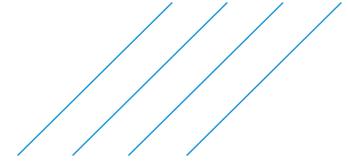


A27 Chichester Bypass

Viability and Buildability of BABA27 Options Highways England

11 December 2018





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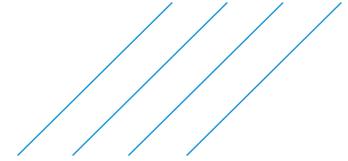
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Client signoff

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Technical Note

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Executive Summary

Highways England commissioned Atkins to review and provide technical commentary on the viability and buildability of the proposals at each location outlined in the Build a Better A27 (BABA27) Report which was prepared for West Sussex Country Council (WSCC) by consultants SYSTRA.

It is intended as an independent review for Highways England to support their discussions with WSCC and their objectives or arriving at viable and buildable options for the A27 at Chichester that can be costed and promoted through the future Road Investment Strategy (RIS) process.

A summary of the key technical issues noted in this exercise for each of the two route options proposed by SYSTRA is shown in Tables A and B respectively. Definitions of the RAG ratings given in these summaries are provided in Table C.

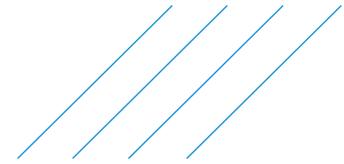
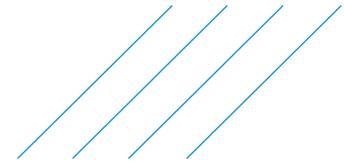


Table 1 - Full South Route

| RAG rating of SYSTRA's proposals | | | | | | | |
|--|---|--|--|--|--|---|-------------------|
| Standards Compliance | Safety | Operation | Environment | Buildability | Future Maintenance | Other Constraints | Cost (Indicative) |
| General: <ul style="list-style-type: none"> Weaving Portfield Junction: <ul style="list-style-type: none"> Geometry Visibility | General: <ul style="list-style-type: none"> Increased risk of accident due to insufficient weaving length | General: <ul style="list-style-type: none"> Congestion caused by vehicles slowing down due insufficient weaving length | General: <ul style="list-style-type: none"> Impacts due to dewatering Ecology Diversion of watercourse | General <ul style="list-style-type: none"> Live traffic Ground conditions Utilities Portfield Junction: <ul style="list-style-type: none"> In / over water | General: <ul style="list-style-type: none"> Pumping maintenance Potential for flooding should pumps fail Portfield Junction: <ul style="list-style-type: none"> In / over water | Various: Nearby residential and commercial property Stockbridge: <ul style="list-style-type: none"> Chichester Canal River Lavant Railway level crossing | |
| <p>Overall:</p> <p>The implementation of SYSTRA's recommendations collectively at all junctions along this route is not considered technically viable. Notably, if grade separation was introduced at all junctions, as proposed, weaving lengths at Stockbridge, Whyke, Bognor Road, Oving and Portfield Junctions would be non-compliant with DMRB, with associated safety implications.</p> <p>However, it may be possible to implement certain elements of the proposals independently. Possible options at each junction are discussed in the main body of this report. Any new scheme would need robust assessment to ensure overall compliance with standards and the avoidance of other negative impacts.</p> <p>Whilst it is noted that there is much reduced land-take negotiation as compared to the Mitigated North Route, fundamental design issues remain to be resolved.</p> | | | | | | | |

Table 2 – Mitigated North Route

| RAG rating of SYSTRA's proposals | | | | | | | |
|--|--------|-----------|---|-------------------------------------|-------------------------------|---------------------|-------------------|
| Standards Compliance | Safety | Operation | Environment | Buildability | Future Maintenance | Other Constraints | Cost (Indicative) |
| | | | <ul style="list-style-type: none"> South Downs National Park No road currently in this location | Mainly offline, but online tie ins. | Vertical Green "Living Walls" | The Goodwood Estate | |
| <p>Overall:</p> <p>Fewer technical constraints than the Full South Route, however considerable land-take negotiation required with the Goodwood Estate and South Downs National Park.</p> | | | | | | | |



Introduction

The Chichester Bypass is a stretch of dual carriageway, approximately 5.5km long, located south of Chichester in West Sussex. The existing A27 Chichester Bypass has five at-grade roundabouts at Fishbourne Road (A259), Stockbridge Road (A286), Whyke (B2145), Bognor Road (A259) and Portfield, and a traffic signal-controlled junction with Oving Road (B2144). Congestion and extensive queuing occurs daily at most of the junctions along the bypass, especially during the seasonal peaks.

The A27 Chichester Bypass Improvement has a long history dating back to the 2000 South Coastal Multi-Modal Study. Following several iterations, the scheme was included in the 2013 White Paper, *Investing in Britain's Future*, and in the Government's *2015-2020 Road Investment Strategy (RIS)*. Within the RIS, Highways England has committed to upgrading four junctions on the existing A27 Chichester Bypass.

However, following the feedback from the 2016 Public Consultation the scheme was cancelled, primarily due to a lack of consensus within the local community.

West Sussex County Council (WSCC) and Chichester District Council (CDC) indicated that to obtain public consensus on a route option they wished to take the project forward and did so through the Build a Better A27 (BABA27) group supported by consultants SYSTRA.

Highways England has asked Atkins to review and provide technical commentary on the viability and buildability of the proposals at each location outlined in the Build a Better A27 Report which was prepared for West Sussex Country Council by SYSTRA.

It is intended as an independent review for Highways England to support their discussions with West Sussex County Council and their objectives or arriving at viable and buildable options for the A27 at Chichester that can be costed and promoted through the future RIS process.

The scheme location is shown in Extract 1 and 'concepts' in Extract 2.

Approach to assessment

The RAG assessment has been limited to, and rated using, highway engineering judgement (professional judgement) only. The assessment assumes that each of the two alternative options, Full South and Mitigated North routes, is implemented in its entirety in accordance with SYSTRA proposals. These recommendations are discussed in this report on a location by location basis, taking account of the impacts of proposals at adjacent junctions.

It is not possible to ascertain if Departures would be granted where relaxations are required, and therefore SYSTRA recommendations at each location are simply assessed as either compliant or non-compliant with DMRB requirements.

Definitions of the RAG ratings are provided in Table C below.

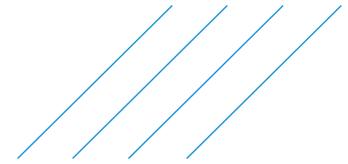
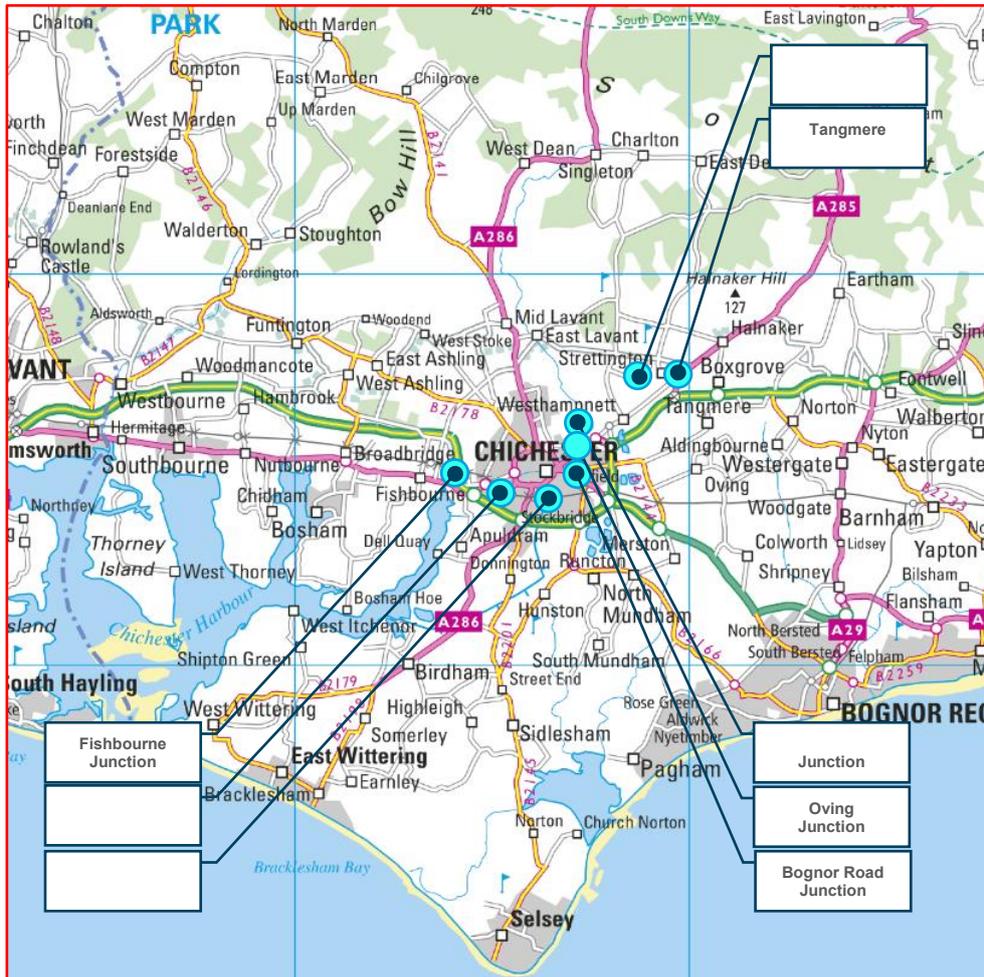


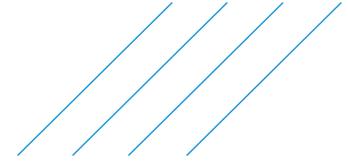
Table 3 - Definitions of RAG ratings

| RAG rating of SYSTRA's proposals | | | | | | | |
|----------------------------------|---|-----------|-------------|--------------|--------------------|-------------------|--|
| Standards Compliance | Safety | Operation | Environment | Buildability | Future Maintenance | Other Constraints | Cost (Indicative) |
| Complies with DMRB | No major issues have been identified in these assessment categories | | | | | | More likely to be economically justifiable |
| N/A | Issues have been identified in these assessment categories, but mitigation could be possible | | | | | | Less likely to be economically justifiable" |
| Does not comply with DMRB | Major issues have been identified in these assessment categories and appropriate mitigation is unlikely to be possible. | | | | | | Appears prohibitive/ economically unjustifiable" |

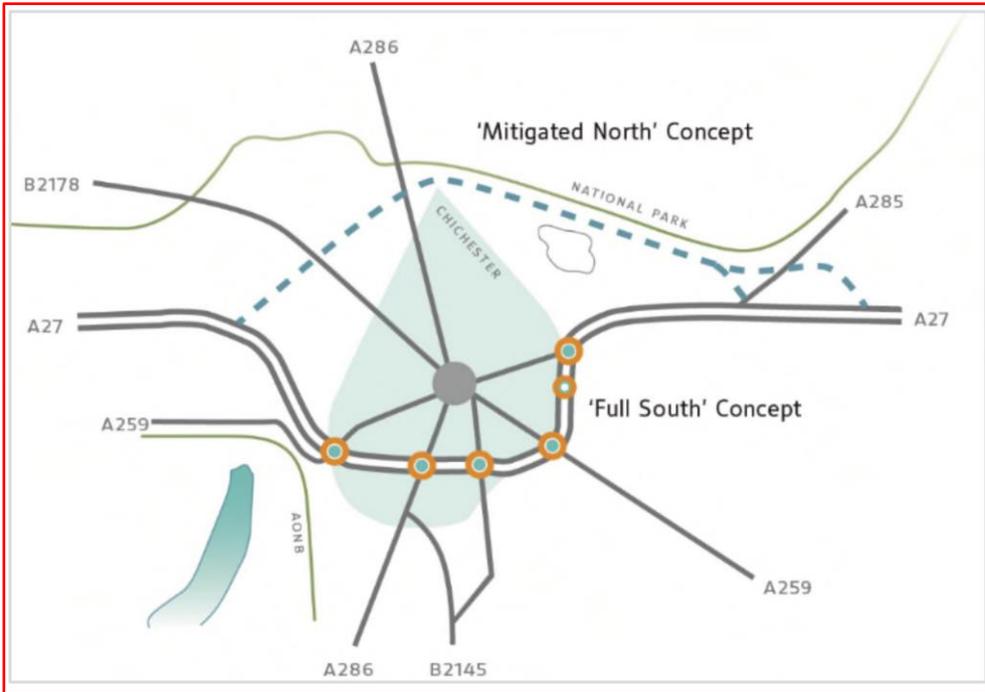
The rating given is based on the number of issues identified within a specific assessment category and weighted on the significance of those issues. In the body of the report, the key issues in each assessment category are listed for each location. It should be highlighted that this is our professional view, and we accept that the view of others may be different.

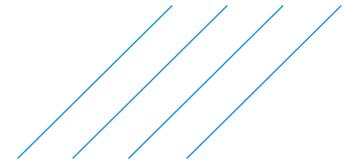
Extract 1: Scheme Location





Extract 2: SYSTRA Scheme 'Concepts'





Viability and Buildability of BABA27 Options - Full South Route

Fishbourne Junction

SYSTRA report para 8.3.36 suggests an underpass as a potential option at this location.

Potential benefits of SYSTRA proposal

- Reduced visual impact (compared to existing) on the immediate area and on the view from Chichester Harbour.
- Reduced noise impacts (compared to existing).
- Connectivity to current access links** and turning movements.

** potential impacts to Terminus Road

Potential issues with SYSTRA proposal

- The highwater table in the area means that construction of an underpass could be complex and could require constant pumping both during construction and in operation.
- The pumping of ground water could result in various environmental impacts.
- The diversion of existing utilities could be more complex than the RIS1 options.
- There would be increased risks due to difficult ground conditions, which would result in delays and additional costs.
- As a result of the above issues, construction and future maintenance costs would be higher than the RIS1 options.

Detailed comments on SYSTRA proposals

SYSTRA suggest there may be an opportunity to improve the horizontal alignments by slightly moving the main carriageways, in part to mitigate construction work but we, (Atkins) are unclear what improvement could be made to the horizontal alignment in this location.

SYSTRA are recommending an underpass, mainly to mitigate the visual impact of the earlier RIS1 design options. Therefore, it will have to be considered whether the cost, buildability and future maintenance of their option makes it a viable alternative to RIS1 proposal.

SYSTRA has recognised that some improvement to the Terminus Road access arrangement may be required which has been driven by safety concerns with the current roundabout arrangements. Atkins understand it is particularly difficult to enter Fishbourne Roundabout from Terminus Road, due to the volume and speed of traffic entering the roundabout from the eastbound A27 and A259 Cathedral Way.

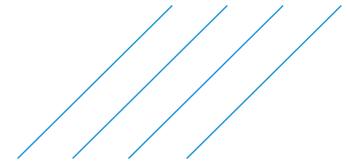
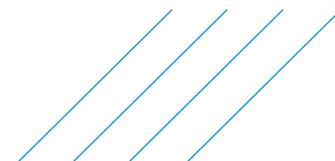


Table 4 - Fishbourne Junction

| RAG rating of SYSTRA's proposals | | | | | | | |
|----------------------------------|--------|-----------|---|--|---|-------------------|-------------------|
| Standards Compliance | Safety | Operation | Environment | Buildability | Future Maintenance | Other Constraints | Cost (Indicative) |
| | | | <ul style="list-style-type: none"> Impacts due to dewatering | <ul style="list-style-type: none"> Live traffic Ground conditions Utilities | <ul style="list-style-type: none"> Pumping maintenance Potential for flooding should pumps fail | | |



Stockbridge Junction

SYSTRA Report para. 8.3.40, suggests an A27 underpass as a potential option at this location.

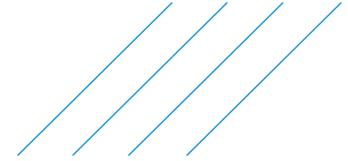
Potential benefits of SYSTRA proposal

- Reduced visual impact and severance on the immediate local area.
- Connectivity to current access links** and turning movements.

** potential impacts with existing railway level crossings on Stockbridge Road and Basin Road.

Potential issues with SYSTRA proposal

- The high-water table in the area means that construction of an underpass could be complex and could require constant pumping both during construction and in operation.
- An underpass will require the existing carriageway level to drop by a minimum of 6.4m (allowing for 5.4m headroom and a structure depth of 1.0m) over a length of approximately 370m on the west and eastbound entry/exit (740m in total).
- Diversion of the Chichester Canal by circa 130m to the east into the Chichester High School Sports Field, Kingsham Farm and coming very close to the South Downs Planetarium and Science Centre and Vauxhall dealership would likely be required to deliver this option.
- DMRB TD22/06 does not allow for a successive merge and diverge to be designed/constructed where the distance (weaving length) between the end of the merge taper and start of the diverge taper is less than 1km desirable minimum.
 - It may be possible to provide an eastbound merge to join the A27 from the Stockbridge Junction but not if there is an eastbound diverge leaving the A27 at the Whyke Junction.
 - Similarly, it may be possible to provide a westbound diverge leaving the A27 but not if there is a westbound merge at the Whyke Junction.
 - It should however be noted that an eastbound merge and westbound diverge at Stockbridge would likely require widening over the Chichester Canal. The extent of widening is currently unknown and is outside the scope of this report, but this would be determined by the type and geometry of the slip road.
 - We would also highlight that the length of the slip roads could be in the region of 500m (subject to type and geometry), therefore an eastbound merge at Stockbridge could impact upon the existing access to the Vauxhall dealership and Texaco Service Station.
- An all movement junction may allow traffic held by the railway level crossings on Stockbridge Road and Basin Road to queue back on to the A27 which will cause delay to through traffic.
- Variations on the alignment are limited due to the location of the River Lavant some 400m west of the existing Stockbridge Junction. Therefore, any option looking to avoid the Chichester Canal by changing/starting the vertical alignment of underpass further to the west may not provide much benefit.



Detailed comments on SYSTRA proposals

SYSTRA recommends that there needs to be a grade separation between the A27 and the A286 Stockbridge Road. The recommendation is for the A27 to go under the existing junction with all turning movements maintained and highlights the close proximity of the Canal to the east of the junction but neglects to highlight the close proximity of the River Lavant to the west of the junction.

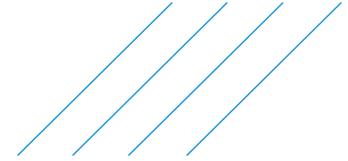
It is unclear how the concepts which SYSTRA have put forward would work given the constraints in this location.

SYSTRA comment that the junction needs to allow for all movements. However, this will not be possible due to the close proximity of the junction with the Fishbourne Junction to the west and Whyke Road Junction to the east because the weaving length between the junctions will not be sufficient. TD22/06 requires a minimum weaving length of 1km between grade separated junctions, this being the distance between the end of the taper on the on-slip and start of the off-slip taper at the next junction. The distance between each junction around Chichester is circa 1km.

As a compromise, the junction could provide east and west bound exit slips leading from the A27 to the junction only with the A286 passing over or under the A27.

Table 5 – Stockbridge Junction

| RAG rating of SYSTRA’s proposals | | | | | | | |
|---|---|--|---|---|--|---|-------------------|
| Standards Compliance | Safety | Operation | Environment | Buildability | Future Maintenance | Other Constraints | Cost (Indicative) |
| <ul style="list-style-type: none"> • Weaving | <ul style="list-style-type: none"> • Increased risk of accident due to insufficient weaving length | <ul style="list-style-type: none"> • Congestion caused by vehicles slowing down due insufficient weaving length | <ul style="list-style-type: none"> • Ecology • Diversion of watercourse | <ul style="list-style-type: none"> • Live traffic • Ground conditions | <ul style="list-style-type: none"> • Potential for flooding should pumps fail | <ul style="list-style-type: none"> • Chichester Canal • River Lavant • Railway level crossing • Fuel Stations | |



Whyke Junction

SYSTRA Report para. 8.3.50, suggests an A27 flyover as a potential option at this location

Potential benefits of SYSTRA proposal

- Connectivity to current access links and turning movements.

Potential issues with SYSTRA proposal

- A27 flyover may present a significant visual impact for residents living in the properties located on the northern boundary of the A27.
- A27 flyover would impact on the existing footbridge located on the western side of the junction and would require relocation.
- DMRB TD22/06 does not allow for a successive merge and diverge to be designed/constructed where the distance (weaving length) between the end of the merge taper and start of the diverge taper is less than 1km desirable minimum.
 - It may be possible to provide an eastbound diverge leaving the A27 but not if there is an eastbound merge at the Stockbridge Junction.
 - Similarly, it may be possible to provide a westbound merge to join the A27 from the Whyke Junction but not if there is a westbound diverge leaving the A27 at the Stockbridge Junction.
- An all movement junction may allow traffic held by the railway level crossing on Whyke Road and Basin Road to queue back onto the A27, which will cause delay to through traffic.

Detailed comments on SYSTRA proposals

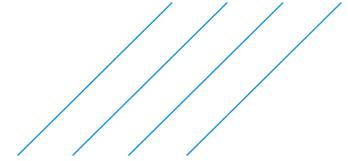
SYSTRA Report Para. 8.3.50 comments that this junction needs to be grade separated and provide all turning movements with the preference being for the local road to pass over the A27.

In principle, elevating the B2145/Whyke Road over the A27 should be feasible but it may impact nearby properties but would be less visually intrusive in comparison to the A27 being elevated.

The SYSTRA report states that all turning movements will be maintained. However, this would not meet current DMRB standards due to their being insufficient distance between the Stockbridge Junction to the west and the Bognor Road Junction to the east. As commented for the Stockbridge Junction, TD22/06 requires a weaving length of 1km between junctions which is not achieved here.

Table 6 – Whyke Junction

| RAG rating of SYSTRA's proposals | | | | | | | |
|----------------------------------|---|--|--------------------------------------|---------------------------------------|--------------------|--------------------------|-------------------|
| Standards Compliance | Safety | Operation | Environment | Buildability | Future Maintenance | Other Constraints | Cost (Indicative) |
| • Weaving | • Increased risk of accident due to insufficient weaving length | • Congestion caused by vehicles slowing down due insufficient weaving length | • Visual impact on nearby properties | • Live Traffic • Ground conditions | | • Railway level crossing | |



Bognor Road Junction

SYSTRA Report para. 8.3.55, agrees that grade separating the junction with the A27 passing over the existing roundabout is a feasible solution.

Potential benefits of SYSTRA proposal

- No further benefits other than those at RIS 1.

Potential issues with SYSTRA proposal

- The Bognor Road Junction was a feasible solution during RIS 1 because **Highways England did not allow for major improvements at the Portfield Junction** but should a grade separated junction be provided at the Portfield Junction then there may be insufficient weaving length between the successive eastbound and westbound merge and diverge of the Portfield and Bognor Road Junction. The existing distance between the two junctions is just over 1km.
- The carriageway would need to be realigned to allow the slip roads and reduce the impact on the nearby commercial premises.
- The realignment would likely require construction in and over Quarry Lake to the north and Leythrone Lake to the south.
- The new flyover would require the removal of the existing footbridge located to the west of the junction.
- Widening of the existing bridge over the railway.

Detailed comments on SYSTRA proposals

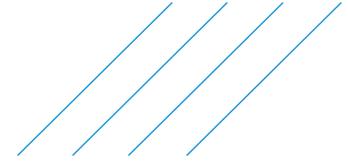
It is noted that Vinnetrow Road was proposed to be diverted and this is probably due to it currently being very difficult to enter the roundabout due to the volume of through traffic and its close proximity to the northbound A259 entry and A27 westbound exit from the roundabout.

This junction is on the boundary of the Portfield Trading Estate where the likes of Screwfix, HSS Hire, and Toolstation are located as well as the nearby Quarry Lane Industrial Estate, thus any elevation of the A27 in this location is unlikely to have any detrimental visual impact on the surrounding area.

As SYSTRA commented there may be other junction arrangements which can be considered, but this will be the subject of traffic modelling which is not within the scope of this exercise.

Table 7 – Bognor Road Junction

| RAG rating of SYSTRA's proposals | | | | | | | |
|---|---|--|--|---|--------------------|--|-------------------|
| Standards Compliance | Safety | Operation | Environment | Buildability | Future Maintenance | Other Constraints | Cost (Indicative) |
| <ul style="list-style-type: none"> • Weaving | <ul style="list-style-type: none"> • Increased risk of accident due to insufficient weaving length (if Portfield included) | <ul style="list-style-type: none"> • Congestion caused by vehicles slowing down due insufficient weaving length (if Portfield included) | <ul style="list-style-type: none"> • Watercourse • Ecology | <ul style="list-style-type: none"> • Live Traffic • Ground conditions | | <ul style="list-style-type: none"> • Railway bridge • Vinnetrow Road • Nearby commercial property | |



Oving Junction

SYSTRA Report para 8.3.57-8.3.59, recognises that there are works planned for this junction linked to the consented Shopwhyke Development which will provide ‘left-in’ and ‘left-out’ only access to the site. SYSTRA have retained the planned closure of Oving Road (East) and the ‘left-in’ and ‘left-out’ arrangement for Oving Road (West).

Potential benefits of SYSTRA proposal

- No further benefits other than those identified during RIS 1.

Potential issues with SYSTRA proposal

- The Oving junction configuration would need to be revisited if it’s decided the Portfield junction should be included in the scheme. This is because a grade separated junction (as suggested in the SYSTRA report para 8.3.63) would impact the Oving Junction and possibly the Bognor Road Junction, due to the 1km weaving length which is required between successive merge and diverge arrangements. Traffic modelling and further design will be required to determine the optimal solution.

Detailed comments on SYSTRA proposals

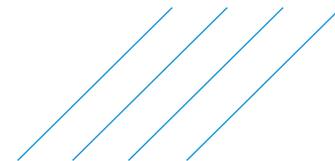
SYSTRA can see merits in retaining the Highways England RIS1 options (1, 1A and 2) to maintain a ‘left-in’ and ‘left-out’ arrangement to the A27 north/eastbound.

SYSTRA has put forward the concept of grade separating the eastbound movement at the Portfield Junction and stated this may compromise road safety if an access from Oving Road onto the A27 were to be maintained.

Given that the traffic modelling undertaken for the RIS1 schemes showed that the junction arrangement providing ‘left-in’ and ‘left-out’ turning movements for Oving Road West and buses only out of Oving Road East would cater for future traffic up to the year 2034. We concur that this is the best and safest option in this location; but note that should improvements be required to the Portfield Junction then the junction arrangement may have to be reconsidered.

Table 8 – Oving Junction

| RAG rating of SYSTRA’s proposals | | | | | | | |
|----------------------------------|--------|-----------|-------------|--------------|--------------------|--|-------------------|
| Standards Compliance | Safety | Operation | Environment | Buildability | Future Maintenance | Other Constraints | Cost (Indicative) |
| • Weaving | | | | | | • Nearby residential and commercial property | |



Portfield Junction

SYSTRA Report para 8.3.60 recommends that the eastbound movement should be grade separated to allow free flow traffic through the junction.

Potential benefits of SYSTRA proposal

- Free flow mainline traffic through the junction.
- Increased Journey Time Reliability.
- Removes a potential 'bottleneck'.

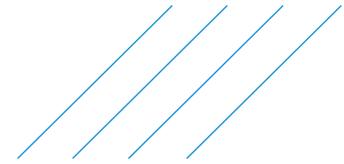
Potential issues with SYSTRA proposal

- Reduced Speed limit due to Geometry and Sight Stopping Distance (SSD) requirements; or
- Increased carriageway/structure widths required to achieve SSD requirements and retain speed limit as existing (70mph). The typical width of rural dual 2 lane carriageway is 26.1m (back of verge to back of verge) without taking in to consideration any widening required to accommodate SSD and street furniture, such as Road Restraint, Traffic Signs, and Lamp Columns.
- Construction in and or over water.
- The proposed geometry may impact upon the nearby retail units located at Portfield Retail Park on the western side and the commercial units at Glenmore Business Park on the south east side of the Portfield Junction.
- There is currently an approximate distance of 1.5km between the Portfield Junction and start of the eastbound diverge at the Temple Bar junction. Therefore, it may not be possible to provide an eastbound merge at the Portfield Junction if the weaving length were to be less than 1km. This will be subject to further design which is outside the scope of this report.
- It is understood that the Shopwhyke Lakes development is planning to construct a new access to their development from the A27 westbound approach to the Portfield junction and to improve the existing access on the A27 westbound just south of the Portfield Junction, with the addition of two new footbridges over the A27 south and east of the Portfield Junction. Therefore, these new constraints would have to be taken into consideration when looking at any improvements to this junction.

Detailed comments on SYSTRA proposals

The report states that the proposals for grade separation at Portfield Junction would only appear to be feasible by building over or into a small part of the Westhampnett Lake used for watersport activities. However, an outline design of this proposed flyover has shown that the alignment allowing for a posted speed limit of 50mph is likely to be pushing the northernmost boundary of the lake. Also, whilst it is buildable, would there be a limited number of contractors prepared to take on the work.

We do know that this location gets very congested with traffic trying to enter and egress the Portfield Retail Park, Lidl, Sainsbury's, The Range and nearby Homebase, Wickes, Halfords and Iceland. Permission has also been granted for a new Lidl in the land located north of Stane Street almost opposite their existing site and construction underway for the 500 dwelling Shopwhyke Lakes residential development in the land on the north side of Shopwhyke Road. In addition, there is a further 300 dwelling residential development which has just started construction in the land located on the north of Stane Street opposite the Council Depot and adjacent to the Chichester Park Hotel.



It is therefore likely without improvement that this junction will struggle with the demand, but this can only be confirmed once traffic figures are known and traffic modelling undertaken.

Table 9 – Portfield Junction

| RAG rating of SYSTRA's proposals | | | | | | | |
|---|---|--|--|---|---|--|-------------------|
| Standards Compliance | Safety | Operation | Environment | Buildability | Future Maintenance | Other Constraints | Cost (Indicative) |
| <ul style="list-style-type: none"> • Geometry • Visibility • Weaving | <ul style="list-style-type: none"> • Reduced due to geometry | <ul style="list-style-type: none"> • Reduced speed limit will impact traffic flow | <ul style="list-style-type: none"> • Visual Impact • Ecology | <ul style="list-style-type: none"> • In / over water | <ul style="list-style-type: none"> • In / over water | <ul style="list-style-type: none"> • Nearby retail units • New residential development • 2 new footbridges • New junction on westbound A27 | |

Summary of Full South Route

Table 1 - Full South Route

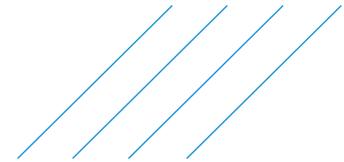
| RAG rating of SYSTRA's proposals | | | | | | | |
|---|---|--|--|--|--|---|-------------------|
| Standards Compliance | Safety | Operation | Environment | Buildability | Future Maintenance | Other Constraints | Cost (Indicative) |
| <p>General:</p> <ul style="list-style-type: none"> • Weaving <p>Portfield Junction:</p> <ul style="list-style-type: none"> • Geometry • Visibility | <p>General:</p> <ul style="list-style-type: none"> • Increased risk of accident due to insufficient weaving length | <p>General:</p> <ul style="list-style-type: none"> • Congestion caused by vehicles slowing down due insufficient weaving length | <p>General:</p> <ul style="list-style-type: none"> • Impacts due to dewatering • Ecology • Diversion of watercourse | <p>General</p> <ul style="list-style-type: none"> • Live traffic • Ground conditions • Utilities <p>Portfield Junction:</p> <ul style="list-style-type: none"> • In / over water | <p>General:</p> <ul style="list-style-type: none"> • Pumping maintenance • Potential for flooding should pumps fail <p>Portfield Junction:</p> <ul style="list-style-type: none"> • In / over water | <p>Various:</p> <ul style="list-style-type: none"> Nearby residential and commercial property <p>Stockbridge:</p> <ul style="list-style-type: none"> • Chichester Canal • River Lavant • Railway level crossing | |

Overall: The implementation of SYSTRA's recommendations collectively at all junctions along this route is not considered technically viable. Notably, if grade separation was introduced at all junctions, as proposed, weaving lengths at Stockbridge, Whyke, Bognor Road, Oving and Portfield Junctions would be non-compliant with DMRB, with associated safety implications.

However, it may be possible to implement certain elements of the proposals independently. Possible options at each junction are discussed in the main body of this report. Any new scheme would need robust assessment to ensure overall compliance with standards and the avoidance of other negative impacts.

Whilst it is noted that there is much reduced land-take negotiation as compared to the Mitigated North Route, fundamental design issues remain to be resolved.

This summary is replicated in the Executive Summary at the front of this report.



Viability and Buildability of BABA27 Options - Mitigated North Route

Main Route (Disregarding 'Tie-Ins' To Existing Routes)

Summary review

SYSTRA Report Para. 8.3.5 states that their 'Mitigated North' concept could follow either Option 4 or 5 (of the previous HA Concept Design), or some other earlier Stage 1 options A to D but they go on to say, other tactical/minor variants or alternative routing could be undertaken in some locations to maximise the opportunities to mitigate impacts and/or trade-off engineering feasibility, design and costs.

SYSTRA also state that the RIS1 free flow junctions provided at the 'tie-in' point with the existing A27 are an integrated component of their concepts but it is possible that alternative lower cost solutions may need to be considered during further RIS2 development in assessing 'next-best' or 'lower cost' alternatives to the preferred concept.

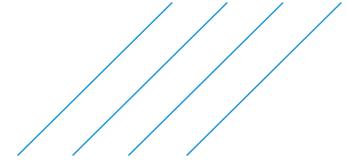
SYSTRA has advised that an integral part of their concept is the presumption that, where possible, and especially in the open vistas around the Lavant Road and Goodwood Estate that the vertical alignment of the road is reduced below existing ground, which broadly follows the assumption of the RIS1 options, for example to reduce the road level 6 metres below ground at the Goodwood Motor Racing Circuit.

Potential benefits of SYSTRA proposal

- Alignment could allow for a speed limit of 70mph.
- Free flow mainline traffic.
- No intermediate junctions other than those which are free flow at the tie-ins to the existing A27.
- Reduced interaction with live traffic during construction.
- Increased Journey Time Reliability.
- Reduced visual impact.

Potential issues with SYSTRA proposal

- Local community contest the proposal on the basis that no road currently in this location.
- Increased risk of compensation claims due to blight.
- Considerable negotiation with the Goodwood Estate and South Downs National Park.
- Significant excavation of earthworks and increased risk to the contractor's workforce.
- Mainline corridor width could potentially be circa. 60m if retaining features such as 'living walls' are deemed not cost effective.
- Vertical "living walls" may require a more rigorous maintenance programme.
- Additional 14.3m wide local single 2 lane access road required to replace New Road will add to the land required from the Goodwood Estate and within the South Downs National Park.



- The removal of Tangmere Roundabout will sever connectivity between Boxgrove and Tangmere and the impact of this will need to be considered during the next stage.
- Green bridges may prove to be unviable, mainly due to significant cost implications.

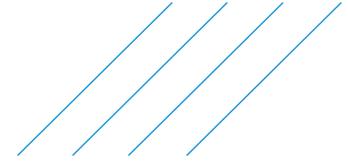
Detailed comments on SYSTRA proposals

The proposed Claypit Lane Green Bridge would be a significant structure (circa 100m long and 25m wide). Other design options may prove more cost effective.

Whilst deemed technically easier to deliver of the two options, there is likely to be considerable negotiation regarding the ‘reasonableness’ of land take requirements, from both The Goodwood Estate and also the South Downs National Park.

Table 10 – Main Route (Disregarding ‘Tie-Ins’ To Existing Routes)

| RAG rating of SYSTRA’s proposals | | | | | | | |
|----------------------------------|--------|-----------|---|---|---|--|-------------------|
| Standards Compliance | Safety | Operation | Environment | Buildability | Future Maintenance | Other Constraints | Cost (Indicative) |
| | | | <ul style="list-style-type: none"> • South Downs National Park | <ul style="list-style-type: none"> • Offline | <ul style="list-style-type: none"> • Vertical green “Living Walls” | <ul style="list-style-type: none"> • The Goodwood Estate • Sennicots Estate. | |

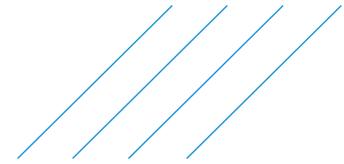


Western Tie-In (Clay Lane Junction)

This is deemed technically feasible, in line with previous Highways England work.

Table 11 – Western Tie-In (Clay Lane Junction)

| RAG rating of SYSTRA's proposals | | | | | | | |
|----------------------------------|--------|-----------|---|--|--------------------|-------------------|-------------------|
| Standards Compliance | Safety | Operation | Environment | Buildability | Future Maintenance | Other Constraints | Cost (Indicative) |
| | | | <ul style="list-style-type: none"> Chichester Harbour AONB | <ul style="list-style-type: none"> Online | | | |



Eastern Tie-In (Tangmere Junction)

Summary review

This is deemed technically feasible, in line with previous Highways England work however it may have some challenging interface issues particularly where it intersects with the A285 Stane Street and Roman Road. Furthermore, it is unclear at this stage what impact the free flow junction may have on the existing Tangmere Roundabout, particularly on the eastbound approach.

Table 12 – Eastern Tie-In (Tangmere Junction)

| RAG rating of SYSTRA's proposals | | | | | | | |
|----------------------------------|--------|-----------|---|--|--------------------|--|-------------------|
| Standards Compliance | Safety | Operation | Environment | Buildability | Future Maintenance | Other Constraints | Cost (Indicative) |
| | | | <ul style="list-style-type: none"> • Roman Road • South Downs National Park | <ul style="list-style-type: none"> • Online | | <ul style="list-style-type: none"> • The Goodwood Estate • The villages of Strettington and Westerton • Existing Footbridge • Fuel Station • Tangmere Road Junction | |

Summary of Mitigated North Route

Table 2 – Mitigated North Route

| RAG rating of SYSTRA's proposals | | | | | | | |
|---|--------|-----------|---|-------------------------------------|-------------------------------|---------------------|-------------------|
| Standards Compliance | Safety | Operation | Environment | Buildability | Future Maintenance | Other Constraints | Cost (Indicative) |
| | | | <ul style="list-style-type: none"> • South Downs National Park • No road currently in this location | Mainly offline, but online tie ins. | Vertical Green "Living Walls" | The Goodwood Estate | |
| Overall: | | | | | | | |
| Fewer technical constraints than the Full South Route. However considerable land-take negotiation would be required with the Goodwood Estate and South Downs National Park. | | | | | | | |

This summary is replicated in the Executive Summary at the front of this report.