Morton could support the creation of a new settlement midway between Worksop and Retford. It is envisaged that up to 4,000 dwellings could be provided in the area and these would require high capacity, high quality, fast and frequent public transport connections to reduce reliance on the car and ensure the long-term sustainability of the new community.

3.2 Strategic benefits of the new station may include:

- **Commuter Link** – The station would provide access to existing services operating between Sheffield and Lincoln via Worksop and Retford ensuring the new settlement is within easy reach of the major employment centres in the sub-region.

  Connecting services available at Retford would also open up the possibility of longer distance rail-based commuting to Doncaster and Leeds in the north and London to the south, whilst Nottingham could be reached via the Robin Hood Line at Worksop. It could also improve access to employment opportunities east of Worksop and in Ranby.

  These services would offer a realistic alternative to the car for many, which bus-based public transport provision couldn't provide.
- **Parkway Station** – The proposed location, adjacent to the A1/A57 Apleyhead junction, also suggests that it could function as a Parkway Station for commuters wanting to travel into Sheffield, and to a lesser extent Worksop. This would help to reduce the volume of traffic, and supplement local demand for rail travel, thereby increasing the viability of investment in a new facility.
- **Gateway to Clumber Park** – The station would also provide scope to encourage more sustainable access to Clumber Park. At present the park is only realistically accessible by car. The new station could provide the opportunity for it to be served more sustainably with the additional provision of cycle hire facilities and a shuttle bus service, to coincide with major events for example.
- **Viability of Services** – Given that the station would also take advantage of existing train services operating on the line, it would reduce both the cost and risk of intervention, whilst the additional passenger numbers the station could generate may help to support long-term viability of the rail service, benefiting the wider community, and could generate the case for increasing the frequency of current rail services.
- **Density of Development** – The station could reduce reliance on the car and therefore potential levels of car ownership within the new community. This may enable the provision of housing at higher densities and ensure that general traffic does not dominate the public realm.

3.3 Despite the potential benefits of the station, there are several issues which may require attention for its successful delivery:

- **Junction Capacity** – The station could place more traffic pressure on the A1/A57/B6420 Apleyhead junction if developed as a Parkway Station, by attracting trips from the strategic road network into the site.
- **Bus Service Provision** – The station could undermine attempts to improve the frequency and attractiveness of the existing bus service running close to the site (no.43 operated by Stagecoach) between Retford and Worksop.
- **Land Ownership** – Land-take requirements associated with the area immediately to the north of the existing tracks.

4.0 Case Studies

4.1 There are several examples of where new stations have been provided to support new settlements, and which also operate as Parkway Stations:

- **Buckshaw Parkway, Chorley, Lancashire** – Buckshaw Parkway Station opened in 2011 at a cost of £6.8m on the site of a former Royal Ordnance Factory between Chorley and Leyland. It was opened to serve the new community of Buckshaw Village (with a population of around 4,000) and the wider urban area. The station caters for 350,000 passengers a year who predominantly commute either north to Preston or south to Manchester.
- **Reading Green Park, Berkshire** – The £16.5m Reading Green Park Station is set to open later in 2019 to serve a new residential development of 750 houses, plus employment provision.

4.2 However, not all proposed new stations have materialised in recent years, as can be seen in the example below:

- **Wixhams, Bedfordshire** – Wixhams Station was earmarked to be provided as part of the development of 4,500 new dwellings which would form the new town of Wixhams, immediately to the south of Bedford. Despite being included within plans for the settlement, it has not been provided as the level of funding set aside fell short of the estimated cost of the station.

5.0 Service Provision

5.1 Critical to the delivery of the scheme is the ability of existing trains to serve a new station at Morton through revisions to their current timetabled schedule. Any changes to the schedule could have implications for the capacity of the wider network, particularly in Sheffield, and so the scope to revise the timetable has been considered.

5.2 There are three potential options to serve the new station, notably:

- An additional stop on the Sheffield to Lincoln service.
- An additional stop on the Sheffield to Gainsborough service.
- An extension of the Nottingham to Worksop service, to Retford via Morton.

Sheffield to Lincoln/Gainsborough Services

5.3 The rail line between Worksop and Retford has two passing trains per hour in each direction, one local service between Sheffield and Gainsborough, and a 'Northern Connect' semi-fast service between Lincoln and Leeds, via Sheffield.

5.4 The Gainsborough service commenced in May 2019, so has not yet built up to its full potential, but loadings in this area are sufficiently low that we can be reasonably sure that extra demand can be accommodated, not least because the existing 'Pacer' rolling stock is being replaced with trains of higher capacity.

5.5 At this stage, it is not easy to predict the relative future importance of this development within the region, and hence it is not clear whether it would be sensible for inter-urban Lincoln – Leeds trains to call at the proposed station. However, it would certainly be appropriate for the local trains between Sheffield and Gainsborough to call, which would add around 3 minutes to their journey times.

5.6 As timetabling in the Sheffield area is very constricted, an assumption has been made that times in that area would be kept the same, with any amendments taking place at the 'other' end of the line.

5.7 Examination of the current timetable shows that trains are currently given around 22 minutes to reverse at Gainsborough Central. Even if the 3-minute impact of stops in both directions were subtracted from this, the resulting 16 minutes is enough turnaround margin for trains running only to/from Sheffield.

5.8 However, it should be acknowledged that timetabling would become tight if the station at Waverley, recently proposed in the Sheffield City Rail Vision, were also constructed on the line between Sheffield and Worksop. That said, this might necessitate a wider reconstruction of the timetable on this line in any case.

Extension of Nottingham to Worksop Service

5.9 In addition, or as an alternative to being served by the Sheffield to Gainsborough trains, the new station could conceivably benefit from an extension of the Robin Hood Line which currently operates between Nottingham and Worksop.

5.10 Extending the service through to Retford, via the new station at Morton would provide greater accessibility to employment opportunities in the south of the county.

5.11 However, following a review of the current timetable in place, it is apparent that a new trainset would be required given the additional journey times that would be incurred. This is likely to be a show-stopper due to the extent of investment that would be required.

6.0 Potential Demand

6.1 Initial calculations have been undertaken to quantify the potential level of demand and revenue which could be generated by the new station.

Patronage

6.2 In terms of actual patronage projections for the station, estimations have been made based on the scale of new development to be delivered, the resultant population, levels of economic activity and the current modal split of commuting trips across Bassetlaw.

6.3 If the current level of rail-based commuting across the district is applied (this equated to 1.2% in the 2011 Census), it is envisaged that the station would accommodate around 42,000 trips per annum from a resident population approaching 9,500.

6.4 Such a trip rate would equate to 84 two-way trips to/from the station each day (based upon 250 workings days per year). This would put the station in a similar league to other stations on the line, such as Kiveton Bridge and Kiveton Park[1]. Both of these settlements also have a total population of about 10,000, although they also provide rail access for other villages such as South Anston and Wales.

6.5 However, if rail-based commuting accounted for 5% of all trips from the new development, the annual number of trips using the station would increase to around 175,000 before other journeys are considered, equating to around 350 two-way trips per day.

[1] https://dataportal.orr.gov.uk/statistics/usage/estimates-of-station-usage/

6.6 This level of demand would make the station the 1,463rd busiest in the country, if rank-ordered nationally, out of the 2,560 stations on the national rail network. It would therefore function as a category F1 station, but with more than sufficient demand to keep it out of the quietest and most economically-doubtful category of F2 stations[2].

6.7 Given the location of the station (directly off the A1 at a major interchange), there may also be some potential for additional patronage to be generated through the provision of a Park and Ride facility, however at this stage it is hard to estimate the level of demand.

Boardings

6.8 At a more disaggregated level, one would expect a broadly-hourly service provision at the new station, giving 32 potential departures per day (16 each way). The majority of these[3] would be expected to be Sheffield-focussed, giving a range of between 60 and 260 passengers travelling to Sheffield each day (based upon the daily trip forecast for low and high use scenarios).

6.9 With at least half of trips being in the three hours of the peak period, that could lead to between 10 and 40 people boarding the busiest train. The higher value of these could lead to overcrowding issues, but some of the passengers would be expected to alight in Worksop, allowing new passengers to take their place.

6.10 However, that is potentially only a longer-term issue, and would also be alleviated through peak-only extra stops on the Lincoln to Sheffield semi-fast services, which also pass by and (in the peaks) call at the other local stations on the line, in order both to provide capacity and a higher, more-attractive, service frequency.

Abstraction from Adjacent Stations

6.11 The proposed site is broadly four miles both from Worksop and from Retford. For local services in the regions, the existing inter-station spacing is more than enough to sustain the insertion of another stop.

6.12 Typically, 50% of the demand from stations serving residential areas comes from places within 800m of the station, a fact which demonstrates how far this site is outside the normal catchment areas of the two existing stations.

6.13 We would therefore assess the potential of this station to abstract from its neighbours to be very low, especially as both Worksop and Retford have a better service offering with a wider range of destinations.

Revenue

6.14 If the net increase in rail passengers from introducing this station were 84 per day, each paying £5, then one would expect annual net incomes in the region of £105,000.

6.15 However, the 84 passengers per day is the low end of the estimated demand range. The high end is around 350 per day, leading to revenues of almost £450,000 per annum. This would go some way towards justifying expenditure of potentially £10m on a new station and a contribution to extra operating costs, even before one adds in the values of time saved, and other social, environmental and health benefits.

[2] https://en.wikipedia.org/wiki/United_Kingdom_railway_station_categories

[3] We have assumed three-quarters of all journeys will be towards Worksop/Sheffield based upon a survey of peak time trains on 18 June 2019.

Impact on Wider Demand

6.16 The likely loss of demand from the increased journey time to existing passengers on passing services is assessed using generalised cost theory. This quantifies journey difficulty into an 'index of hassle', from which elasticities (response rates) can be applied to understand changes in journey characteristics.

6.17 Calculations have been undertaken in relation to a typical journey on the line from Retford into Sheffield. This indicates a loss of about 1 passenger per train. With at most 40 trains calling per day, the resulting demand loss of 40 is much less than the 200+ expected to be generated by the station.

6.18 Moreover, in terms of the impact of this extra stop on existing passengers, the timing of the current proposal is opportune. Passengers between Retford and Sheffield have recently benefitted both from a doubling of service frequency, and from a speed increase on alternate trains (as the service doubling has allowed the Lincoln train to be speeded up, running non-stop West of Worksop).

6.19 These benefits between them have contributed to a major improvement in service and removing 3 minutes of that benefit would not be expected to be regarded too adversely by passengers.

7.0 Views of Stakeholders

7.1 The deliverability of a new station would be heavily dependant upon the support of Network Rail and the Train Operating Companies (TOCs) who would serve it, together with Nottinghamshire County Council as the local transport authority. As such initial discussions were held with the County Council, Network Rail and Northern, who operate the current Sheffield to Lincoln service, between July and August 2019.

Northern

7.2 A tele-conference was held with Pete Myers, the Stakeholder Manager for Northern on 23 July 2019. In principle, Northern support a new station at Morton, particularly if it serves both the new community and operates as a Park and Ride from the A1.

7.3 From an infrastructure perspective there are not considered to be any real issues. The line is straight and there are no other stops, although advice from Network Rail would be required in terms of the most appropriate location.

7.4 The main issues are likely to relate to timetabling. Demand on the line is driven by Sheffield (for commuting) with trips to Lincoln being more for leisure purposes.

7.5 At present 2 trains per hour use the line, one to/from Gainsborough and one to/from Lincoln. The Gainsborough train is slow and stops at all stations, and with a 30 minute turnaround time at Gainsborough, there is unlikely to be a detrimental effect on longer distance patronage of proving an additional stop at Morton.

7.6 The Lincoln train however is fast and there would be ramifications in terms of the impact on longer distance travellers, as a result of the slower journeys an additional stop would see.

7.7 However, the provision of a Park and Ride site would improve the case for a new stop on the Lincoln service (at the expense of the longer distance trips).

Network Rail

7.8 A tele-conference was held with Stephen Hind, the Route Enhancement Manager at Network Rail on 27 August 2019. In principle Network Rail support the new station if it can be demonstrated that there is capacity on the line to accommodate scheduled services.

7.9 It was noted that whilst a previous station may have been located in the area, the exact siting may not be the most appropriate for a modern station and so all options should be considered.

7.10 The closure of the three level crossings along the line would be welcomed.

7.11 Finally, it was estimated that a new station in the broad location identified on the Sheffield to Lincoln Line, including the provision of a lift or ramps, would cost in the region of £10-15m.

Nottinghamshire County Council

7.12 A tele-conference was held with Kevin Sharman, the Transport Strategy Team Leader at the County Council on 27 August 2019. He to expressed support for the concept as a means of encouraging more sustainable travel in the area.

7.13 He stated that the reason many of these schemes do not 'get off the ground' is because of line capacity and if sufficient slack is within the current timetable, then the station could be a deliverable proposition.

7.14 It was stated that the line has seen a number of improvements recently, including new services and a reduction in journey times, and this could complement these changes.

8.0 Level Crossings

8.1 It is Network Rail's policy to remove or replace level crossings to improve the safety of the rail network. There are three level crossings in place on the Sheffield to Lincoln Line between Worksop and Retford. These comprise:

- **Howards No.1 Level Crossing** – Provides a crossing point for local farm traffic only. It is not accessible from the public highway and as such is likely to be used infrequently and only by farm vehicles.
- **Mansfield Road Level Crossing** – The B6420 Mansfield Road forms an important link between Retford and the A1, Clumber Park and Worksop. It caters for an Annual Average Daily Traffic flow of around 3,100 vehicles[4] and so its closure would result in the reassignment of a significant number of trips.
- **Old London Road Level Crossing** – Unclassified road predominantly serving several farms. It offers an alternative route in the event of any closure of Mansfield Road.

8.2 The locations of the crossings are shown in **Figure 1** and illustrations of their provision are depicted in **Figure 2**. The most realistic alternative routing options for the key movements are summarised in Table 1 and illustrated in **Figure 3**.

[4] Nottinghamshire County Council Traffic Surveys Database (Survey Ref 000010906578)

Table 1: Alternative Routing Options Associated with the Closure of Level Crossings

Movement	Alternative Route	Issues
Retford to A1	There are three alternative junctions through which traffic can travel between the A1 and Retford, via Blyth to the north, Ranby to the west and Markham Moor to the south.	No major issues. Potential junction improvements required.
Retford to Worksop	The A620/B6079 provides an alternative link between the towns, passing under the A1 at Ranby.	No major issues. Potential junction improvement required.
Retford to Clumber Park	Traffic is likely to use the A620 and then the A1 between Ranby and the A57. Traffic could avoid the A1 by travelling into Worksop and then back out (using the B6079/B6040/A57) but this is unlikely to be the case in practice.	This would see local traffic using a 2km section of the A1, which could undermine its strategic role.
Local Farm Traffic	The closure of all three level crossings would provide local farm traffic with three options with which to access the fields on either side of the tracks: - Eastern Option | Travel east using Old London Road, Ollerton Road and the A620. - Western Option | Travel west over the A1, along the A57, B6040 and B6079, and under the A1. - Direct Option | Join the A1 at the junction with the A57 and exiting at the Ranby junction, 2km to the north.	The most direct route would see farm traffic use the A1, but this would see slow, local traffic using the strategic road network which should be avoided due to capacity and safety concerns.

Key Concerns

8.3 The most pressing concerns associated with these re-routing options are the additional traffic demand that key junctions would be subject to due to traffic reassignment, particularly the A1 junction at Ranby and the potential impact of local traffic, including farm traffic on the A1, with the capacity and safety concerns this could represent.

8.4 Further analysis is required to understand the propensity for farm traffic to travel between both sides of the railway. The Garden Village development to the south may see the current farm disappear and so the issue of farm vehicles on the A1 may not arise. Alternatively, concerns could be negated through:

- The transfer of the fields to the north of the tracks to 'Forest Farm' to remove the demand/need for movement across the tracks.
- Utilise an existing underbridge immediately to the south of Great Morton which is only suitable for farm vehicles (see **Figure 4**).

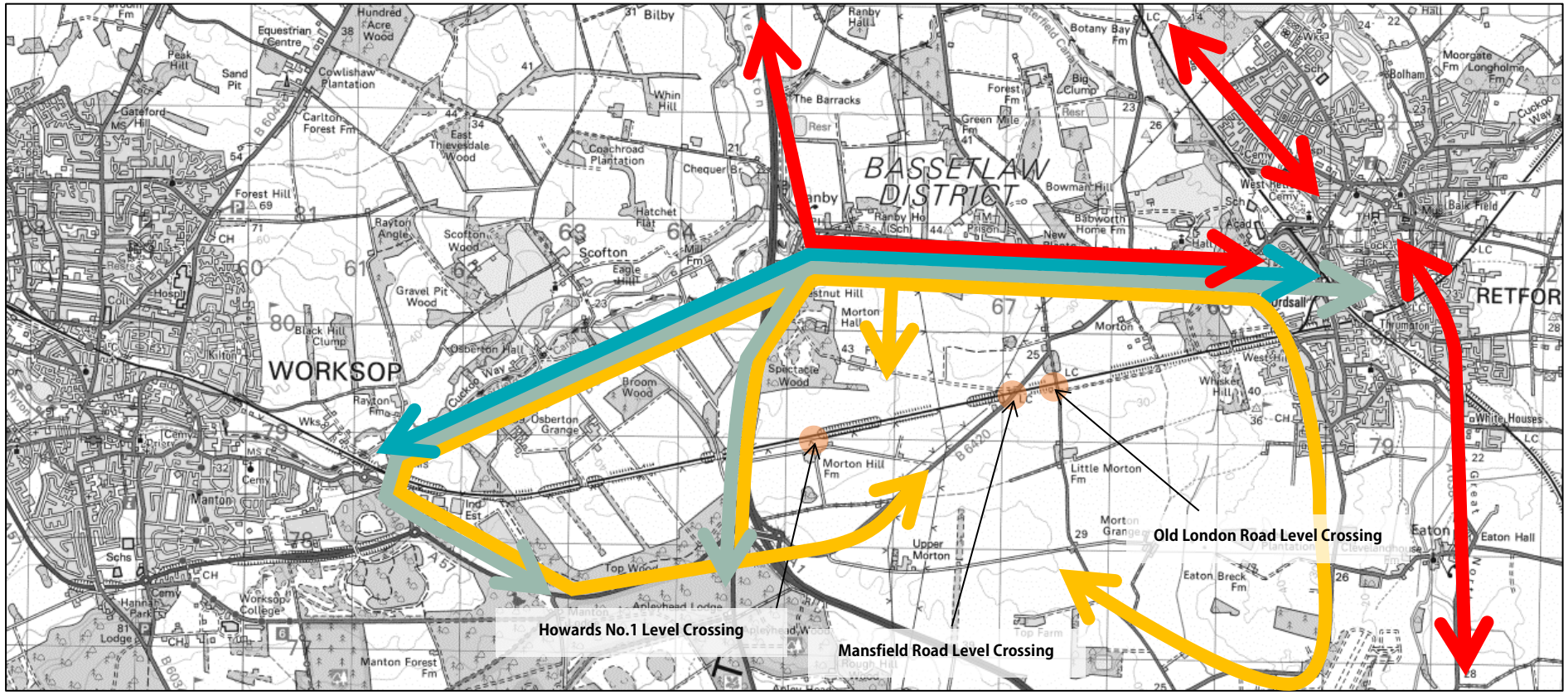
Figure 2: Level Crossing Images

Howards No.1 Level Crossing

Mansfield Road Level Crossing

Old London Road Level Crossing

Figure 3: Re-Routing Options



Key:

| Retford to A1
| Retford to Worksop
| Retford to Clumber Park
| Local Farm Traffic

Figure 4: Underbridge at Great Morton

Underbridge at Great Morton

Replacement Bridge – Pedestrians and Cyclists

8.5 Whilst appropriate re-routing of general traffic can be identified, there remains a need to cater for pedestrian and cycle movements close to the level crossings. Whilst existing demand is likely to be low, this will substantially increase as a result of the provision of 4,000 dwellings in the Morton area. As such it is envisaged that a bridge or underpass will be required to cater for future pedestrian and cycle movements.

8.6 The most obvious location for this would be on the alignment of Mansfield Road as the Old London Road doesn't provide a convenient or direct connection. Improvements to pedestrian and cycle links along Mansfield Road to the A620 should also be considered.

Replacement Bridge – Buses and General Traffic

8.7 If the development site is to be served by a fast and direct bus service, the alternative routing arrangements for general traffic will not suffice and a more substantial bridge would be required.

8.8 This would generate substantial additional costs, and as detailed elsewhere in this Technical Note, the provision of a new train station and the connectivity it will provide, may negate the need for a dedicated bus service. However, if a bus service is seen as an important part of the sustainable transport offer, a bridge over the railway is likely to be required.

8.9 The provision of the bridge is likely to be constrained along the current alignment of Mansfield Road due to the existing dwellings and an electricity sub-station, whilst to the west there is a solar farm and electricity pylons, with more solar panels in the fields to the east. Therefore, a bridge on the alignment of Old London Road would appear to provide the most appropriate and constraint free routing option, together with a new east-west road link back towards the Garden Village.

8.10 Finally, it is also worth considering if a road bridge should permit access by all modes, or if it should be a facility dedicated to sustainable transport. By only allowing buses, pedestrians and cyclists to use the bridge, it may give them a journey time advantage over general traffic and thereby encourage more sustainable access into Retford, reflecting the principles of the Garden Village initiative.

9.0 Summary

9.1 There appears to be a strong case for the provision of a new station at Morton, to serve a new Garden Village. There are few obvious barriers in terms of providing the physical infrastructure, whilst timetable changes can be made to ensure that it is served by regular trains, without disruption to the wider network.

9.2 The anticipated level of demand also points towards a revenue stream which could make the station a viable and attractive public transport option to support growth in the local area.