

The Implementation and Likely Effects on Demand of Improved Rail Links in Wessex.

(The Yeovil Junction Southern Chord.)

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Executive Summary

For historical reasons the railways in parts of Wessex, as in many other areas of the country, do not always form a coherent network (see Appendix Two). Such problems reduce the attractiveness of rail for many journeys, by unnecessarily increasing both the time of journeys and the levels of interchanging required. These difficulties mean that the local rail network is not contributing as effectively as it might to a reduction in the growth of congestion on the parallel road network. Many cross-country rail services therefore remain un-competitive, under used and unprofitable.

This report investigates one way of significantly improving the connectivity of the Wessex rail network by more effectively linking in a little used part of it - the line between Castle Cary and Weymouth. This integration could be achieved by connecting the Waterloo - Exeter and Weymouth - Castle Cary lines with a new track (chord) just south of the point at which they cross near Yeovil. Fortunately the earthworks for this connection are in place, having been constructed in 1860 to facilitate the exchange of traffic between the two railways. The installation of this Southern Chord would permit significantly upgraded services between West Country and the South Coast¹, east of Weymouth, as well as providing several other benefits.

The most obvious impact of the opening of the Southern Chord is the possibility of improved rail connections between south Dorset/Hampshire and the West Country. There are, however, additional benefits and some disbenefits associated with the implementation of the chord and these are outlined in the table below.

Benefits	Disbenefits
Improves journeys from south coast to points west of Yeovil.	Increases journey time for trips between points south of Yeovil and points north of Yeovil, e.g. Dorchester to Castle Cary.
By diverting some cross-country passengers from the congested eastern part of the Wessex network to the less congested western part, capacity is freed up for additional traffic.	Makes the operation of summer through trains from the north to Weymouth more difficult.
Improves access to mainline services at Yeovil Junction for people accessing the Yeovil urban area.	Increases the complexity of track layout and signalling at Yeovil Junction.
Reduces the amount of plain track (between Thornford and Yeovil Pen Mill) that needs to be maintained.	Closure of direct route between Thornford and Yeovil Pen Mill could make it more difficult to provide freight services north from Weymouth in the future.
Could allow the closure of Thornford Halt (reducing journey times) as an additional stop would be provided nearby at Yeovil Junction.	Would cause a small loss of revenue as some passengers previously made extended journeys via Southampton.
Increased passenger numbers at Yeovil Junction station would increase the viability of facilities/services at the station, e.g. retailing, connecting bus services, station staff, cycle storage. Creates a positive feedback loop.	
Simplifies the track layout and signalling at Yeovil Pen Mill.	
Improves journeys from stations between Exeter and Salisbury to points north of Yeovil.	
Presents the opportunity for completely new services, e.g. Weymouth - Exeter.	
Might allow the installation of an easily graded cycle path on surplus trackbed between Yeovil town centre and Yeovil Junction station.	

¹ For the purposes of this report, the West Country is defined as west of Sherborne and the South Coast as the area between Weymouth and Southampton.

Benefits	Disbenefits
May reduce the need for Paddington services to stop at Castle Cary (increasing line capacity and reducing journey times) as local westbound traffic would go be routed via Yeovil.	
Would provide a service into Yeovil for the minor settlements near Junction station, e.g.: Barwick and Stoford, though the bus is likely to prove more convenient.	
Would allow the Yeovil Junction steam centre to run summer trains to Weymouth helping to promote tourism in the resort and increase utilisation of a little used section of track.	

The table below presents the best estimates from the model of all the additional traffic and revenue that would be generated by the implementation of the Southern Chord. These gains must be offset against the loss in revenue that would result from passengers in the future being sent on a more direct route. This would mean that passengers would in the future be paying lower fares. It is estimated that this revenue loss would be small, amounting to approximately £12,254 p.a.

Total Additional Rail Trips p.a.
including redistribution/generation at 10%

Southern Chord Service Pattern	Additional Trips	Additional Revenue
Weymouth - Plymouth	69,102	£1,266,631
Weymouth - Exeter	39,739	£662,245
Weymouth - Yeovil Junction	10,292	£158,326
<i>Additional Diverted Trips</i>	<i>4,377</i>	<i>-£12,254</i>

The study suggests that there are significant impediments to rail journeys between the south coast and the West Country at present. The plethora of, often very indirect, alternative routes and fares are confusing both to the potential passenger and the staff at NRES. In the short term it may be worth considering improvements to the connections available at Castle Cary to ensure that every service between Castle Cary and Weymouth makes a connection with First Great Western services. This would increase the attractiveness rail between the South Coast and the West Country at minimal cost.

In the longer term the additional benefits of the Southern Chord may be sufficient to justify its implementation. While the additional traffic (and revenue) may not be particularly large; it is unlikely (in rail terms) to be an expensive scheme. Funding may also be available through various schemes, like the Rail Passenger Partnership Program. The benefits of Chord are, however, unlikely to be fully realisable until the Waterloo - Exeter line is upgraded and, if the Chord is to be implemented, it would appear logical do this at the same time as any upgrade. This would reduce the costs of implementation considerably and would allow the re-casting of services to create a new network. Any reductions in journey times between Waterloo and Exeter that result from such an upgrade, would increase patronage over the Southern Chord by reducing generalised travel times on cross-country journeys. Journeys via the Southern Chord would then become significantly more attractive than those via Castle Cary (the best route currently available). It may be that it is a combination of the benefits associated with the Chord, rather than just the likely increase in revenue between the South Coast and the West Country, that justify its implementation.

1 Introduction

1.1 The Network

For historical reasons the railways in parts of Wessex, as in many other areas of the country, do not always form a coherent network (see Appendix Two). Such problems reduce the attractiveness of rail for many journeys, by unnecessarily increasing both the time of journeys and the levels of interchanging required. These difficulties mean that the local rail network is not contributing as effectively as it might to a reduction in the growth of congestion on the parallel road network. Many cross-country rail services therefore remain un-competitive, under used and unprofitable.

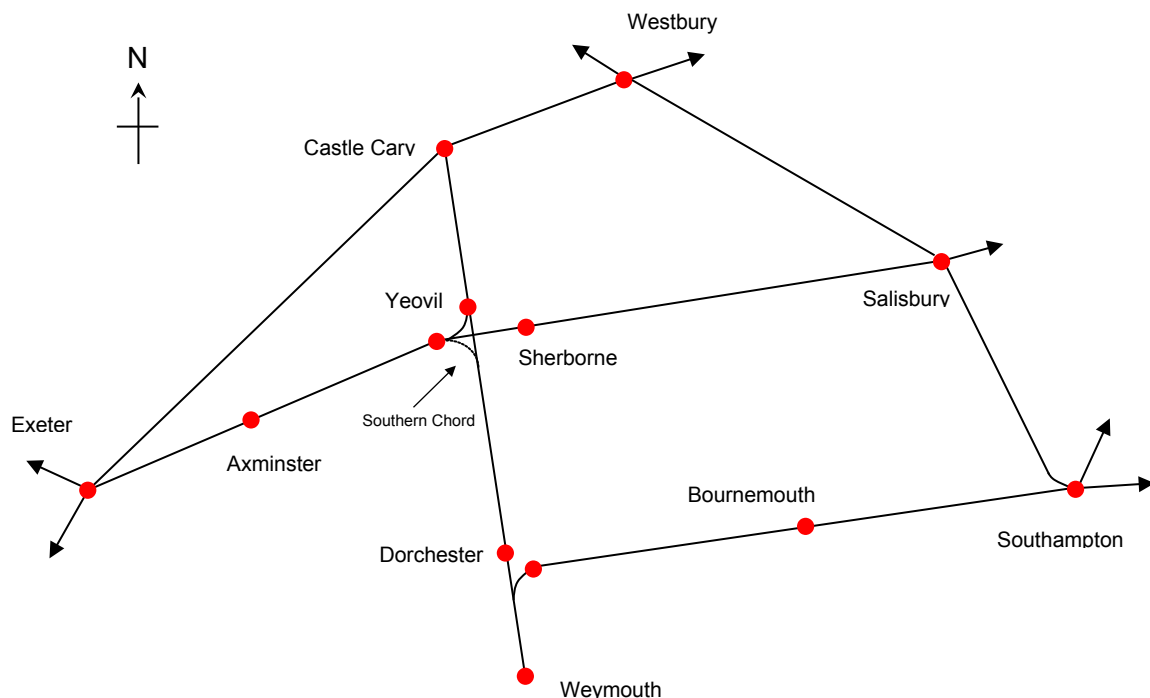


Figure 1.1. The Wessex Rail Network
Lyminster and Hamworthy branch lines omitted for clarity

This report investigates one way of improving the connectivity of the Wessex rail network (Figure 1.1) by more effectively linking in a little used part of it - the line between Castle Cary and Weymouth (Figure 1.2). This integration could be achieved by connecting the London (Waterloo) - Exeter and Weymouth - Castle Cary lines with a new track (chord) just south of the point at which they cross near Yeovil. The earthworks for this connection are in place, having been constructed in 1860 to facilitate the exchange of traffic between the two railways. It would appear that the installation of this Southern Chord, would permit significantly upgraded services between West Country and the South Coast² (east of Weymouth) as well as providing several other benefits.

The implementation of this Yeovil Junction Southern Chord has been under consideration for some time and a previous study (Harrell, 1986) presented an overview of some of the potential benefits. Although the Southern Chord is still listed as a possible future development (for example, in Local

² For the purposes of this report, the West Country is defined as west of Sherborne and the South Coast as the area between Weymouth and Southampton.

Transport Plan for Somerset 2001-2006, July 2000) more detailed work was not been carried out and the scheme has not progressed.

This study has been undertaken by an experienced freelance transport consultant and aims to consider the proposal in more detail. It also attempts to give some indication of the likely impact of the scheme on patronage and revenue. It should be noted that this research has been undertaken without the official support, or funding, of any body related to the project; although some people have provided information. It must therefore be stressed that this is a preliminary investigation with only limited access to data, relying on a combination of limited original data collection, standard parameter values and information gleaned from previous research. Nevertheless the author's experience in undertaking such work during the past decade (see Appendix 2) means that the study should be able to give a useful indication of the likely impact of the project.

1.2 The Rail Operators

Since privatisation in 1990s the train services operated by the former British Rail have been provided by 25 franchisees. The services examined in this report have, until recently, been operated by three companies: South West Trains (part of the Stagecoach group), Wales and West (part of the Prism Group) and Great Western (part of First Group). In terms of the map in figure 1.1., Stagecoach operate the services between Waterloo - Bournemouth and Weymouth, as well as the services between Waterloo - Salisbury and Exeter. Wales and West have been operating the services between Salisbury and Southampton, as well as those between Weymouth - Yeovil and Castle Cary. Great Western operate the services between London (Paddington) - Westbury and Exeter.

Various difficulties have resulted in the Wales and West services being taken over by National Express on a caretaker basis until the franchise is renewed. From 14 October 2001 Wales and West services were split between two new rail companies: Wales and Borders Trains and Wessex Trains, in preparation for the renewal of the franchise. The services within the scope of this report were transferred to the latter organisation. As part of this re-franchising process it is proposed that the Waterloo - Yeovil - Exeter service is to be transferred from South West Trains to Wessex trains in 2003 (although South West Trains are currently applying for a two year extension).

Rail demand has, in recent years, been growing at unprecedented levels (according to the Strategic Rail Authority, surface rail passenger kilometres rose by 24% between 1990 and 1999) and in many cases lack of capacity has become a serious problem. Patronage on the line between Waterloo and Exeter has now grown to such an extent that there is talk of re-doubling the sections of the line that were singled in 1967. In this new climate, investment in rail infrastructure is receiving a more positive response than in the recent past and this coupled with the ongoing arrangements for re-franchising presents an opportunity to investigate the unification of the network.

2 Current Transport Services.

2.1 Rail.

The only traffic that remains between Castle Cary and Weymouth is a local passenger service and occasional summer excursion trains. There has been a significant effort to generate additional traffic in recent years by the Bristol - Weymouth Rail Partnership and the service is now branded as the "Heart of Wessex Line". Some engineering trains and diverted passenger services occasionally access the line via a northern chord between Yeovil Pen Mill and Yeovil Junction stations.

The Castle Cary - Weymouth line has a two-hourly service calling at most stations, although services usually only stop on request at the three smaller stations: Thornford, Yetminster and Chetnole. The trains used on this service are generally Diesel Multiple Units (DMUs) dating from the 1980's - some of which no longer offer a particularly pleasant travelling environment.

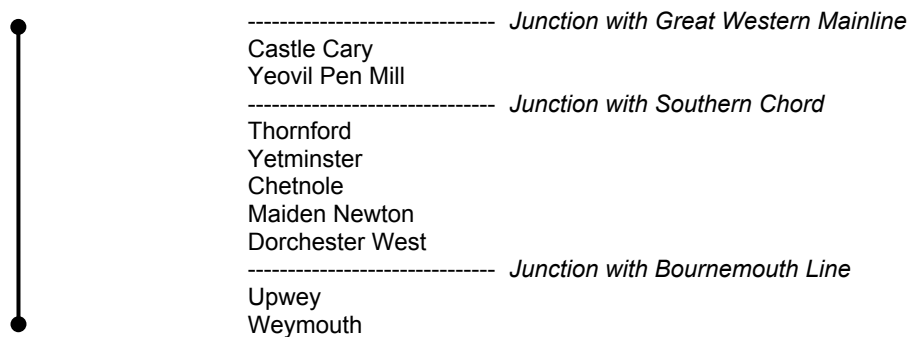


Figure 2.1. Order of Stations between Weymouth and Castle Cary.

It is possible to make connections between Castle Cary - Weymouth services and several others; although the infrequent nature of these can mean that long waits are required at interchange points. Connections are available at Westbury, for London and other stations towards Southampton and Brighton. London connections can also be made at Castle Cary. Connections with Waterloo - Weymouth services can be made at Dorchester (where a ¼ mile walk is required between Dorchester West and Dorchester South stations), Upwey and Weymouth.

The scope of this study means that two of the adjoining lines will be considered in this exercise. These are the Waterloo - Yeovil Junction - Exeter and Waterloo - Southampton - Weymouth routes.

The Yeovil Junction line has a two-hourly service from Waterloo, which calls at most stations on the line. Some additional services operate east of Gillingham and Salisbury. Most services are operated using DMUs built in the 1990's. The line is predominantly single track west of Salisbury although there are proposals to reinstate a second track.

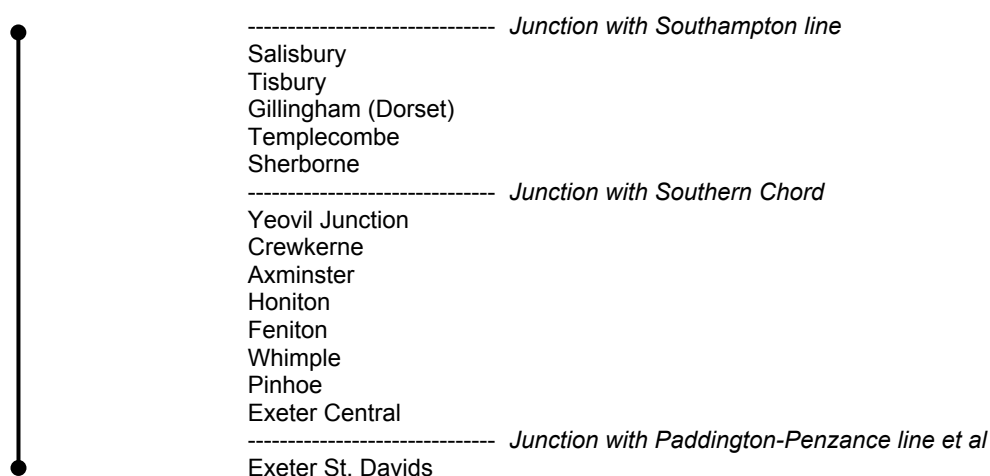


Figure 2.2. Order of Stations between Salisbury and Exeter.

The Southampton line has an hourly service between London and Weymouth, calling at all stations west of Wareham. This is supplemented by additional trains running east of Wareham. Weymouth services are usually run using class 442 Wessex electric stock from the late 1980's, while services east of Wareham often use much older stock based on the 1950's Mark One design. The line is electrified and double tracked, except for the section between Moreton and Dorchester South - which was singled in the late 1980's.

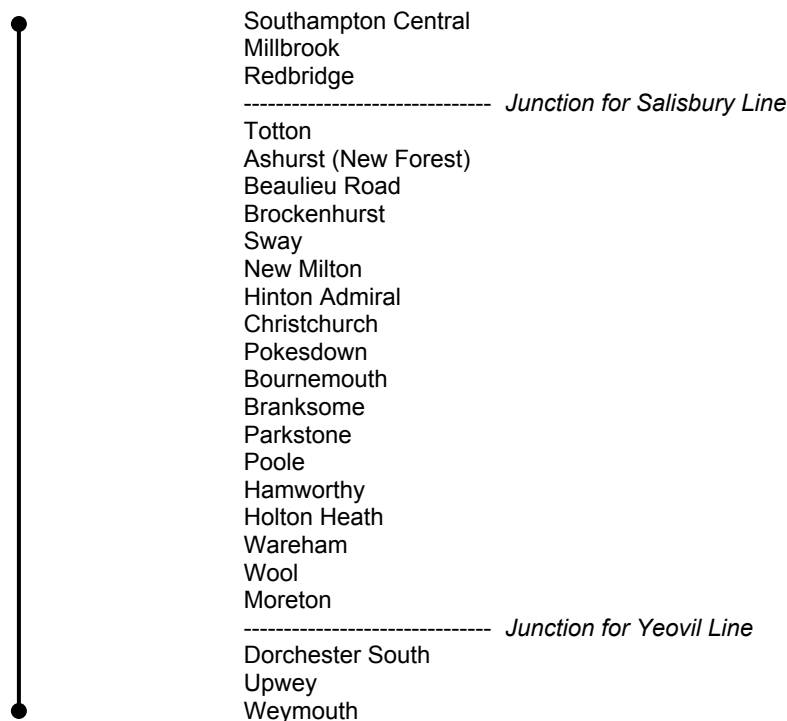


Figure 2.3. Order of Stations between Weymouth and Southampton.

2.2 Private Car.

The main trunk route that is of relevance, to the Southern Chord, is the A31/A35 which runs from Southampton, around the Bournemouth/Poole conurbation and on to Dorchester and Honiton: where it joins the A30 going westwards to Exeter. The road is a mix of single and dual carriageway.

Congestion on the A30/A35 between Exeter and Bere Regis, is under normal conditions, not significant, nor is it forecast to be in the next 10 years. Motorists travelling east of Bere Regis who use the A31 to Southampton do, however, experience significant congestion at peak periods (Hyder/Highways Agency, Nov. 2001). Although no data has been obtained by this study, it is believed that the A35 east of Bere Regis, into the Bournemouth/Poole conurbation, also suffers from peak period congestion.

The section of the A35 between Honiton and Dorchester passes directly through a number of communities, where it serves in some cases as the high street, creating "severe adverse environmental impacts" (Hyder/Highways Agency, Nov. 2001). A significant source of these impacts are heavy good vehicles. Hyder state that "much of the route falls well below the modern standards for a trunk road". The low standard of this section of route means that the personal injury accident (PIA) rate is at its highest on this section, reaching 38.6 PIA per million vehicle kilometres between Bridport and the junction with the A37 west of Dorchester. This compares with a figure of 8 PIA on the dual carriageway section between Puddletown and Bere Regis.

2.3 Bus.

The principal bus/coach route within the scope of the study is National Express service 315/6, which runs along the south coast - daily in winter and twice daily in summer. Service 315 runs all year round from Brighton to Cornwall via (among others): Southampton, Bournemouth/Poole, Dorchester, Weymouth, Axminster, Honiton, Exeter and Plymouth.

There are several other bus services that can, theoretically, be used to connect rail services on the Waterloo - Bournemouth/Poole - Weymouth route with those on the Waterloo - Yeovil Junction - Exeter service to allow a through journey to be made by public transport from South Dorset/Hampshire to the West Country. There is, however, no integrated ticketing and only limited co-ordination of these rail/bus services.

Southern National (part of the First Group) service 216, which is supported by Dorset County Council, goes from Dorchester to Sherborne. It runs six times per day in each direction on weekdays and five times on Saturday, taking just over 50 minutes to make the journey. This service calls at the railway station in Sherborne, but not at either of the stations in Dorchester.

Service 31, run by Southern National, goes between Weymouth, Dorchester and Axminster. It takes 1 hour and 40 minutes and goes 12 times a day from Monday to Saturday and six times per day on Sundays and public holidays. The bus calls at Axminster and Dorchester South railway stations.

The X53, run by Southern National, runs between Weymouth and Exeter via (among others): Bridport, Lyme Regis and Seaton. It takes approximately 3 hours for the complete trip. The service is subsidised by Dorset and Devon county councils, running 3 times a day from Monday to Saturday in each direction.

Southern National service 212, which is supported by Dorset County Council, runs parallel to the railway between Yeovil and Dorchester. Four end to end services are provided in each direction from Monday to Saturdays, while five or six additional services run in each direction on between Maiden Newton and Dorchester. These services provide a local service to areas that are not served by intermediate stations on the railway. The bus does not call at Yeovil Junction Station.

3 The Southern Chord.

3.1 Weymouth - Castle Cary Line.

As can be seen from Appendix Two, the line from Weymouth up to Castle Cary and beyond was built in a competitive environment, to serve different patterns of demand to those seen today. In Victorian times private railway undertakings were keener to maximise profits by securing territory for *their network*, than to enhance overall opportunities for the travelling public by providing an integrated *national network*. In the days when rail was the dominant means of transport, such activities were (*just*) sustainable; but this has not been the case since the 1950's.

The Weymouth - Castle Cary route effectively lost the battle (with the coastal route to Waterloo) to become the principal route to Weymouth. The subsequent decline of the town, as a port and seaside resort, has further reduced the line's *raison d'être*. The line thus continues to make losses and serves little practical purpose in its present form.

If the line is to remain in operation, it makes financial sense to identify ways of reducing these

losses by either increasing revenue, or reducing costs. As the line is already operated as a minimal railway, there is little scope for reducing costs and significant efforts have already been made in recent years by the Bristol - Weymouth Rail Partnership to increase revenue by developing the market for leisure travel.

The opening of the Southern chord presents an opportunity to provide a new focus for the line, as part of a through route, which would attract additional traffic - while continuing to serve the limited local markets that it does at present. Although these additional flows would be small in national terms, they may not significantly increase the operating costs of the service and may attract enough additional revenue to justify the relatively small investment required in additional infrastructure.

It could be argued that if such a scheme was economic, it would have been implemented in the past. But the fact that the various rail services and routes involved have been managed by different organisations for much of their lives, has made it hard to progress such a scheme. An attempt was made to provide a connecting bus service between the two Yeovil stations to allow such cross-country journeys to be made. The service ran for several years but did not prove entirely effective and it has now been withdrawn (see section 3.3). It may be that a rail link between the stations would prove more successful and the breaking down of the traditional groups in the modern railway could present an opportunity to pursue this option.

3.2 Railways in Yeovil

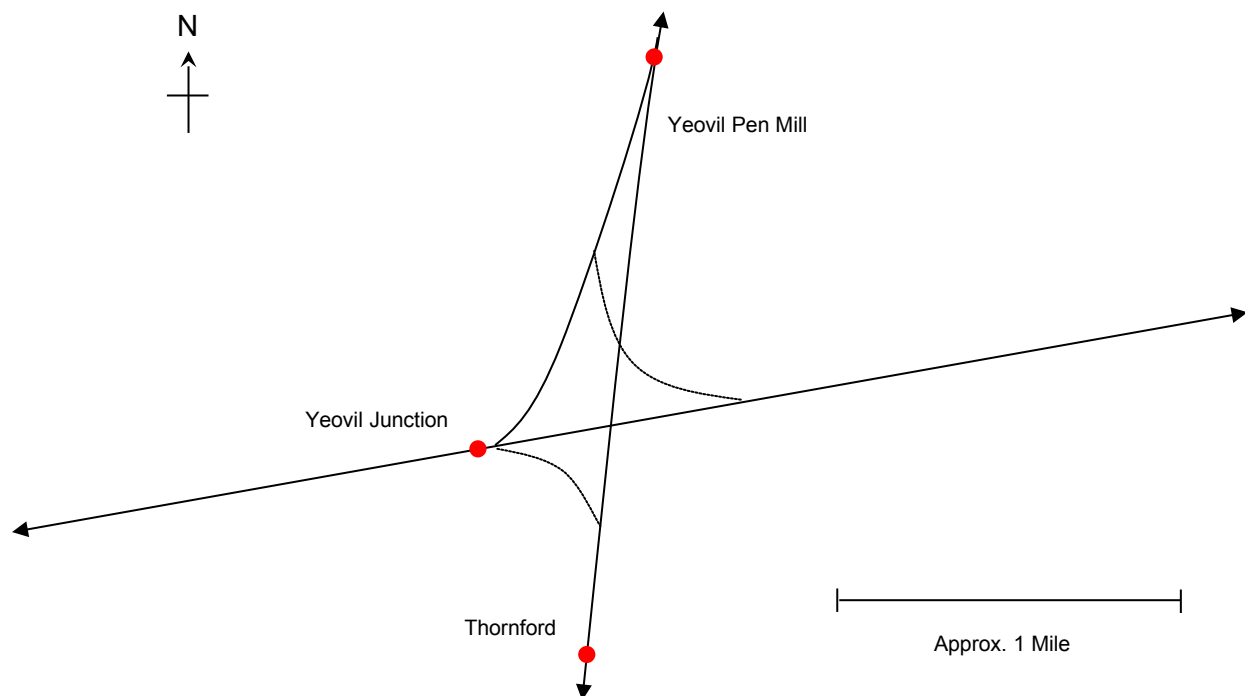


Figure 3.1. Trackbeds in the Yeovil Area.
Some trackbeds omitted and alignments simplified for clarity

Yeovil now has two railway stations. Yeovil Pen Mill is just on the eastern edge of the town and is served by trains on the Weymouth - Castle Cary line. Yeovil Junction is three miles outside of the town and is served by trains running between Waterloo and Exeter. The two stations are three

miles apart by road.

Trains from the two routes cross each other just to the east of Yeovil Junction station (see figure 3.3) and passengers are unable to change from one service to the other, unless they walk, take a taxi or use two local buses. There is a rail connection between the two lines on the northern side of Yeovil Junction station, but this is usually only used for engineering movements and diversions.



Figures 3.2. (left) The Southern end of the Southern Chord at Yeovil Junction.
Figure 3.3. (right) The Crossing of the Two Lines at Yeovil Junction.

Historical investigation and a site visit, have revealed an unused earthwork to the south west of Yeovil Junction station (figure 3.2) which could connect the two lines to the south. This could be re-instated and used in combination with the northern connection to allow trains from Weymouth to run into Yeovil Junction, reverse out and then continue their journey northwards to Yeovil Pen Mill and beyond.



Figure 3.4. The Eastern End of Yeovil Junction Station,
The Southern Chord can be seen on the right.

As the figures 3.2 and 3.4 show, there are no obstructions on the trackbed and some of the trackwork, necessary for such a manoeuvre, is already in place at Yeovil Junction. If the current direct route between Thornford and Yeovil Pen Mill were to be closed and the track lifted: the complexity of the trackwork on the southern approaches to Yeovil Pen Mill could be reduced, partially offsetting increases in costs at Yeovil Junction. Some of the track from the lifted route could also, perhaps, be used to create the new chord.

3.3 The Yeovil Bus Link

During the early 1990's a shuttle bus was run between the two Yeovil stations in an attempt to better link the services on the two lines. The service required subsidy from the local authorities (Dorset and Somerset County Councils) and was presumably not considered cost-effective - as it was withdrawn several years ago. It could be argued, that the failure of this service means that demand for such cross-country rail journeys via Yeovil is insufficient to justify the expense of more costly alterations to the rail infrastructure. However, there were several impediments to the success of the bus link, that would not be present if a rail service via the Southern Chord were to be implemented.

Using the connecting bus required two bus-rail interchanges; whereas only one cross-platform interchange would be required on services via the Southern Chord. Travel via the Yeovil bus link was not therefore likely to be attractive to those with luggage/children or the elderly. A perception that rural bus services, in an age of deregulation, may be temporally unstable could also have reduced passengers' confidence in a route that involved the use of a connecting bus. The two rail services were not designed to connect with the bus service, which could mean prolonged waits at either station. Finally, although the connecting bus service did sometimes appear in the rail passenger timetable, there was only limited integrated ticketing and rail staff still tended to route passengers via longer rail-only routes. An indication of the problems were described by Harrell in 1986.

Attempts have been made to improve the situation at Yeovil by instigating a useful minibus link between the two stations and the town centre which has proved fairly popular. This is jointly subsidised (£4,000 in total) by British Rail, Dorset and Somerset County Councils and publicity leaflets are available at both stations. However, for an adult this involves an additional charge of £1 each way between the stations reducing the attractiveness of the route, especially as so many difficult changes have to be made. Although the bus link leaflet highlights a number of journeys that benefit from using it, the direct South Dorset/Hampshire-West Country route is not among them. Through-booking is now available for the bus service from stations in South Dorset. But all passengers west of Wareham are routed via Westbury to the West Country and all passengers east of Wareham are routed via Southampton/Salisbury. So the bus link may as well not exist for through passengers to the West Country. Perhaps the best example of bad routing is provided by Southern Region whose reluctance to direct passengers on to the Dorchester-Yeovil line is illustrated by a new passenger route guide at Bournemouth station. This directs passengers from Bournemouth to the West Country via Southampton/Salisbury, without even mentioning alternative routes. But the most stunning example in the guide is the suggested route for a journey from Bournemouth to Yeovil. This sends passengers via Southampton/Salisbury meaning that the passenger is taken to Yeovil Junction station (well outside of the town) and in doing so the passenger has to travel 33 miles in the wrong direction and pay for it, on a journey of 40 miles by road!

4 Impacts of the Southern Chord

4.1 Overview

The most obvious impact of the opening of the Southern Chord is the possibility of improved rail connections between south Dorset/Hampshire and the West Country. There are, however, additional benefits and some disbenefits associated with the implementation of the chord and these are outlined in table 4.1.

Table 4.1. Impact of the Implementation of the Southern Chord.
(on the assumption that the direct route between Thornford and Yeovil Pen Mill is closed)

Benefits	Disbenefits
Improves journeys from south coast to points west of Yeovil.	Increases journey time for trips between points south of Yeovil and points north of Yeovil, e.g. Dorchester to Castle Cary.
By diverting some cross-country passengers from the congested eastern part of the Wessex network to the less congested western part, capacity is freed up for additional traffic.	Makes the operation of summer through trains from the north to Weymouth more difficult.
Improves access to mainline services at Yeovil Junction for people accessing the Yeovil urban area.	Increases the complexity of track layout and signalling at Yeovil Junction.
Reduces the amount of plain track (between Thornford and Yeovil Pen Mill) that needs to be maintained.	Closure of direct route between Thornford and Yeovil Pen Mill could make it more difficult to provide freight services north from Weymouth in the future.
Could allow the closure of Thornford Halt (reducing journey times) as an additional stop would be provided nearby at Yeovil Junction.	Would cause a small loss of revenue as some passengers previously made extended journeys via Southampton.
Increased passenger numbers at Yeovil Junction station would increase the viability of facilities/services at the station, e.g. retailing, connecting bus services, station staff, cycle storage. Creates a positive feedback loop.	
Simplifies the track layout and signalling at Yeovil Pen Mill.	
Improves journeys from stations between Exeter and Salisbury to points north of Yeovil.	
Presents the opportunity for completely new services, e.g. Weymouth - Exeter.	
Might allow the installation of an easily graded cycle path on surplus trackbed between Yeovil town centre and Yeovil Junction station.	
May reduce the need for Paddington services to stop at Castle Cary (increasing line capacity and reducing journey times) as local westbound traffic would be routed via Yeovil.	
Would provide a service into Yeovil for the minor settlements near Junction station, e.g.: Barwick and Stoford, though the bus is likely to prove more convenient.	
Would allow the Yeovil Junction steam centre to run summer trains to Weymouth helping to promote tourism in the resort and increase utilisation of a little used section of track.	

The remainder of report considers these impacts in more detail, focusing on the likely impacts on rail passenger demand: as it is the revenue from this that is likely to drive investment in the scheme.

4.2 Inter-regional Traffic: South Coast to the West Country.

4.2.1 Overview.

The main traffic flows that present an opportunity for the Southern Chord are trips between the south coast and the West Country. Theoretically any journey that has one trip end on the South coast between Brighton and Thornford (the last station to the south of Yeovil) and another west of Yeovil Junction is in scope. However, in practical terms the quality of the coastal rail service and the existence of the Southampton - Salisbury line reduce the potential of the Southern Chord significantly. The extent of the latter's potential is likely to be determined by the form of any train service offered via the Chord. If direct services were to be offered from Weymouth to Exeter and perhaps beyond, the amount of interchanging required for cross-country journeys is reduced, making journeys via the chord more attractive. Such through services would therefore produce higher levels of patronage and revenue.

In an attempt to establish the likely patronage and revenue associated with services via the Southern Chord, the size of the total market is first estimated. Simple diversion models based on the generalised costs of travel are then used to gauge the likely transfer to rail. It should be remembered that the resources available to this study were limited and further work may be necessary if investment in such a scheme were to be seriously considered.

4.2.2 Bus.

The main route that caters for flows that are within the scope of the Southern Chord are National Express Services 315/6. These run daily between Southampton - Bournemouth - Weymouth - Dorchester - Exeter - Plymouth and points further west. The service also stops at: Poole and Wareham. An additional daily service runs through Bournemouth and Exeter in the summer months. Relief coaches have in the past been run during busy periods; though it is not clear that this is still the case. The fares between Bournemouth and Exeter are: single/economy day return £13, £14.40 economy apex return (7 days advance booking, not Friday), standard apex return (7 days advance booking, Friday), £16 economy return (not Friday) and £19 standard return (Friday).

Passenger flows between Dorchester and Axminster/Honiton/Exeter are of interest to this study; but as the coaches are operated by a private company, patronage and revenue figures are not publicly available. A previous study (Harrell, 1986) managed to estimate patronage for the services by counting passengers boarding/alighting at Dorchester and Exeter, as well as observing/counting passengers during a number of trips on the services.

The previous study estimated that 25,480 trips were made in each direction between Dorchester and Exeter during 1986. It was noted that load factors were higher in the summer months (as would be expected on a route carrying some tourist traffic). In summer coaches were reported to be around 80% full, while in winter this fell to around 45%. A through journey factor, for the section between Dorchester and Exeter, of between 81% and 88% was recorded.

Since 1986 the number of services run by National Express on the route has been reduced and there are now only two buses per day each way in summer and one bus per day in winter. Further journeys and observations have been made and the winter load factor is now estimated at 37%, while that in the summer is believed to be about the same as that recorded in 1986. The through journey factor is estimated to be 85%. On the basis of this updated information and the National Express timetable it is estimated that 17,617 passengers were carried each way in 2001. This represents a 31% reduction in coach traffic since 1986, which compares to a broadly static picture nationally during this period.

A number of the local bus services, mentioned earlier in the report, can be used to make journeys that are within the scope of this section.

Although it is possible, using a variety of local bus services, to get from Bournemouth to the Waterloo - Exeter main line, such connections are only usually possible once per day and are very time consuming. It can, for example, take three hours to get from Bournemouth to Gillingham by a combination of local bus services³. It is therefore unlikely that any of the passengers using these services are in scope.

It is theoretically possible that cross-country travellers are using Southern National service 216 from Dorchester to Sherborne (which takes 50 minutes end to end) to enable such cross-country journeys. However, the lack of a stop at Dorchester South station and through ticketing, as well as the lack of any information about the possibility of making such connections, means that it is highly unlikely that more than a handful of passengers would be making such trips.

Service 31 run by Southern National between Weymouth, Dorchester and Axminster takes 1 hour and 40 minutes from Dorchester to Axminster. From Monday to Saturday it provides an hourly service calling at both Axminster and Dorchester South railway stations. Again the lack of through ticketing and the slowness of the journey makes it unlikely that significant numbers of people are using this to connect the two rail services. There may, however, be a handful of people travelling solely by bus who could be captured by a direct rail service over the Southern Chord. As no data is available and the numbers likely to be small they are ignored in the calculations.

The X53, run by Southern National, runs between Weymouth and Exeter via (among others): Bridport, Lyme Regis and Seaton. It takes approximately 3 hours for the complete trip. The service runs 3 times a day in each direction from Monday to Saturday. The low frequency of the service, the amount of time that the journey takes end-to-end and the lack of through ticketing means that it is unlikely that anyone is using the service as part of a multi-modal journey that is within the scope of this section. There may, however, be a very limited number of passengers that make bus only journeys from end-to-end. Again as no data is available and the numbers likely to be small they are ignored in the calculations.

4.2.3 Car.

As mentioned previously the main road corridor between the south coast and the West Country is the A30/A35/A31. This road has been upgraded in recent years with a number of by-passes and partially duelled. It is now possible to drive between Bournemouth and Exeter in approximately 2 hours. Table 4.2 shows the average annual daily traffic flows for each section of the route between Exeter and Bere Regis (just over 10km the west of the Bournemouth/Poole conurbation).

A Route Management Study (RMS) study, sponsored by the Highways Agency, is currently being undertaken by Hyder Consulting. The study is to be used to plan future investment on the route and information presented in its various reports has allowed an estimate to be made of the number of car trips within the scope of the Southern Chord. During the RMS a number of roadside interviews were conducted at three locations: Chideock (on the A35 near Bridport), on the A35 east of Dorchester and on the A31 near Ferndown. By combining the information obtained from the interviews with aggregate traffic data, the consultants have managed to produce an origin-destination matrix for traffic using the route.

³ For example, Damory Coaches service 310 from Bournemouth to Blandford and service 309 from Blandford to Gillingham.

Table 4.2. Road Traffic Statistics for A30/A35 between Exeter and Bere Regis.

Section	Length (Km)	Average Speed (Km/h)	Seasonal Index (Aug./Mar.)	AADT 2001	AADT 2011 (forecast)	% HGV	% PSV	Average Time
1	23.01	60.3	1.01	18,913	22,393	8	0.5	14:14
2	15.33	44.7	1.03	9,410	11,141	8	0.8	12:47
3	7.47	45.5	1.04	9,286	10,995	7	0.6	6:08
4	13.5	44.1	1.08	13,583	16,081	5	0.5	11:25
5	20.51	43.8	1.04	11,776	13,943	6	1.0	17:20
6	5.95	49.9	1.05	15,475	18,332	8	0.7	4:28
7a	2.28	60.5	1.01	19,575	23,117	10	0.4	3:51
7b	3.95	60.5	1.01	"	"	"	"	"
8	9.61	60.3	1.01	19,105	22,620	5	0.6	5:57

Source: Hyder/Highways Agency

Notes:

Sections of A30/A35 defined by Hyder and the Highways Agency (November 2001)

- 1 A30/M5 junction at Exeter to A30/A35 junction east of Honiton.
- 2 onwards to A35/A350 junction near Axminster.
- 3 onwards to A35/A3052 roundabout west of Charmouth.
- 4 onwards to A35/A3066 roundabout east of Bridport.
- 5 onwards to A35/A37 roundabout west of Dorchester.
- 6 onwards to A35/B3150 roundabout east of Dorchester.
- 7a onwards to A35 at change of road standard west of Yellowham Hill.
- 7b onwards to A35/A354 junction east of Puddletown.
- 8 onwards to A35/A31 junction east of Bere Regis.

AADT Average annual daily traffic, total annual traffic in both directions divided by 365.

HGV Heavy Goods Vehicle

PSV Public Service Vehicle (buses and coaches)

Table 4.3. Road Traffic Flows from Exeter and Points West to Areas on the South Coast.

Flows from Exeter & West to →	Dorchester	Poole/Bournemouth	Weymouth	A31/5 between Dorchester & Southampton	Southampton	Total
All Vehicles (AADT)	290	1,530	190	735	2,795	5,540
HGVs as % of O-D	6.9%	4.9%	0.0%	2.7%	1.4%	
PSVs as % of O-D	5%	5%	5%	5%	5%	
Thus cars (AADT)	256	1,379	181	678	2,615	5,108
% of Cars Total	5.0%	27.0%	3.5%	13.3%	51.2%	100%
Car Occupancy	1.5	1.5	1.5	1.5	1.5	
Thus Car Users (AAD)	383	2,068	271	1,017	3,923	7,662
Annual Car Users	139,886	754,729	98,824	371,342	1,431,849	2,796,630

Source: Adapted from Hyder/Highways Agency

Notes:

AADT Average annual daily traffic, total annual traffic in both directions divided by 365.

AAD Average annual day, total annual amount in both directions divided by 365.

HGV Heavy Goods Vehicle

PSV Public Service Vehicle (buses and coaches)

Other information, both from the various RMS reports and other sources, has been used to refine the figures to enable an estimate to be made of the number of car users for each origin-destination per annum (table 4.3). Traffic classified as internal is not considered to be within the scope of the Southern Chord and the total number of car trips that could *theoretically* be captured is therefore 2,796,630 p.a..

4.2.4 The Current Rail Market.

Estimates of rail patronage for 1986 were also made by Harrell (1986). These estimates were based on data provided by, the then, British Rail. Current data is not available, because of commercial sensitivity; but estimates can be made on the basis of the data used in the earlier study.

Since 1986 there have been several changes to rail services in the area. The line from Bournemouth (Branksome) to Weymouth has been electrified, removing the need to change motive power at Bournemouth and accelerating journey times west of Bournemouth. Dorchester South Station has been re-built and most Waterloo trains now serve Upwey station, increasing the opportunities for interchange there.

In 1986 passengers from west of Wareham were routed via Weymouth or Dorchester and Westbury; while those east of Wareham were routed via Southampton and Salisbury. Although there was a connecting minibuss service between the two lines at Yeovil (see section 3.3.) it was rarely mentioned to prospective passengers and has since been withdrawn.

The Railtrack train planner (RTP) and the National Rail Enquiry Service (NRES) currently offer prospective passengers three main routes for journeys between the South Coast and the West Country. The routes include interchanges at: Southampton/Salisbury, Dorchester/Castle Cary and Southampton/Westbury. There appear to have been improvements in the connections available at Castle Cary in recent years (there are now five weekday connections between Bournemouth and Exeter compared with two in 1986).

A number of additional routes via, for example, Basingstoke and even Reading are sometimes proposed by the RTP and NRES. The latter was recently suggested, during a call to NRES, for a journey between Bournemouth and Exeter at return fare of £72.00! It appears that, in an attempt to be fair to all the train operators, NRES are offering a bewildering array of routes and fares. This complexity sometimes means that NRES staff issue incorrect or conflicting advice, which cannot be to rail's overall benefit.

The number of possible routes means that the fares on rail services between the south coast and the West Country are rather complex, as they depend on both the exact route taken and the time of travel. For example, consider a journey between Bournemouth and Exeter: a single, going via Dorchester and Castle Cary, is £21.50 and a 5 day return (travelling after 09.30) is £27.80. According to NRES it is not possible to buy a return on this route to travel before 09.30. The preferred route is via Southampton and Salisbury/Westbury and a single on that route costs £27.70. A five day return via Southampton and Salisbury is £33.40 (travel after 09.30) and a return on this route (allowing travel before 09.30 and a stay away of more than five days) is £34.50.

Using the information reported by Harrell (1986) the following estimates of rail patronage can be derived. The number of trips with one trip end between Bournemouth and Weymouth, and the other beyond and including Exeter was 17,514 in 1986. Of these trips 36% had a trip end in the Bournemouth/Poole conurbation. The most popular West Country origin/destination was Plymouth, followed some way behind by Exeter.

Since 1986 there have been significant changes in the economy, society and the travel market that

could have produced significant changes in these numbers. Increases in real disposable income and thus car ownership have been shown to reduce the demand for rail travel on secondary lines; but increases in economic activity have, conversely, been shown to generate an increasing propensity to travel. Significant sections of the parallel A31/A35/A30 road route have been improved, reducing journey times by car; although journey times by rail have also improved. Conventionally railway analysts use a time trend on secondary routes of -2.0% p.a. to account for rail's worsening position as a result of social change and a growth factor to account for extra demand generated by the growth in the economy (measured by GDP). The elasticity for rail demand with respect to GDP for such services is believed to be around 1.5 and GDP growth has averaged 2.55% p.a. between 1987 and 2000⁴. This suggests that rail traffic should have slightly increased during this period. Nevertheless, for the purposes of this analysis, the slightly conservative assumption is made that rail traffic is the same as in 1986.

This estimate excludes a number of other trips that are currently being made by rail that could be diverted via the Southern Chord.

1. Journeys with one trip end between Crewkerne and Pinhoe, and the other between Thornford - Weymouth - Bournemouth.
2. Journeys with one trip end between Southampton and Bournemouth, with the other north and/or west of Dorchester.
3. Journeys with one end between Southampton and Brighton and the other west of Sherborne.
4. Journeys between Thornford - Weymouth - Totton and Sherborne - Salisbury.

On the basis of a very simple model (based on patronage from the nearest station, where data was available and population) it is estimated that first group would account for approximately 379 trips per annum and the second 2,032 trips p.a.. The third group would comprise of significantly more trips, perhaps of the order of 15-20,000 p.a. but these are unlikely to be diverted by via the Southern Chord, unless this was required to free some capacity between Southampton - Salisbury and Yeovil. The fourth group of trips would require such indirect rail journeys that it is unlikely that anyone would make them.

This means that the number of existing rail trips that would be likely to be routed over the Southern Chord would be 20,260 p.a (17,514 + 379 + 2,032). It is likely that around half of these are currently routed via Southampton and Salisbury and the other half via Weymouth/Dorchester and Castle Cary.

4.2.5 Likely Diversion to the Southern Chord.

4.2.5.1 *Diversion from Car.*

During the A30/A35/A31 RMS interviews car users were asked the question, "could you use another form of transport?". Of those interviewed between Honiton and Dorchester, only 6% believed that they had an alternative. Respondents were asked which modes they would use and the results are presented in Table 4.4.: Just over a quarter, of those who stated that they could use another mode, considered rail to be an alternative. This suggests that only 1.5% of interviewees considered themselves able to use rail in place of car for their current journey.

This figure should not, however, be taken as the maximum potential diversion to rail. The question would have been answered on the basis of a respondent's perception of the alternative services available at present. Previous research has shown that car drivers and passengers (to a lesser extent) are unlikely to be aware of the full range of alternatives available to them. Rail services between the West Country and the South Coast are not particularly attractive and while people

⁴ UK Office for National Statistics.

may know that rail is a theoretical option, many probably do not consider a journey from Bournemouth to the West Country, via Southampton and Salisbury, as a viable alternative.

Table 4.4. Alternative Modes of Travel

Mode	Train	Bus/Coach	Bicycle	Walk	Other	Total
Number	323	138	170	101	525	1,257
%	25.7%	11.1%	13.5%	8.0%	41.8%	100.0%

4.2.5.2 Coach:

During the coach surveys it was noticed that a large proportion of the coach passengers were either of retirement age or students. To attract either market the railway would need to offer a more direct route with more attractive fares. The current level of interchange is also likely to be an impediment to the pensioner market and it is unlikely that many such people would be attracted to a rail journey that involved a $\frac{1}{4}$ of a mile walk at Dorchester. This suggests that it may be better to use Upwey, or even Weymouth, as an interchange in the south.

4.2.5.3 Current Rail:

The implementation of the Southern Chord would mean that passengers from Weymouth to Totton would be routed via Dorchester. Passengers from Southampton and points further east along the coast could theoretically be routed via Dorchester and Yeovil, instead of Salisbury, which may help to redistribute passengers from busier to quieter sections of the network, enabling the more effective use of capacity. The feasibility of such an idea would depend on whether direct services from Weymouth to Exeter were to be introduced. If the Southern Chord was to be predominantly served by Weymouth - Bristol trains, the additional interchange penalty at Yeovil would make journeys from Southampton and points east unattractive compared to the existing route via Salisbury. In the model it is assumed that no passengers travelling to/from Southampton and points east are routed via the Chord.

4.2.5.4 The Model

The estimation of the additional patronage and revenue that would accrue in the event of the Southern Chord being implemented, has been made using simple logit models. These estimate the diversion to rail from car and bus for trips between several zones. The models use standard parameter values and are calibrated to replicate the current travel market in the corridor. The models compare the generalised travel times of the various alternatives to estimate the numbers of passengers that would use each mode. The modelling process is described in more detail in Appendix One.

To give an indication of the relative attractiveness of the options available to people travelling in the corridor, end-to-end travel times are shown in Tables 4.5 to 4.8 for four of the most common journeys.

Tables 4.5 and 4.6 compare the travel times from Bournemouth to Exeter and Weymouth to Exeter. It is clear from these figures that few options even approach the times achievable by car. It is perhaps only direct services via the Southern Chord between Weymouth and Exeter that come close, taking 25% longer than a journey by car. The current favoured rail route from Bournemouth to Exeter (via Southampton and Salisbury) is the least competitive option and takes longer than the National Express coach - despite the service stopping for a meal break en-route at Bridport. Times via Dorchester and Castle Cary are competitive with the coach and even with the current irregular

connections, at the latter, offer a significantly more frequent service. If direct Weymouth - Exeter services were offered via the Southern Chord significant savings could be made on the best times available via Castle Cary. If a change were to be required at Yeovil Junction, savings via the Chord would be much smaller.

Table 4.5. Comparison of Travel Times of Various Modes/Routes:
(Bournemouth - Exeter)

Mode and Route	Travel Time	Compared to Car	Compared to Coach	Compared to Rail via Southampton & Salisbury
Car using A30/A35	2 hours	1.00	0.62	0.57
National Express Coach	3 hours 15 mins	1.63	1.00	0.92
Rail via Southampton & Salisbury	3 hours 32 mins	1.77	1.09	1.00
Rail via Dorchester & Castle Cary	3 hours 3 mins	1.53	0.94	0.86
Rail via Southern Chord (change at Dorchester)	2 hours 36 mins	1.30	0.80	0.74
Rail via Southern Chord (change at Dorchester & Yeovil Junction)	2 hours 56 mins	1.47	0.90	0.83

Services via the Southern Chord assume an average 20 minute wait at each interchange.

Table 4.6. Comparison of Travel Times of Various Modes/Routes:
(Weymouth - Exeter)

Mode and Route	Travel Time	Compared to Car	Compared to Coach	Compared to Rail via Castle Cary
Car using A30/A35/A354	1 hour 25 mins	1.00	0.61	0.65
National Express Coach	2 hours 20 mins	1.65	1.00	1.08
Rail via Castle Cary	2 hours 10 mins	1.53	0.93	1.00
Rail via Southern Chord (direct)	1 hour 46 mins	1.25	0.76	0.82
Rail via Southern Chord (change at Yeovil Junction)	2 hours 6 mins	1.48	0.90	0.97

Services via the Southern Chord assume an average 20 minute wait at each interchange.

Tables 4.7 and 4.8 consider journey times between Bournemouth/Weymouth and Plymouth. Car travel appears to be even more attractive for such journeys: this is in part because of the slow speed of rail services between Exeter and Plymouth. Rail services via Southampton and Salisbury again offer un-competitive times from Bournemouth, even more so to Plymouth because of the need to interchange at Exeter. Services via Castle Cary are more competitive, as many of the trains calling at this station also call at Plymouth. Services via the Southern Chord only beat those via Castle Cary, if direct services from Weymouth to Exeter (and ideally beyond) are operated.

Table 4.7. Comparison of Travel Times of Various Modes/Routes:
(Bournemouth - Plymouth)

Mode and Route	Travel Time	Compared to Car	Compared to Coach	Compared to Rail via Southampton & Salisbury
Car using A30/A35	2 hours 33 mins	1.00	0.58	0.52
National Express Coach	4 hours 25 mins	1.73	1.00	0.90
Rail via Southampton, Salisbury & Exeter	4 hours 56 mins	1.93	1.12	1.00
Rail via Dorchester & Castle Cary	4 hours 07 mins	1.61	0.93	0.83
Rail via Southern Chord (change at Dorchester)	3 hours 40 mins	1.44	0.83	0.74
Rail via Southern Chord (change at Dorchester & Exeter)	4 hours	1.57	0.91	0.81
Rail via Southern Chord (change at Dorchester, Yeovil Junction & Exeter)	4 hours 20 mins	1.70	0.98	0.88

Services via the Southern Chord assume an average 20 minute wait at each interchange.

The tables suggest that rail's position in the corridor could be improved, in the short term, by routing much of the traffic via Castle Cary in preference to Southampton. At present connections at Castle Cary are irregular and interchange is not possible from all Weymouth line services. Ensuring that a reasonable connection can be made from all trains would be likely to increase traffic. There may, however, be other priorities for the timing of Paddington - Exeter services and in the longer term the upgrading of the Waterloo - Exeter line presents the opportunity to install the Southern Chord at reduced cost. It is expected that this work will also reduce journey times between Yeovil and Exeter, which will then make journeys via the Southern Chord more attractive - even compared to journeys via Castle Cary. Yeovil Junction is also likely to prove a more attractive interchange, as it would be able to sustain a greater range of facilities for waiting passengers.

Table 4.8. Comparison of Travel Times of Various Modes/Routes:
(Weymouth - Plymouth)

Mode and Route	Travel Time	Compared to Car	Compared to Coach	Compared to Rail via Castle Cary
Car using A30/A35/A354	1 hour 25 mins	1.00	0.40	0.44
National Express Coach	3 hours 30 mins	2.47	1.00	1.08
Rail via Castle Cary	3 hours 14 mins	2.28	0.92	1.00
Rail via Southern Chord (direct)	2 hours 50 mins	2.00	0.81	0.88
Rail via Southern Chord (change at Exeter)	3 hours 10 mins	2.24	0.90	0.98
Rail via Southern Chord (change at Yeovil Junction and Exeter)	3 hours 30 mins	2.47	1.00	1.08

Services via the Southern Chord assume an average 20 minute wait at each interchange.

4.2.5.5 Results

On the basis of the generalised times calculated using the model, the following estimates of the

additional patronage and revenue that might result from the implementation of the Southern Chord have been produced. Estimates have been made on the basis of three possible service patterns. The highest forecasts are associated with direct Weymouth to Plymouth services and the lowest where services continue from Weymouth up to Bristol, meaning that an interchange would be required at Yeovil Junction. It may be that the best option would be some combination of these service patterns, but further work would be required to develop an optimal solution. All Southern Chord journey time estimates, used in the model, are based on current start-to-stop times which would, of course, be lower if the line from Waterloo to Exeter were to be upgraded as proposed.

Table 4.9. Additional Rail Trips p.a. Diverted from National Express Coach

Southern Chord Service Pattern	Additional Trips	Additional Revenue
Weymouth - Plymouth	12,233	£214,869
Weymouth - Exeter	10,375	£180,406
Weymouth - Yeovil Junction	6,597	£118,214

The increased attractiveness of journeys between the South Coast and the West Country is likely to result in some redistribution of trips from other destinations, as well as the generation of completely new trips. For example, a person in Bournemouth who may have previously taken a weekend break in London, might (after the implementation of improved rail services to the West Country) decide to try a break in the West Country instead. It is hard to estimate this generation effect and it is unlikely to be large with the limited improvements suggested. It could, however, provide an additional 10% above the figures outlined in the tables above.

Table 4.11. Additional Rail Trips p.a. Diverted from Car

Southern Chord Service Pattern	Additional Trips	Additional Revenue
Weymouth - Plymouth	50,587	£936,614
Weymouth - Exeter	25,751	£421,635
Weymouth - Yeovil Junction	2,759	£25,719

It is also important to consider the way that demand would increase after the implementation of any new services. It is unlikely that any increase in patronage would occur immediately. The infrequent nature of the trips made in the corridor may mean that it could take 2-3 years before the forecast levels are reached. The profile of this "ramp up" in demand would depend upon several issues, one of the which would be the marketing that accompanied any new service.

Table 4.12. Total Additional Rail Trips p.a.
including redistribution/generation at 10%

Southern Chord Service Pattern	Additional Trips	Additional Revenue
Weymouth - Plymouth	69,102	£1,266,631
Weymouth - Exeter	39,739	£662,245
Weymouth - Yeovil Junction	10,292	£158,326
<i>Additional Diverted Trips</i>	<i>4,377</i>	<i>-£12,254</i>

Table 4.12 presents the best estimates from the model of all the additional traffic and revenue that

would be generated by the implementation of the Southern Chord. These gains must be offset against the loss in revenue that would result from passengers in the future being sent on a more direct route. This would mean that passengers would in the future be paying lower fares. It is estimated that this revenue loss would be small, amounting to approximately £12,254 p.a.

4.3 Yeovil - London Services.

4.3.1 Overview

Yeovil Junction station is located some distance away from the town it serves. One benefit of the implementation of the Southern Chord would be the opportunity to offer an improved rail service between the town of Yeovil and stations along the Waterloo - Exeter line. This may particularly affect journeys to London.

It is currently possible to reach London Paddington by rail from Yeovil Pen Mill station; but the service is irregular and one or more interchanges are required. From Yeovil Pen Mill there are approximately five reasonably direct (requiring only one interchange with no backward or sideways travel) services. The average total rail travel time is 2 hours and 29 minutes, with an average wait at the interchange (Castle Cary or Westbury) of 23 minutes. Direct services to London Waterloo from Yeovil Junction take an average of 2 hours and 17 minutes to reach Waterloo. The timetable is rather complex, but 14-17 direct trains operate each way from Monday to Friday.

At present London can also be reached by two coach operators. Berry's Coaches run two express coaches on weekdays from Taunton to London (Hammersmith) calling at Yeovil. Coaches depart Yeovil at 08:00 and 10:30, arriving in London at 10:40 and 13:10 respectively - a journey time of 2 hours and 40 minutes. The return trips leave London at 15:15 and 18:15, arriving in Yeovil at 18:00 and 21:00 respectively. An adult single costs £12.00, a day return £13.00 and a period return £17.00.

National Express run a daily service between Yeovil and London which takes 4 hours and 40 minutes. The bus departs Yeovil at 07:40 and arrives in London Victoria at 12:20. It is hard to imagine that anyone uses this service to travel to London, as the Berry's service is cheaper and allows a later departure with an earlier arrival in London. A single costs £14.00, a day return £15.50 and an open return £22.00.

4.3.2 Impact of the Southern Chord.

Without further research it is very difficult to make any estimate of the likely impact of better connections between Yeovil Pen Mill and Waterloo bound services. There is very little data publicly available with which to make such an assessment. Until the mid 1960's Yeovil Junction was connected by a rail shuttle service to another station near the town centre called Yeovil Town. When Yeovil Town station was closed, it was reported that mainline (Waterloo) traffic suffered as a result (St. John Thomas). An estimate of the reduction in patronage is not available; but the figures would nevertheless be too dated to have much relevance today.

It could be argued that the current bus service (no. 680) connecting Yeovil town centre to Yeovil Junction station is just as effective as a rail link to Pen Mill station, which is not located in the town centre. On the other hand a rail feeder would have some other advantages, such as through ticketing, higher speeds and more space for luggage. A rail shuttle would also not require a local subsidy which the bus service does.

4.4 Other Issues

There are a number of additional issues that would be likely to have a bearing on whether the Southern Chord were to be implemented. Most of these are highlighted in figure 4.2.

The increased use of Yeovil Junction station, generated by this scheme and the upgrade of the line between Waterloo and Exeter would increase the viability of passenger facilities at the station. The station could become a kind of rural transport hub offering some park and ride opportunities for cars and cycles (which could perhaps access the station using surplus railway trackbeds).

There has been talk of significant port developments in the Weymouth/Portland area. Such a development would be likely to create additional freight traffic, some of which might be routed via Yeovil Junction.

There may be complications arising from the way services in the area are divided between franchisees. Passengers from Bournemouth to the West Country are routed via Southampton and Salisbury to the benefit of South West Trains. If passengers are routed via Castle Cary, First Great Western and Wessex Trains would benefit. The Southern Chord would be to the advantage of Wessex Trains and South West Trains; but may be seen to slightly reduce traffic on First Great Western. Even so it is likely that the success of such schemes will allow the total market to grow so that all three operators benefit.

5 Conclusions:

Before drawing any conclusions it should be stressed that this is a preliminary study carried out with limited access to data and few resources. The rail patronage data, upon which the model is based, is old and the estimation of coach traffic is based on unofficial counts. The road traffic data is, however, thought to be reasonably valid and up to date. It should also be noted that the diversion models, used in the research, use standard parameters and that no market research has been undertaken to ascertain the validity of them in this environment. Despite these limitations it is believed that this study provides a reasonable indication of the patronage and revenue that might result from the opening of the Southern Chord.

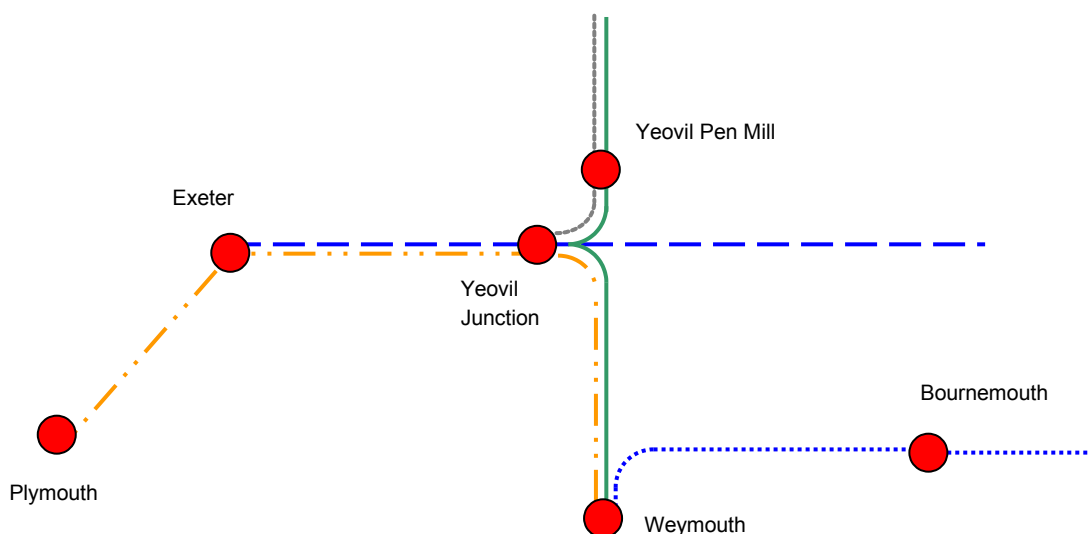


Figure 5.1. A Possible New Wessex Rail Network.

The study suggests that there are significant impediments to rail journeys between the south Coast and the West Country at present. The plethora of, often very indirect, alternative routes and fares are confusing both to the potential passenger and the staff at NRES. In the short term it may be worth considering improvements to the connections available at Castle Cary to ensure that every service between Castle Cary and Weymouth makes a connection with First Great Western services. This would increase the attractiveness rail between the South Coast and the West Country at minimal cost.

In the longer term the additional benefits of the Southern Chord may be sufficient to justify its implementation. While the additional traffic (and revenue) may not be particularly large; it is unlikely (in rail terms) to be an expensive scheme. Funding may also be available through various schemes, like the Rail Passenger Partnership Program. The benefits of Chord are, however, unlikely to be fully realisable until the Waterloo - Exeter line is upgraded and, if the Chord is to be implemented, it would appear logical do this at the same time as any upgrade. This would reduce the costs of implementation considerably and would allow the re-casting of services to create a new network such as that in figure 5.1.. Any reductions in journey times between Waterloo and Exeter that result from such an upgrade, would increase patronage over the Southern Chord by reducing generalised travel times on cross-country journeys. Journeys via the Southern Chord would then become significantly more attractive than those via Castle Cary (the best route currently available). It may be that it is a combination of the benefits associated with the Chord, rather than just the likely increase in revenue between the South Coast and the West Country, that justify its implementation.

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Appendix One - The Demand Model

The demand forecasts in the study are based on a spreadsheet which contains a series of simple logit models (commonly used in such transport applications) to estimate patronage and revenue for services using a new Southern Chord. Two choice models are implemented: one considers the choice between train and car and the other between train and bus/coach.

Both models have the following formulation.

$$\text{Proportion using mode A} = \frac{\exp(S \cdot \text{generalised time A})}{\exp(S \cdot \text{generalised time A}) + \exp(S \cdot \text{ASC} \cdot \text{generalised time B})}$$

Where S is a sensitivity parameter, which determines sensitivity to changes in generalised time and ASC is the alternative specific constant, which reflects a preference for one mode over the other.

The model takes, as its input, the time taken to travel between two zones by each mode of transport. The time used in the exercise is an combination of the time spent in the vehicle, the time spent waiting for the vehicle and any time taken changing vehicles - if an interchange is required. This combination is known as generalised time.

The model uses standard parameter values for the calculation of generalised time. Waiting time is valued at twice in-vehicle time. Interchange penalties are the sum of the expected wait at the interchange, plus a 10 minute penalty (20 minutes in the case of changes made at Dorchester because of the inconvenient transfer between the two stations). This penalty is approximately equivalent to that which would accrue if passengers were to travel a little further and make a more convenient interchange at Upwey (the next station down the line).

The time penalty for the waiting time at the origin station is estimated using a table of values. These values are tapered (in accordance with standard practice), so that short waits are valued at twice in-vehicle time and longer waits less so. This tapering reflects the fact that passengers using infrequent services do not have to wait in the strict sense for the next train; but they do have to adjust their behaviour to fit in with the timetable.

The same generalised time parameters are used for bus; but differences in preference between bus and rail are taken account of by the alternative specific constant (ASC) in the model. The ASC and sensitivity parameters were adjusted to ensure that the models were able to closely reproduce current behaviour in the corridor.

In-vehicle times were, in the case of public transport, taken from public timetables. The RailTrack website was used to estimate average waiting times at points of interchange. There is assumed to be no acceleration of services: current start-to-stop times have been used to estimate journey times via the Southern Chord.

Car driving times were calculated using route planning software which was calibrated to ensure that times reported in the A30/A35/A31 RMS were closely matched.

Five zones were considered in the modelling exercise. The two western zones were: from Yeovil to Exeter and to the west of Exeter. The centroids of the two zones were Exeter and Plymouth respectively. In the east the zones were: Dorchester, Weymouth and the Bournemouth/Poole conurbation. The bus model only had one eastern zone based on Bournemouth/Poole.

It was assumed that no traffic from Southampton, or any point east of it would not be captured by the Southern Chord. None of the road traffic associated with origins/destinations along the A31/5 between Dorchester and Southampton was assumed to be diverted.

Revenue figures are generated from the following assumptions. It is assumed that the average revenue per additional single trip is equivalent to half of the price of the lowest price period return. This probably underestimates revenue as singles, more expensive returns and first class travel would all be associated with higher costs per trip than the price assumed in the model. Discount fares for children and railcard holders would have the opposite effect. Data from other cross-country rail services appears to substantiate this assumption.

Appendix Two - Historical Background to the Castle Cary - Weymouth Line.

The line was constructed as part of a Chippenham-Weymouth railway (which was eventually absorbed by the Great Western Railway) and took a relatively long time to complete running through quite difficult country and being constructed just after the "railway mania" years which meant finance was difficult to obtain. After numerous delays, legal action and the fear that Weymouth would be lost to the competing London and South Western Railway (L&SWR) the railway was finally completed on 20th January 1857.

The financial viability of the undertaking was not helped by awarding the L&SWR the right to run their trains on the new line from Dorchester to Weymouth. In no way could the line be seen as likely to generate large returns for the investors, especially as much of it passed through rural areas. Even in the beginning, the line was commercially suspect but a series of events promised to make it more so.

1. London traffic was restricted because the L&SWR route was 20 miles shorter than the Great Western Railway (GWR) line, and in the 1880s this advantage was increased by the completion of a number of cut-off lines in the Bournemouth area. Although the GWR's line had been doubled between Yeovil and Evershot in 1858, initial traffic expectations were not fulfilled. So while the South Western's service developed, the GWR's declined. The situation became so bad that in the financial crises of 1866/7, economies were made, and there were sweeping cuts in train services (the number of London connections per day falling from five to three by 1868).
2. The GWR was finding its broad gauge a handicap in the development of through-traffic, but the money was not available for conversion or modernisation, and so the situation worsened. Eventually in 1874 the line was converted to standard gauge, and it was able to compete more effectively for the important Jersey potato traffic. However the GWR passenger traffic remained in the shadow of the L&SWR line, with journeys to London taking an hour longer on the former route, even on the fastest trains. Towards the end of the century the situation improved slightly as steamer traffic from Weymouth to the Channel Islands was developed. The GWR also opened a number of cut-off lines, and so by the early 1900s the times for both London services were at last comparable. Nevertheless it had taken nearly half a century to achieve this. The South Western line was now established as the main London route.
3. The new cut-off lines meant the northern part of the line was shared with other services and so the Weymouth line now effectively began at Castle Cary. The principal stations on this shortened line were at Yeovil, Dorchester and Weymouth. With the opening of a new L&SWR route from Salisbury to Exeter via Yeovil in 1860, all these settlements were now served more directly by this rival company.
4. Finally the growth of other resorts in the area, especially Bournemouth which grew rapidly from the 1860s, must have restricted the growth of traffic to the rival resort of Weymouth on both routes.

By the 1930s the GWR line had begun to make some progress, carrying substantial freight and seasonal passenger traffic. Channel Island traffic had been concentrated on Weymouth and to cope with this increase, Weymouth's harbour facilities were improved. The greater road competition led to the construction of a number of halts, on the southern half of the line, the last of which was opened in 1936, representing the maximum development of the line.

After the second world war the railways were nationalised into one network. However this was still

divided up into regions, and in Dorset the lines were shared between the Western and Southern regions. This division roughly corresponded with the GWR/L&SWR one of earlier years. In 1950 the Southern Region took over the GWR route and the latter has declined ever since. As the Southern region was now in control of the two competing lines, all the traffic that could be, was diverted onto their original (L&SWR) line, on the original GWR route the track was singled and a number of stations closed.

Under the recommendations of the Beeching report the Dorchester- Castle Cary line was not scheduled for closure although all the stations along it, except for Yeovil Pen Mill, were. When the time came for closure to be carried out it was realised that the proposals were just not practical and so a number of stations were reprieved. Dorchester West was saved as it generated a large proportion of the traffic on this part of the line and is the county town. Maiden Newton too, is a relatively important stop; and Chetnole, Yetminster and Thornford could not be served adequately by a replacement bus service.

Appendix Three - A Selection of Previous Work by the Author.

Depending on other commitments I am available as a consultant or contractor to work individually, or as part of a team, on projects within my areas of expertise. Some of my previous projects are listed below:

Undertook a demand risk analysis for public transport at the Sydney Olympics.

Undertaken exploratory research to investigate and value passengers' preferences on travelling underground.

Produced demand forecasts for an upgraded rail service between Sydney and Newcastle in association with Pacific Consulting Infrastructure Economics. The study involved the development of a complex spreadsheet model and extensive fieldwork.

Rail Infrastructure Pricing - assisting on a UIC/CER project to develop an improved approach to infrastructure pricing at the European level in the light of the E.U. Green Paper on Fair and Efficient Pricing.

T.E.Ns programme - Assisted in advisory work for the European Commission on the calculation of cross-border socio-economic benefits for passenger projects. Also involved in preliminary attempts to develop a methodology for freight projects.

Macau Transportation Study - Involved in the development and implementation of an extensive market research exercise. Designed the stated-preference (conjoint) exercises, jointly organised the fieldwork and arranged the translation of the survey instruments.

Regional Railways Sprinter Refurbishment - Responsible for the design of the survey instrument to gauge customer reaction to a refurbished Sprinter unit in the North East of England. Also jointly responsible for the analysis and writing of the final report.

Valuation of Passenger Information System - Designed a stated-preference (conjoint) exercise to estimate the value rail users placed on a passenger information system on trial in Sydney.

Tilt Train Preliminary Demand Study - Undertook desk based research to estimate the likely demand for a tilting train service between Sydney and Canberra. Demand was forecast using secondary data to formulate a generalised cost "Logit" style model.

Non-user Benefits for Wellington Trolley-Buses - Participated in the development of the methodology of a study to value the benefits derived by residents from having electric trolley-bus services rather than diesel buses. Was also involved in the design and analysis of the stated-preference (conjoint) survey.

Network Passenger Counts - Participated in the design of the 1992 passenger count in Sydney. Especially involved in coverage of the busiest stations of the network. Undertook supervisor duties in the field controlling large numbers (up to 150) of fieldworkers. Liased with employment agency in employing temporary staff.

Ultimo/Pymont Light Rail Study - Produced a desk study to estimate the demand for proposed L.R.T system in the heart of Sydney. Involved the collection and analysis of large amounts of secondary data.

Airport Rail Link - Designed and implemented a study to estimate the demand for an airport rail link to Sydney (Kingsford Smith) Airport. The position involved employing and controlling a number of fieldworkers as well as liasing with a number of government and commercial bodies.

Ph.D. Thesis - Studied the effects of intangible product attributes on demand. Research was focused on the value of improvements to rolling stock using stated-preference (conjoint) techniques.