APPENDIX F

UTILITIES DRAWINGS
Figure F1: Water
Figure F2: Electricity
Figure F3: Gas
APPENDIX G

LIAISON WITH ENVIRONMENT AGENCY
EASTLEIGH STRATEGIC TRANSPORT STUDY

Notes of Meeting with the Environment Agency
held at 2:00pm on 10 September 2015 at Elizabeth II Court, Winchester

Present:
HCC Engineering Consultancy
Linda Wickens – Project Manager
Rob Ward – Lead Design Engineer
Pat Warrener – Group Engineer Structures
John Burrows – Project Engineer, Structures
John Dimond – Graduate Engineer, Structures

Environment Agency
Alex Haydon – Partnership & Strategic Overview

Circulation: Those above + Adrian Ingerson, Tom Griffiths, Sarah Reghif, Pat McKenna, Chris Murray

<table>
<thead>
<tr>
<th>REF</th>
<th>ITEM</th>
<th>ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>BOTLEY BYPASS – Drg No. EC/RJ567621/03/011</td>
<td></td>
</tr>
<tr>
<td>1.1</td>
<td>Alex confirmed that everything EA related in the 2013 Waterman report is still valid.</td>
<td></td>
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<tr>
<td>1.2</td>
<td>Alex advised:</td>
<td></td>
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<tr>
<td></td>
<td>• The further away from the railway bridge the better for the road bridge</td>
<td></td>
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<tr>
<td></td>
<td>• If the channel is to be realigned then a Water Framework Directive assessment would be required</td>
<td></td>
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<tr>
<td></td>
<td>• Need to prove that the flood risk is not increased</td>
<td></td>
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<tr>
<td></td>
<td>• Would probably need to provide replacement capacity for piers within the watercourse – Alex to check</td>
<td>AH</td>
</tr>
<tr>
<td></td>
<td>• The existing railway bridge is the bottleneck, road bridge to provide additional flow capacity</td>
<td></td>
</tr>
<tr>
<td>1.3</td>
<td>Alex to check with colleagues whether there are any restrictions with regard to the fish in the river, and send design guidelines.</td>
<td>AH</td>
</tr>
<tr>
<td>1.4</td>
<td>The drainage strategy is to use balancing ponds to take the run-off and discharge into existing watercourses at a rate of 5l/sec, designed for a 100yr storm. It is assumed that soakaways would not be an option.</td>
<td></td>
</tr>
<tr>
<td>1.5</td>
<td>The balancing ponds would have a hydro break and pollution control before discharge.</td>
<td></td>
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</tbody>
</table>
1.6 Pat to provide a photograph of a similar structure to that proposed, for EA review.

1.7 NB: cross-section, verges, parapet height, sight lines, not all considered in Waterman’s report.

2. BISHOPSTOKE ROAD CORRIDOR

2.1 Chickenhall Lane Roundabout

2.1.1 The existing trough decked structure is nearing the end of its life, therefore the preference is to demolish and rebuild. Another crossing would need to be provided for traffic during construction.

2.1.2 The River Barton could be diverted if it is made bendier, not straighter, in order to keep span to a minimum.

2.1.3 Alex to check if there would be an issue regarding fish ecology with keeping the roundabout open in the middle.

2.2 Riverside Junction

2.2.1 The river is much wider to the south of the existing road bridge. This is probably because of scour created by the flow rushing past the constricted width of the old mill, so the new bridge would not have to be wide enough to span the scour areas. Alex to check, and advise. Bagwork protection to the banks would be required.

2.2.2 The new road bridge would have to be over-wide such that half could be used to keep traffic flowing during construction.

2.2.3 A copy of the WSP drgs was handed over to Alex.

3. NORTH BISHOPSTOKE BYPASS

3.1 Any crossing of the flood plain would need to be modelled. Alex to advise of the flood level required (Option 2B).

3.2 There are buildability issues with replacing the existing bridge over the River Itchen beside the railway on Highbridge Road; a new structure would need to be constructed with a wider span(s) before the old is demolished.

3.3 Structures will be looking at an option to widen the three bridges over the River Itchen channels east of Highbridge Farm, and provide a broad order cost estimate. However the options currently considered do not widen the road that far east.

Linda Wickens, Engineering Consultancy
20-Sep-15
Flood Risk Management: Bridges – advice for Development and Flood Risk activities

Operational instruction 278_04

Issued 05/07/2010

What's it about? This document outlines the consenting and planning issues surrounding the construction and maintenance of different types of bridges. It focuses on the impact of bridges on flood risk.

It also sets out our basic design requirements for the construction and maintenance of bridges, and other issues we require developers to consider.

Who does it apply to? This document applies primarily to Development and Flood Risk Officers assessing proposals for works involving bridges. It may also be useful to other staff within Flood and Coastal Risk Management (FCRM).

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Contact for queries
Matthew Kean

Doc No 278_04 Version 3 Last printed 11/09/15 Page 1 of 7
## Consent and planning permission

### Background
We must consider whether anyone intending to construct or alter a bridge over a watercourse requires our consent. In the text below ‘developer’ refers to anyone wanting to construct or maintain a bridge, including property developers, highway authorities, private landowners and maintenance contractors.

### Bridges over 'main rivers'
Any proposed new bridge or significant change to an existing bridge over a main river requires a consent under Section 109 of the Water Resources Act 1991 (except proposals for road schemes being carried out under a Highway Order). Temporary works in watercourses may also need consent (see below). Developers must pay a fee for a S.109 consent.

Works to bridges may also require consent under our local land drainage / flood defence byelaws. You should consult the relevant set of byelaws when considering a proposal. There are usually ‘savings’ (limitations of applicability of the byelaws) for individual bodies such as highway authorities, utilities etc, so you should also check these.

### Bridges over ordinary watercourses
The planning situation for bridges over ordinary watercourses is less straightforward than for main rivers. Developers need a consent under Section 23 of the Land Drainage Act 1991 for “any mill, dam, weir or other like obstruction” or “to erect any culvert” in an ordinary watercourse. Developers must pay a fee for a S.23 consent.

A bridge which crosses an ordinary watercourse in a free span technically doesn’t require a S.23 consent. If it’s clearly evident to you prior to a developer making an application that a proposed bridge won’t cause an obstruction to the flow, advise the developer that they don’t require a consent. However, it’s good practice for the developer to confirm their proposal in writing to you, and you must also respond to their proposal in writing. The developer may need to submit detailed drawings to you to confirm no obstruction will be caused.

### Highway authorities using the Highways Act 1980
A highways authority may claim powers to do work to bridges and watercourses under the Highways Act 1980. Highways authorities proposing works, particularly under Section 110 and under other sections noted in Section 339 must seek our consent as a ‘drainage authority’ before commencing. If a highway authority claims powers to do work without seeking our consent, you must ask them under which section of the Act they are claiming these powers. Check their response with your regional solicitor or the primary contact for this document, to determine what consenting powers if any are appropriate.
Bridges for road schemes being carried out by highway authorities under an Order in accordance with Schedule 1 of the Highways Act 1980 don’t require our consent. In such cases we must resolve all our flood risk concerns (that would otherwise need a consent) via the pre Order consultation process. If we can’t resolve our concerns satisfactorily, we must consider objecting to the entire road scheme and be prepared to argue our case at a public enquiry.

A joint memorandum of understanding (MoU) was signed by the Highways Agency and us in November 2006, with a technical Water Environment paper in November 2009 – see links at end of this document. The MoU only applies to the Highways Agency (in England) in these circumstances, but not with individual county councils and other road promoters, including Welsh Assembly Government (WAG) / Transport Wales.

Some ‘bridge’ proposals, particularly for highways may actually be large section culverts with the invert placed below the bed level of watercourse. Developers often favour culverts rather than true bridges as they are often cheaper than bespoke designed bridge foundations. Where such culverts are proposed, you must treat them according to the guidelines set out in our culverting policy and its associated documents.

You will need to pay special attention to proposals for temporary works around bridges as these can create an increased flood risk. On a main river, you can address the issues surrounding temporary works by a separate consent or you can include a condition in a consent to ensure the design for such proposals meets our requirements before work is allowed to commence.

You must not accept the fact that there are existing sub-standard bridges along a river stretch as justification for allowing further inadequate structures to be installed. Only by insisting on higher standards for new bridges can we achieve improvements where poor structures are a problem. You may need to point out that we take a long term view on river and flood risk management.

That said, there will be occasions where the best outcome we can achieve is a bridge that is as high as possible (to minimise the impediment to flow) if the crossing is to be useable. Many old bridges, although they present restrictions to flow, are historic structures which may be listed for protection. These bridges are unlikely to be demolished or radically altered as a result.
Most new bridge proposals will require planning permission and therefore a flood risk or consequence assessment (FRA or FCA respectively). Proposals to alter a bridge may require planning permission depending on the extent of the changes and the listed status of the structure.

The FRA or FCA must show that there’ll be no worsening of flooding as a result of the changes, and ideally an overall benefit. You must consider the effects on the surrounding land, especially properties, as well as the immediate effect on the river and its flow. If planning permission isn’t required you must still encourage developers to provide you with the kind of information an FRA or FCA would contain.

Catchment Flood Management Plans (CFMPs) and other studies may offer you information about design criteria and the planned future management of a locality when you’re considering proposals.

Our design requirements

Best practice

We recommend the following design criteria as best practice.

Soffits

- Road or rail bridge soffit levels and flood spans must normally be 600 mm or more above the design flood level (or the maximum known flood level on minor watercourses) in order to allow floating debris to pass freely through the structure. The soffit level may be further influenced by what is in the vicinity, particularly upstream of the proposed bridge. This requirement may be relaxed on very small watercourses where we don’t know the maximum flood level so long as the soffit is above bank level and there is a low risk of damage nearby.

- The soffit must be no lower than 300 mm above either of the upstream banktops. If a lower soffit is required on technical grounds, we may require a wider span to compensate.

- Footpath and bridleway bridges in large flood plains can be treated differently. It may be more practical to construct a bridge with the soffit 300mm above bank top level and with open handrails, which will be submerged in a flood. A large structure raised above flood level with approach ramps could not be reached during a flood in any case.

- Soffit levels on navigable rivers will need to take account of the clearance level required for boats legally using the river. You must ensure the developer consults the relevant navigation authority (British Waterways, ourselves as navigation authority, the county council, or a private company, as appropriate) if bridge works are proposed where they operate.
Design flows

- Design flows must be based on a 1% annual event with an additional allowance for climate change in accordance with FCDPAG3 Economic Appraisal Supplementary Note to Operating Authorities – Climate Change Impacts, October 2006. Planning Policy Statement 25 in England uses the same climate change allowances as FCDPAG3. WAG have confirmed that these allowances are also applicable in Wales. Most structures will remain in place for a long time and we must ensure (as far as possible) their future suitability. Major new bridges will have a design life specified, and climate change allowances must be incorporated for the duration of the design life. If an application does not specify a lifetime, discussions between us and the developers should result in an agreement of what would be realistic. This will vary with the kind of bridge. Developers should justify why they have adopted a given lifetime when they are formulating their proposals. The impacts of climate change need to be taken account of in a realistic way.

- We must consider the effect on overland flow routes of bridges and the transport routes leading to them. Long embankments across flood plains may cause more problems than the bridge itself. Where additional flood openings are proposed, we expect a model study to identify the optimum number, size and location. We’re likely to require a physical or detailed computer flow model in complex situations or if there is a wide floodplain requiring a number of openings.

- The developer must adequately consider local scour to piers and abutments. A study of bridge failures has indicated that between 60 and 70% are caused by hydraulic action. This is the bridge owner’s responsibility.

- Flood velocities should ideally be limited to between 1.5 and 2.0 m s\(^{-1}\). If this can not be achieved developers will need to use training walls to design for velocities of up to 3.5 m s\(^{-1}\). The developer must include the design for any training walls in their consent application.

- We must make developers aware that they need to take account of foreseeable increases in flow within a catchment due to further development and climate change. There is legal precedent for this.

Bridge span

- Developers must provide clear span bridges as a general rule, though in larger rivers this may not be possible. In such cases, design calculations must confirm the capacity of the bridge is maintained. On rivers where a navigation right exists, there may be issues with proposals for piers in the channel. The developer must consult us and the navigation authority, in such cases.

- If a multiple span design is needed, a single span covering the normal wetted channel with an approach span on each side (a three span bridge) can sometimes be more appropriate than a two span design which requires a central pier located in the channel.

Afflux

- A new bridge must produce no difference in water levels between the upstream and downstream sides (afflux) since this would increase flood risk upstream of the bridge.
Inverts

- We must encourage the use of soft inverts to allow the natural river bed to be retained. The top of abutment footings of bridges with no solid invert must be set at least 600 mm below the existing bed level.

- Solid inverts must be set at least 600 mm below the existing hard bed level to allow for future re-grading. The void up to the existing bed level must be filled a suitable inert material, commonly a clean local gravel. Developers can consider shaping the materials to allow dry weather flow to be concentrated rather than spread over the entire base, to prevent sitting.

Parapets

- Open parapets/handrails may be appropriate to allow some flow over the deck in case the bridge opening becomes blocked or in an extreme flood event. Developers must consider the safety of bridge users in these circumstances. Although this is the developers responsibility, we must also make them aware of it.

Deck design

- Service pipes carrying utilities crossing the watercourse must not impinge into the cross section of the bridge opening. It’s better to include any necessary pipes in the deck structure, as this allows access to them without disturbing the river. Developers can lay extra ducts into the deck in anticipation of future services being laid.

Ecology

- Developers must consider the choice of materials and their environmental implications for all works affecting a watercourse. They may need surveys to ascertain if any protected species are present, particularly water voles. The results of the surveys must accompany consent applications.

- Bridges can provide potential nesting sites for a number of bird and bat species. Nest boxes can be incorporated into the design of new bridges. Our Biodiversity staff will be pleased to advise developers.

- Developers must take account of fish, otters and other fauna. They can include flood arches, marginal shelves or wildlife underpasses (commonly a 600 – 1000 mm pipe) in the structure to allow wildlife to move up and downstream. Developers may need to install wildlife proof fencing alongside roads in particular to encourage animals to use these features.

- We must consider and propose any suitable ecological features during pre-application discussion, as it’s not suitable to impose these features on already approved designs.
Repairs to bridges

Maintaining flow capacity
When a developer proposes to repair or strengthen an existing bridge, we must seek (within the bounds of reason) flood risk and environmental improvements through the consenting process. Amendments to the bridge’s cross section must not obstruct existing capacity or flood flow routes near the existing bridge. There may even be scope to improve the capacity of a bridge during repairs, however we must consider the implications of increased downstream flow before we advocate this.

Consenting repair works
Developers need our consent for any repairs affecting the cross section of a bridge or any works requiring access to the channel of a main river. In many cases, for example re-pointing stonework, our main issue when consenting will be the impact of temporary works rather than the end result, which may not materially change the structure. Strengthening the deck of a bridge or resurfacing a highway shouldn’t require our consent provided the works can be done from the surface of the road and there is no change to the bridge opening.

Related documents

Links
- Consentening operational instruction (Spring 2010)
- Design manual for roads and bridges
- FCDPAG3 Economic Appraisal Supplementary Note to Operating Authorities – Climate Change Impacts, October 2006
- Introduction and link to the general Highways Agency MoU
- Index of annexes for the Highways Agency MoU
- http://intranet.ea.gov.uk/static/documents/Policy/m090145_MoU_09-09_ANNEX_1_Water.pdf for MoU water annex, including consenting. Note that flood risk and water quality are interwoven in the document, so you need to review the whole annex for details
Flood Risk Management: considering the use of flood plain compensatory storage (England)

Operational instruction 178_05  Issued 06/07/2010

What's it about?
This document explains the issues surrounding the use of flood plain compensatory storage as one means of managing flood risk arising as a result of development.

It aims to provide good practice guidance to staff and to allow them to make consistent, robust, timely and transparent decisions with good environmental outcomes.

This document only applies to developments in England.

Who does it apply to?
This document applies to Development & Flood Risk Officers. It will be useful to anyone involved in managing flood risk to new developments.

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- Introduction to compensatory storage 2
- PPS25 and the Practice Guide 2
- Our general principles 3
- Guidance for direct schemes 4
- Our requirements for compensation schemes 4
- Compensatory storage in defended areas 7
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- Example of compensatory storage 13

Contact for queries
Matthew Kean
Introduction to compensatory storage

Background
The Environment Agency is a statutory consultee for most development applications within flood plains. When development takes place within a flood plain, it can reduce the volume of flood storage available. Compensatory storage options can be incorporated into development plans and individual applications to replace the lost storage volume and potentially even to increase the overall space available for water.

As with many types of flood plain development, the individual effect of not carrying out compensation works is usually minor. However we’re concerned with the cumulative affect of many such proposals.

PPS25 and the Practice Guide

Sequential approach and flood risk hierarchy
PPS25 set out a sequential approach to development and flood risk. The Practice Guide to PPS25 goes further by suggesting that development in flood prone areas should follow a risk hierarchy. This means that development should preferentially avoid areas of high flood risk. If this is not possible, then the lowest hazard parts of a development (open space for example) should be placed in the portions of a site at highest probability of flooding, instead of elements such as housing, thereby substituting the highest risk. Only when these options have been deemed unachievable should risk control or mitigation options be used.

Risk substitution
Flood plain compensatory storage is a form of risk substitution, since it makes land liable to flood more frequently, but with a low risk use – normally open space or conservation type uses. It must not be used as a reason to advocate flood plain development when lower risk alternatives are available.

Caution
You must only use this document for advice when compensatory storage has been deemed necessary. You must not use it to establish a principle of developing in any location. That will be determined by use of the Sequential and Exception tests of PPS25, though flood plain compensation can be considered within part [c] of the Exception test.

Our philosophy
Providing and enhancing compensatory flood storage can be seen as a literal application of the Government’s strategy ‘Making Space for Water’. It also supports the aims of Defra policy.
Paragraph five of PPS25 states: "Where new development is, exceptionally, necessary in such areas [at risk of flooding], policy aims to make it safe without increasing flood risk elsewhere and where possible, reducing flood risk overall."

This gives a clear message that where practical compensatory works should aim to reduce overall flood risk, and they may be presented as a flood plain enhancement. This can be most easily achieved by providing more storage than is lost due to the development, although other options may exist in particular cases.

This principle is also supported in part [c] of the Exception Test where a development is being considered in that context.

Our general principles

Our aim

We aim to preserve, enhance and restore where possible natural flood plain storage and flow capacity. In some locations it’s possible to re-contour the land adjoining a flood plain to allow development without increasing, and ideally reducing, overall flood risk. One way to achieve this is by incorporating compensatory flood plain storage into the development plan, provided the Sequential and Exception tests have been demonstrated properly.

We require that compensation works are carried out when development is to take place in undefended areas of flood plain. Where a development is proposed in a defended area, we must calculate the impact of the development on flood risk to see if compensation is appropriate.

There are other ways to achieve this aim, however compensation has the advantages of being easy to calculate, and is usually carried out on land within the control of the developer. Other proposals may require more complex design and assessment.

Coastal locations

We don’t normally require compensation in coastal locations as the volume of flood plain displaced by the development will be transferred to the sea.

Surface water flooding

Compensation may be appropriate in locations prone to sewer and overland flooding. We must involve the water company and the local authority in such cases. Our degree of involvement here will depend on how much we have engaged with urban drainage issues. In future, this will change as development of the local authority’s role in urban drainage takes place, once the Floods and Water Management Act 2010 is formally commenced.

Groundwater flooding

Compensation for groundwater flooding can be difficult to achieve due to the source of flooding. The local authority must consider such cases as part of a Strategic Flood Risk Assessment (FRA) and individually as part of a site specific risk assessment.
Planning for compensation works – flood risk assessment

Compensation works must be considered as part of a planning application or consent application (if needed) since they will affect the final appearance of a development, particularly its landscaping. The compensation proposal will therefore form part of the flood risk assessment and be included in application drawings of the site layout.

Types of compensation

Compensation works are divided into direct and indirect. These terms come from CIRIA report C624 "Development and flood risk – guidance for the construction industry (2004)".

Direct or 'level for level' methods as they are also known re-grade the land at the same level as that taken up by the development. Direct schemes therefore provide a direct replacement for the lost storage volume.

Indirect methods rely on water entering a storage area which then releases water at a slower rate, akin to a surface water attenuation scheme. The storage area can be remote from the flood plain or even a tank. Indirect schemes are complicated to design and construct and require a more intensive maintenance regime, which must be continued indefinitely. For these reasons we are generally opposed to indirect schemes unless a planning decision has already been made and they are the only remaining option.

Guidance for direct schemes

Some general considerations

You must consider the following issues before approving a 'direct' compensation scheme:

- The principle of developing a particular site must be in line with the sequential test of PPS25. There may be better sites to develop that are at lower risk. Alternatively, a development could be designed to fit the lowest risk part of a site, largely or even completely removing the need for compensatory storage. The developer must consider why the development can't be built in the area earmarked for compensatory storage.

- Normally, direct compensation works won't increase the land available for development on a site, they'll merely reconfigure it for more convenient use. In order to increase the land available on site, further land off site is required.

- Assuming the proposed development will extend above the design flood level (for example, a building), some land will be required to compensate at that design flood level. By definition this will be at or beyond the edge of the existing flood plain. As a result of this, compensatory storage schemes can't be carried out on sites entirely within a flood plain.

Level for level compensation

Level for level compensation is the replacement of volumes lost from the flood plain through development with new flood plain volume, by reducing nearby ground levels. The compensatory volume must be at the same level (within reasonable working limits) as the lost storage.

In general, level for level compensation should only be applied in areas where flood water is stored; flood flow routes should be protected. There may sometimes be benefits in altering routes or increasing flood flow.
capacity, however it should only be carried out after careful assessment of the downstream impacts. This assessment must be included in the developer’s FRA.

Floodplain enhancement can generally be achieved in two ways. Firstly, and most simply is where the volume provided for compensation is greater than the volume lost through development, so increased storage is provided. Secondly, it can be achieved by carrying out work in a different manner to normal compensation to achieve certain clearly specified objectives. It may sometimes be appropriate for example to deliver works in a different location to where the development is proposed. Steered by our CFMPs, such locations need to have been identified as being required for compensation and be established, typically at the LDF level. Developers won’t normally have mechanisms or finance to carry out compensation works on land outside their influence. Therefore, if we are seeking works at offsite locations (that may contribute to a larger scheme to manage flood risk), the commitment of the LPA and any other relevant landowners is vital.

Ideally over time, we’ll embed our CFMP objectives and policies within the Regional Spatial Strategies, Local Development Frameworks, or other comparable plans, so they identify the locations where the effectiveness of the floodplain needs to be enhanced in order to deliver sustainable outcomes.

In such instances, we will work to establish frameworks for voluntary agreements to achieve this, with associated funding and delivery mechanisms (for instance, as part of supplementary planning guidance). Where these mechanisms are not yet in place, we’ll have to work within the context of the immediate site.

Our requirements for acceptable compensation schemes

As stated in PPS25, development must be directed away from the areas of highest risk. Where new development is necessary, it must aim to reduce flood risk overall. Developers must therefore ensure there’ll be no loss of flood flow or flood storage capacity for floods up to the severity of the 1% fluvial flood as a result of their development. Developers must consider climate change predictions when designing their development, and they should seek to create a net benefit to flood risk wherever possible.

You must consider the consequences of more extreme flood events when deciding on the appropriateness of a developer’s compensation proposals. In some circumstances, you may deem the consequences to be in excess of what we consider ‘safe’. In these circumstances the proposals won’t be acceptable to us and we will object to the scheme.
Our requirements

There is no lower volume limit below which compensation is not required. You must however consider what might be deemed reasonable if an appeal is made against our requirements. Focus your efforts on securing improvements to higher risk proposals rather than forcing changes to relatively low risk proposals.

Our basic requirements for compensatory flood plain storage are as follows:

- A volume of flood plain equal or larger than that lost to the proposed development must be created.
- The equal volume must apply at all levels between the lowest point on the site and the design flood level. Normally this is calculated by comparing volumes taken by the development and the volume offered by the compensatory storage for a number of horizontal slices through the range defined above. See Example of compensatory storage for a depiction of this.
- The thickness of a slice should be typically 0.2 metres. In the case of large flat sites or very steep sites this may be varied, for example for flat sites to 0.1 or even 0.05 metres. The slice thickness should be set to provide between ten and fifteen slices for such unusual sites.
- Compensatory storage must be provided equal to or exceeding the development for each of these slices.

This approach allows you make a simple comparison of volumes to ensure there will be no net loss of flood storage. If a more complicated proposal is made by a developer, they'll need to back it up with more detailed analysis to allow you to reach a clear conclusion.

Liaison with the developer

The developer must prepare suitably detailed plans and calculations to show in their FRA how they'll achieve the 'no net loss' condition. Your pre-application discussions with the developer should agree the scope of the work prior to calculations being undertaken. The calculations must include the upper and lower levels over which the compensation works will apply, the slice thickness to be used and the general location of the works.

Acceptable compensation

The location of the compensation works must relate hydraulically and hydrologically to the location of the site. It may not be acceptable for a developer to propose compensation several kilometres away or separated from the site by a significant structure such as a weir or restrictive bridge. Each proposal must be judged on its own merits.

A developer may provide compensation as a block to match the development (that is, all the slices occupy the same plan area) or they may distribute the compensation in convenient locations around the site.

Important!

We must insist that excavation of the compensation is complete before infilling commences to ensure that flood plain capacity is maintained during construction of the development.
Compensatory storage in defended areas

**Carry out a sensitivity test**

In defended areas you must consider the need for compensation based on the results of a sensitivity test. The test can be assessed in three parts:

- What increase in flood levels may result from development in the defended area if the defences were breached or overtopped?
- What is the effect of this change, how much better or worse will flooding be to properties in particular?
- Are the effects acceptable, and what to do about it if not? Compensation will be an appropriate solution if the principle of development in the area is in accordance with PPS25.

**Identifying the changes**

The (S) FRA for the development proposal must identify the resulting change. Rather than saying "the change in levels is X", it must say "if the change in levels is X, how many more or less properties will be at what changed risk of flooding?". If an increase of 0.12m means that water gets above the threshold of ten more properties in a design flood event then that is likely to be unacceptable. Proposals that would raise that level are either inappropriate and must be resisted, or compensatory storage or other mitigation works should be investigated.

If however the increase is 0.0012 m, it probably means (though the (S) FRA would have to demonstrate it) that no more properties would be flooded. This is more likely to be acceptable without the need for compensation.

In principle, flood risk must be reduced for up to and including the 1% fluvial and 0.5% tidal events and people must remain ‘safe’ during an extreme event.

**Extra risk assessment required**

This means some more work is required for the (S) FRA. We might need survey work to identify the extent of change of flooding (a ground level survey) or the numbers of houses at increased risk (a threshold or floor level survey). The developers need to carry out this extra work at their own expense.

**Making sensitive decisions**

Due to the fact that areas protected by defences are by their nature low lying and at risk of flooding, it can be difficult to find areas that are suitable for flood plain compensation in the vicinity. You’ll have to decide if the sensitivity of the defended area is so great that compensation must be provided.

The ultimate outcome of your decision could be an objection (or consent refusal if applicable) as compensation is not feasible. We’re unlikely to want to defend an appeal against our objection on the basis of lack of compensation within a defended area. We’ll only want to defend our decision at appeal if the consequences of not compensating were very severe.
Consulting your internal colleagues

Considering our other duties

Although our primary concern when assessing compensation schemes is mitigating and reducing flood risk, we must also consider our wider duties. You must consult with your colleagues to ensure that we take account of our biodiversity, recreation and heritage duties, along with our CFMPs and Water Level Management Plans where they apply.

Biodiversity

Compensation schemes must conserve and where possible enhance the biodiversity value of a site. Developers should avoid areas of particular conservation interest when selecting sites. This not only means sites with statutory designations and protected species but also higher quality local environments such as county wildlife areas.

We must not promote or allow developers to undertake ground lowering or raising close to trees without the approval of a qualified tree specialist. This is because roots can be damaged and trees made unstable.

Suitable planting of the compensation area should form part of a scheme wherever possible. Planting within a compensation area should comprise native species, preferably of local origin, and bearing in mind the increased frequency and duration of flooding.

All compensation works must be sustainable on a long term basis and include provision for appropriate maintenance of the planting.

Our wetlands policy

Where developers are providing compensatory storage close to normal river levels, you should promote the creation or restoration of wetlands. You should also make developers aware of any opportunities to improve river corridors and add value to the landscapes character.

Our wetlands policy states:

- “We will take action to conserve, enhance and re-create the wetland capacity of catchments as part of our contribution to rebuilding the biodiversity of England and Wales on a landscape scale”
- “We will work to secure the long term sustainable management of wetlands when planning and implementing our regulatory and operational business, thereby meeting our local, national and international responsibilities”
- “The role of wetlands in reducing floods will be recognized, and the environmental benefits from natural floods will be maximised”

Where possible you must promote the enhancement of existing wetland features in the locality of a scheme, particularly those of importance to species covered by a Biodiversity Action Plan (BAP).

Landscape

Compensation schemes should at least conserve and where possible enhance the landscape value of a site. Developers must avoid areas of particular landscape interest when selecting sites for compensatory storage. This not only means designated sites but also higher quality local sites taking on board landscape character.
Recreation

We must consider both existing and future recreation needs when considering compensation schemes. Developers can use compensation areas to provide open spaces associated with a development, however these areas are by their nature liable to flooding. Compensation areas can place access such as footpaths at risk from flooding, and developers may need to divert such routes to keep them passable in times of flood.

Heritage

Our heritage duty applies to buildings and sites of archaeological, architectural or engineering interest. Developers must protect these features when providing compensation schemes, for example they should avoid excavating alongside foundations. Developers may need to refer to a county archaeologist or similar person if they expect any archaeological finds. Developers should be made aware of their heritage obligations by the LPA, but as promoters of the need for compensation works we should also point out the heritage implications.

Unacceptable options for compensation schemes

Our position

As stated earlier we don’t favour indirect replacement of flood storage. We’re likely to object to any such proposal, in the first instance at least, however you must consider each proposal on its own merits.
We are likely to consider the following examples unacceptable options for compensatory flood storage:

- Excavating a hole in the flood plain below the level of the development. During extreme events this may already be full and therefore offer no storage during a flood. This is direct compensation but it’s not ‘level for level’.

- Excavating a landlocked area isolated from the flood plain or linked by a narrow access such as a culvert. These are prone to accidental blocking and infilling, especially when only used every few years. This is a form of indirect compensation.

- Providing low level compensation to match high level development or vice versa. This arrangement will affect how the compensatory flood plain operates relative to the pre-development condition of the site, and therefore doesn’t replicate the natural behaviour of the flood plain.

- Works that will damage sensitive habitats or the heritage of the site.

- Works that may place surrounding properties at risk. For example, lowering the ground level close to ‘at risk’ properties, thereby increasing their flood risk further.

- The use of stilts or voids. This is not flood plain compensation, it's mitigation of risk. The use of stilts reduces the impact on the development but does not guarantee that the flood plain will be retained in the same way as a compensation scheme (which is a form of risk substitution). Although you mustn’t consider it at this stage, this option may be appropriate in some circumstances.

**Note:** Further guidance on the use of stilts and voids is available in the revised PPS 25 Practice Guide.

---

## Liaising with local planners

### Planning permission

Due to our limited powers to impose our requirements on developers, we should seek to have developers include their compensation scheme in their request for planning permission. Proposals for a compensation scheme will form part of the developer’s FRA and can, once agreed usually be covered by a ‘Grampian’ condition. Developers are likely to need a Section 106 agreement if any component of their compensation scheme is outside the application site. This is likely if we’re suggesting works remote to the site as a result of a CFMP or similar.

### Pre-application discussions

We must encourage pre-application discussions in all cases. Developers may be able to provide a complete acceptable scheme prior to applying for planning permission, which can then go into the planning application. They may require a bylaw consent in some cases (for works affecting the flood plain or within the margin of a main river) but the scheme must also be addressed through the planning consultation.
| **Objection** | If we are consulted on a planning application that doesn’t contain an acceptable compensation scheme, we must object to the application. Our objection must remain in place until we agree a scheme as part of the FRA. |
| **Protecting future land use** | We must insist that the future land use of the compensation area is guaranteed by legal agreements, as there can be pressure to build on open spaces many years after they were designated as compensatory flood plain. Both we and the LPA will need to keep records showing the presence of compensation areas, and to record them in NFCD. It may be appropriate for us to designate compensation areas as flood storage areas (and hence functional flood plain in PPS25). |
| **Maintaining flood plain capacity during phased works** | Where a development is built in phases, developers have two options regarding providing compensatory storage. They can:  
- provide the complete compensation scheme in advance of development work starting.  
  or  
- provide a compensation area matching the volume of each phase in advance of that stage commencing.  
Adhering to these options ensures that flood plain capacity is maintained during the entire construction period of the development. |
| **‘As built’ surveys’** | The developer must provide us with an ‘as built’ survey to ensure they’ve complied with their planning approval and to allow us to alter our flood zones if required. This requirement is equally important to the developer as if it’s not done, the development may be shown as being within a flood plain, which will affect its ability to be sold and insured. |
| **What about maintenance?** | Direct, level for level schemes should be self maintaining with respect to their flood storage aspects, as there are no structures involved. Developers will however need to provide for their maintenance with respect to their landscaping, biodiversity and other aspects in their planning application. More complex schemes will need approved maintenance plans and funding to ensure they are maintained – we will need to approve these jointly with the LPA, though the LPA will enforce it. Normally we expect the future occupiers of the development (either individuals, or more commonly companies maintaining grounds) or local authority to carry out the maintenance |
Related documents

Links

- [123_04 A policy for wetlands in England and Wales](#)
- [Planning Policy Statement 25 (PPS25)](#)
- [Updated PPS25 Practice Guide](#)
- CIRIA report 624 – Development and flood risk – guidance for the construction industry (requires purchase)
Example of compensatory storage

Any loss of flood storage must be compensated for by the reduction in level of nearby ground, such that the same volume is available at every flood level before and after the works and it can freely fill and drain. In other words, in order to mirror the existing situation for a particular flood, each stage or level (say at 0.2 metre vertical intervals for example) is provided with the same storage volume, cut and fill must equate on a level for level basis.

The timing at which the storage effect comes into operation is significant. If this volume is reduced for any stage of a flood then the lost storage results in floodwater being diverted elsewhere, leading to third party detriment. The detriment caused by a small encroachment may not be significant, or even measurable, when taken in isolation but the cumulative effect of many such encroachments will be significant.

Wherever possible schemes should not impact on the channel of the river. However, if as a result of forced changes in flow and velocity suitable bed and bank erosion protection may need to be provided as necessary, and maintained in perpetuity to ensure a stable hydraulic system is upheld.

It is not adequate compensation to:

- excavate holes in the floodplain
- create landlocked areas of lower ground, even if connected to the main floodplain by channels or culverts
- provide low level volumes to replace high level floodplain and vice-versa
APPENDIX H

OPTIONS DRAWINGS
1. DO NOT SCALE FROM THIS DRAWING.
2. SEE DRG No EC/RJ567621/01/001 FOR LOCATION PLAN.
3. TYPICAL SECTION DETAILS ARE INDICATIVE.
4. SWALE & DITCH REQUIREMENTS TO BE CONFIRMED WITH DETAILED DRAINAGE DESIGN.
5. BATTER SLOPE ANGLE TO BE CONFIRMED WITH SOIL INVESTIGATION.
NOTES
1. DO NOT SCALE FROM THIS DRAWING.
2. SEE DRG.No EC/RJ567621/01/001 FOR LOCATION PLAN.
3. TYPICAL SECTION DETAILS ARE INDICATIVE.
4. SWALE & DITCH REQUIREMENTS TO BE CONFIRMED WITH DETAILED DRAINAGE DESIGN.
5. BATTER SLOPE ANGLE TO BE CONFIRMED WITH SOIL INVESTIGATION.

HIGHBRIDGE FARM

NOTES
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HIGHBRIDGE FARM

NOTES
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5. BATTER SLOPE ANGLE TO BE CONFIRMED WITH SOIL INVESTIGATION.
TYPICAL SECTION

REV

AMENDMENTS

DATE

CAD

CHKD

APPD

NOTES

1. DO NOT SCALE FROM THIS DRAWING.
2. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE STATED.
3. TYPICAL SECTION DETAILS ARE INDICATIVE.
4. SWALE & DITCH REQUIREMENTS TO BE CONFIRMED WITH DETAILED DRAINAGE DESIGN.
5. BATTER SLOPE ANGLE TO BE CONFIRMED WITH SOIL INVESTIGATION.

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HCC CAD PLOT:
11/12/2015 9:52:35

DRAWING TITLE

DRAWING NUMBER

REV

SCALE @ A3

DATE

SHEET NUMBER

SCHEME

APPROVED

CHECKED

CAD

DESIGNER

CONSULTANT

CLIENT

STUART JARVIS BSc DipTP FCIHT MRTPI: DIRECTOR OF ECONOMY, TRANSPORT & ENVIRONMENT

HAMPSHIRE COUNTY COUNCIL

ECONOMY, TRANSPORT AND ENVIRONMENT DEPARTMENT

STRATEGIC TRANSPORT

SCALE 1:10,000

SCALE H1:10,000

V1:1,000

FAIROAK

HIGHBRIDGE ROAD B3335

WINCHESTER ROAD B3354

SCALE 1:200

COLDEN COMMON

HV O/H

CARAVAN PARK

PARK

BISHOPSTOKE LANE

RIVER

ITCHEN

RAILWAY

STOKEPARK FARM

WARDLE ROAD

BRAMBRIDGE
NOTES
1. DO NOT SCALE FROM THIS DRAWING.
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DATE
SHEET NUMBER

SCHEME
APPROVED
CHECKED
CAD
DESIGNER
CONSULTANT
CLIENT

Hampshire County Council
ECONOMY, TRANSPORT AND ENVIRONMENT DEPARTMENT
STRATEGIC TRANSPORT

SCALE 1:10,000
NOTES
1. DO NOT SCALE FROM THIS DRAWING.
2. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE STATED.
3. TYPICAL SECTION DETAILS ARE INDICATIVE.
4. SWALE & DITCH REQUIREMENTS TO BE CONFIRMED WITH DETAILED DRAINAGE DESIGN.
5. BATTER SLOPE ANGLE TO BE CONFIRMED WITH SOIL INVESTIGATION.

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DRAWING TITLE
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REV
SCALE @ A3
DATE
SHEET NUMBER

SCHEME
APPROVED
CHECKED
CAD
DESIGNER
CONSULTANT

CLIENT
JOB No.
EASTLEIGH STRATEGIC TRANSPORT STUDY
NORTH BISHOPSTOKE BYPASS
OPTION 2C
PLAN & PROFILE
EC/RJ567621/01/033

STUART JARVIS BSc DipTP FCIHT MRTPI: DIRECTOR OF ECONOMY, TRANSPORT & ENVIRONMENT
HAMPSHIRE COUNTY COUNCIL
ECONOMY, TRANSPORT AND ENVIRONMENT DEPARTMENT
STRATEGIC TRANSPORT

SCALE 1:10,000

KEY
PROPOSED SIGNAL JUNCTION
PROPOSED ROUNDABOUT
PROPOSED GHOST ISLAND
PROPOSED TURNING HEAD
BALANCING POND. INDICATIVE SIZE AND LOCATION

EASTLEIGH STRATEGIC TRANSPORT STUDY
NORTH BISHOPSTOKE BYPASS
OPTION 2C
PLAN & PROFILE
EC/RJ567621/01/033

Hampshire County Council
ECONOMY, TRANSPORT AND ENVIRONMENT DEPARTMENT
STRATEGIC TRANSPORT

SCALE 1:10,000

Highbridge Road B3335
Winchester Road B3354

KEY
PROPOSED SIGNAL JUNCTION
PROPOSED ROUNDABOUT
PROPOSED GHOST ISLAND
PROPOSED TURNING HEAD
BALANCING POND. INDICATIVE SIZE AND LOCATION

Wardle Road B2117
Portsmouth Road

Scale 1:200
Caravan Park
Fisher's Pond
Bishopstoke Lane
River Itchen
Railway
Stoke Park Farm
Highbridge Road Junction
Development Access Road
Winchester Road Junction

Scale H1:10,000
V1:1,000

NOTES
1. DO NOT SCALE FROM THIS DRAWING.
2. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE STATED.
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5. BATTER SLOPE ANGLE TO BE CONFIRMED WITH SOIL INVESTIGATION.
APPENDIX J

OPTIONS ASSESSMENT TABLE
## Consideration

**Accident prevention**
- Free-arm roundabouts placed at bottom of hill connecting Relief Road, Pitmores, Osborne Mews and Allbrook Hill.
- Free-arm roundabouts are considered to be high risk for accidents, particularly for such a small ICD.

## Protection from increased noise

- Will bring traffic noise to the rear of the properties on the north side of Allbrook Hill and the west side of Pitmores Road.
- Frontages of the properties on Allbrook Hill will benefit from some reduction in traffic noise.
- Frontages of the properties on Allbrook Hill will benefit from some reduction in traffic noise.
- Widened road impacts on Allbrook Farmhouse, a Grade II listed building.

## Justification

- Positive - 5

## Impact on Environmental Constraints

**Increase in noise**
- Will bring traffic noise to the rear of the properties on the north side of Allbrook Hill and the west side of Pitmores Road.
- Frontages of the properties on Allbrook Hill will benefit from some reduction in traffic noise.
- Widened road impacts on Allbrook Farmhouse, a Grade II listed building.

## Impact on Listed Buildings

- Positive - 5

## Impact on Statutory Undertakers Plant

- Number of existing services on route of bypass
- Diversionary works required at tie-ins to existing network.
- Minimal private services within greenfield section.

## Land-take

**Extent of land-take and number of different landowners**
- Requires the demolition of four residential properties - the first four on the west side of Pitmores Road.
- Requires land from one more residential property on the west side of Pitmores Road, plus the first residential property on the west side of Pitmores Road.
- Requires land from one more residential property on the west side of Pitmores Road, plus the first residential property on the east side of Pitmores Road, plus the first property on Albrook Hill, north-west side.

## Adherence to Standards

**A gradient of 3% is a Departures from Standard (TD9/93 para 4.2)**
- A design speed greater than 30mph will require additional vertical alignment DSS.
- A gradient of 8% is a Departures from Standard (TD9/93 para 4.2)
- A design speed greater than 30mph will require additional vertical alignment DSS.

## Well Being

**Protection from increased noise**
- Will bring traffic noise to the rear of the properties on the north side of Allbrook Hill and the west side of Pitmores Road.
- Noise bunds / acoustic barriers can be installed along sections of the Relief Road as identified by noise calculations.

## Capital Cost (£m)

**Approximate comparative costs**
- Cost includes: 30% civils contingency, 25% fees, site super and testing, 17.5% inflation (5% per year for 4 years), 44% Optimism Bias.
- Widened carriageway to provide for the two, staggered priority junctions.
- Includes optional dedicated left turn lane for N/B traffic on A225 Allbrook Way.

## Option A

- Capital Cost (£m): 44.0
- Widened carriageway to provide for the two, staggered priority junctions.

## Option B

- Capital Cost (£m): 43.7
- Widened carriageway to provide for the two, staggered priority junctions.

## Option C

- Capital Cost (£m): 43.3
- Widened carriageway to provide for the two, staggered priority junctions.

---

**Feasibility Report, North Basingstoke Bypass, Options Assessment**

Allbrook Hill: Option 1A

- Allbrook Hill connects to Osborne Mews.
- Allbrook Hill and the west side of Pitmores Road.
- Widened road impacts on Allbrook Farmhouse, a Grade II listed building.

Option 1B

- Option 1B
- Widened road impacts on Allbrook Farmhouse, a Grade II listed building.

Option 1C

- Option 1C
- Widened road impacts on Allbrook Farmhouse, a Grade II listed building.
<table>
<thead>
<tr>
<th>Factor</th>
<th>Consideration</th>
<th>Assessment</th>
<th>Option H1 Justification</th>
<th>Option H2 Justification</th>
<th>Option H3 Justification</th>
<th>Option H4 Justification</th>
<th>Option H5 Justification</th>
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<tr>
<td></td>
<td>Operation</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td></td>
<td>Improved alignment</td>
<td>Negative -1</td>
<td>Approximately 250m of new carriageway provided.</td>
<td>Approximately 450m of new carriageway provided.</td>
<td>Approximately 650m of new carriageway provided, plus a new river bridge.</td>
<td>Approximately 550m of new carriageway provided, plus a new river bridge.</td>
<td>Approximately 600m of new carriageway.</td>
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<tr>
<td></td>
<td>Accident prevention</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Week end left-hand and right-hand bends heading east from river crossing.</td>
<td>2</td>
<td>Must reduce accident risk to immediate east of railway bridge.</td>
<td>Takes out sharp reverse curves heading east from railway bridge, but maintains some reverse curvature.</td>
<td>Takes out sharp reverse curves heading east from railway bridge, plus later reverse curves.</td>
<td>Takes out sharp reverse curves heading east from railway bridge and removes later reverse curves.</td>
<td>Takes out sharp reverse curves heading east from railway bridge and removes later reverse curves.</td>
</tr>
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<td>3</td>
<td>4</td>
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<tr>
<td></td>
<td>May reduce accident risk to immediate east of railway bridge.</td>
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<tr>
<td></td>
<td>Positive - 5</td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Impact on Environmental Constraints</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Increase in noise</td>
<td>Negative -1</td>
<td>No direct impact on SAL, SSSI or SNHs in the area. Noise not an issue.</td>
<td>Reduces traffic noise to Roselea and Dunoon, two residential properties on the north side of Highbridge Road.</td>
<td>Reduces traffic noise to Roselea and Dunoon, two residential properties on the north side of Highbridge Road.</td>
<td>Reduces traffic noise to Roselea and Dunoon, two residential properties on the north side of Highbridge Road.</td>
<td>Reduces traffic noise to Roselea and Dunoon, two residential properties on the north side of Highbridge Road.</td>
</tr>
<tr>
<td></td>
<td>Impact on flood plain</td>
<td>2</td>
<td>New road completely in Zone 3 flood plain, but least of all options.</td>
<td>New road completely in Flood Zone 3.</td>
<td>New road completely in Flood Zone 3.</td>
<td>New road completely in Flood Zone 3, has most impact of all options.</td>
<td>New road completely in Flood Zone 3, has most impact of all options.</td>
</tr>
<tr>
<td></td>
<td>Impact on listed buildings</td>
<td>3</td>
<td>No impact on listed buildings.</td>
<td>No impact on listed buildings.</td>
<td>No impact on listed buildings.</td>
<td>No impact on listed buildings.</td>
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<td>Positive - 5</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Impact on Statutory Undertakers Plant</td>
<td>Negative -1</td>
<td>Diversionsary works required at tie-ins to existing network. Minimal private services within greenfield section.</td>
<td>Diversionsary works required at tie-ins to existing network. Minimal private services within greenfield section.</td>
<td>Diversionsary works required at tie-ins to existing network. Minimal private services within greenfield section.</td>
<td>Diversionsary works required at tie-ins to existing network. Minimal private services within greenfield section.</td>
<td>Diversionsary works required at tie-ins to existing network. Minimal private services within greenfield section.</td>
</tr>
<tr>
<td></td>
<td>Extent of land take and number of different landowners</td>
<td>2</td>
<td>Approx 0.5 Ha of farmland required.</td>
<td>Approx 1.1 Ha of farmland required.</td>
<td>Approx 1.8 Ha of farmland required.</td>
<td>Approx 1.8 Ha of farmland required.</td>
<td>Approx 1.8 Ha of farmland required.</td>
</tr>
<tr>
<td></td>
<td>Positive - 5</td>
<td></td>
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</tr>
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<td></td>
<td>Adherence to Standards</td>
<td>Negative -1</td>
<td>No new Departures from standard identified at this stage.</td>
<td>No new Departures from standard identified at this stage.</td>
<td>No new Departures from standard identified at this stage.</td>
<td>No new Departures from standard identified at this stage.</td>
<td>No new Departures from standard identified at this stage.</td>
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<td></td>
<td>Positive - 5</td>
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</tr>
<tr>
<td></td>
<td>Well Being</td>
<td>Negative -1</td>
<td>Noise and severance not an issue.</td>
<td>Existing road outside Roselea and Dunoon will become a cul-de-sac providing a quieter environment. Short diversion for traffic depending on location of access.</td>
<td>Existing road outside Roselea, Dunoon and Highbridge Farm (north) will become a cul-de-sac providing a much quieter environment. Short diversion for traffic depending on location of access.</td>
<td>Existing road outside Roselea, Dunoon and Highbridge Farm (north) will become a cul-de-sac providing a much quieter environment. Short diversion for traffic depending on location of access.</td>
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<td>Capital Cost (£m)</td>
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<td>£2.1m.</td>
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<td>£6.6m.</td>
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<td>Cost includes:</td>
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<td>20% civil contingency</td>
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<td>20% fees, site super and lasting 6.1%, inflation (5% for 4 years)</td>
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</table>
## North Bishopstoke Bypass

<table>
<thead>
<tr>
<th>Factor</th>
<th>Consideration</th>
<th>Assessment</th>
<th>Option 2A</th>
<th>Option 2B</th>
<th>Option 2C</th>
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</thead>
<tbody>
<tr>
<td>Operation</td>
<td>Connectability and economy of junction provision</td>
<td>Negative 1</td>
<td>Approves 3.2km of new carriageway provided between Hightbridge Road, and north of Wardle Road, and Winchester Road at Crowtheil.</td>
<td>Approx 3.2km of new carriageway provided between Hightbridge Road, just to the east of the railway bridge, and Winchester Road at Crowtheil.</td>
<td>Approves 2.9km of new carriageway provided between Hightbridge Road, just north of Wardle Road, and Winchester Road at Fishers pond.</td>
</tr>
<tr>
<td></td>
<td>Accident prevention</td>
<td></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>Signal controlled junction on Hightbridge Road, priority junction with the southern part of Bishopstoke Lane (no access north), roundabout at Stokepark Farm to connect to new development, roundabout on Winchester Road.</td>
<td>Signal controlled junction on Hightbridge Road, priority junctions with Bishopstoke Lane, roundabout at Bishopstoke Lane (no access north), and the new development roundabout on Winchester Road.</td>
<td>Signal controlled junction on Hightbridge Road, roundabout connecting to the southern part of Bishopstoke Lane.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>Site is at 5Ha of farmland required, more than half of which is earmarked for development.</td>
<td>Site is at 5.2Ha of farmland required, more than half of which is earmarked for development.</td>
<td>Site is at 5.9Ha of farmland required.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
<td>Potential to reduce the number of accidents on existing roads.</td>
<td>Potential to reduce the number of accidents on existing roads.</td>
<td>Potential to reduce the number of accidents on existing roads.</td>
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<tr>
<td>Impact on Environmental Constraints</td>
<td>Environmental designations</td>
<td>Negative 1</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Impact on listed buildings</td>
<td></td>
<td>Yes</td>
<td>No</td>
<td>No</td>
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<tr>
<td></td>
<td>Increase in noise</td>
<td></td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Impact on flood plain</td>
<td></td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td></td>
<td></td>
<td>2</td>
<td>Passes within 100/150m of Hill Farmhouse and Woodcroft Lodge, on Bishopstoke Lane, grade II listed buildings.</td>
<td>Passes within 100/150m of Hill Farmhouse and Woodcroft Lodge, on Bishopstoke Lane, grade II listed buildings.</td>
<td>Passes within 100/150m of Hill Farmhouse and Woodcroft Lodge, on Bishopstoke Lane, grade II listed buildings.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>Increases noise to rear of properties on Wardle Road/Lordswood, and properties on Bishopstoke Lane.</td>
<td>Increases noise to rear of properties on Wardle Road/Lordswood, and properties on Bishopstoke Lane.</td>
<td>Increases noise to rear of properties on Wardle Road/Lordswood, and properties on Bishopstoke Lane.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
<td>Closes approx 50m of Flood Zone 3 north-west of Stokepark Farm</td>
<td>Closes approx 50m of Flood Zone 3 at junction with Winchester Road.</td>
<td>Closes approx 50m of Flood Zone 3 at junction with Winchester Road.</td>
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<tr>
<td>Impact on Statutory Undertakers Plant</td>
<td>Number of existing services on route of bypass</td>
<td>Negative 1</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<td></td>
<td></td>
<td></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>Diversionary works required at tie-ins to existing network. Minimal private services within greenfield section.</td>
<td>Diversionary works required at tie-ins to existing network. Minimal private services within greenfield section.</td>
<td>Diversionary works required at tie-ins to existing network. Minimal private services within greenfield section.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
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<td></td>
<td></td>
<td>4</td>
<td>Positive 5</td>
<td>Positive 5</td>
<td>Positive 5</td>
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<tr>
<td>Land-take</td>
<td>Benefit of fund take and number of different landowners</td>
<td>Negative 1</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>Approx 9Ha of farmland required.</td>
<td>Approx 9Ha of farmland required.</td>
<td>Approx 9Ha of farmland required.</td>
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<td></td>
<td></td>
<td>3</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Adherence to Standards</td>
<td>Negative 1</td>
<td>No new Departures from Standard identified at this stage.</td>
<td>No new Departures from Standard identified at this stage.</td>
<td>No new Departures from Standard identified at this stage.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>No new Departures from Standard identified at this stage.</td>
<td>No new Departures from Standard identified at this stage.</td>
<td>No new Departures from Standard identified at this stage.</td>
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<tr>
<td></td>
<td>Well Being</td>
<td>Negative 1</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Noise bunds / acoustic barriers can be installed along sections of the Bypass as identified by noise calculations.</td>
<td>Noise bunds / acoustic barriers can be installed along sections of the Bypass as identified by noise calculations.</td>
<td>Noise bunds / acoustic barriers can be installed along sections of the Bypass as identified by noise calculations.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>Severance of Bishopstoke Lane may be an issue.</td>
<td>Severance of Bishopstoke Lane may be an issue.</td>
<td>Severance of Bishopstoke Lane may be an issue.</td>
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<tr>
<td></td>
<td>Capital Cost (£m)</td>
<td>Approximate competitive costs include: 25% civils contingency 25% fees, site super and testing 51% inflation (5%/yr for 4 years) 44% Optimism Bias</td>
<td>£22.1m.</td>
<td>£32.0m.</td>
<td>£15.7m.</td>
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<td></td>
<td></td>
<td>Highest</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lowest</td>
<td>Yes</td>
<td>Yes</td>
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APPENDIX K

COST ESTIMATES
<table>
<thead>
<tr>
<th>Description</th>
<th>Option 1C</th>
<th>Option H2</th>
<th>Option 2A</th>
<th>Total</th>
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<tbody>
<tr>
<td>200 - Site Clearance</td>
<td>105,000</td>
<td>1,000</td>
<td>60,000</td>
<td>166,000</td>
</tr>
<tr>
<td>300 - Fencing and Barriers</td>
<td>29,420</td>
<td>36,856</td>
<td>238,200</td>
<td>304,276</td>
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<tr>
<td>400 - Safety Barriers</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>500 - Drainage and Ducts</td>
<td>241,213</td>
<td>125,605</td>
<td>1,003,311</td>
<td>1,370,129</td>
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<tr>
<td>600 - Earthworks</td>
<td>569,260</td>
<td>136,150</td>
<td>2,433,000</td>
<td>3,138,410</td>
</tr>
<tr>
<td>700 - Pavements</td>
<td>675,303</td>
<td>401,547</td>
<td>2,387,060</td>
<td>3,463,910</td>
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<tr>
<td>1100 - Kerbs, Footways and Paved Areas</td>
<td>179,412</td>
<td>92,379</td>
<td>590,715</td>
<td>862,506</td>
</tr>
<tr>
<td>1200 - Traffic Signs and Road Markings</td>
<td>12,000</td>
<td>1,750</td>
<td>35,750</td>
<td>49,500</td>
</tr>
<tr>
<td>1300 - Road Lighting</td>
<td>41,300</td>
<td>6,195</td>
<td>82,600</td>
<td>130,095</td>
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<tr>
<td>Structures</td>
<td>0</td>
<td>266,000</td>
<td>31,400</td>
<td>297,400</td>
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<td>Special elements</td>
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<td>10,000</td>
<td>111,000</td>
<td>131,000</td>
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<td>Preliminaries and Temporary work</td>
<td>359,596</td>
<td>122,599</td>
<td>1,561,437</td>
<td>2,043,632</td>
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<td>Price Fluctuation - Not Included</td>
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<td>0</td>
<td>0</td>
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<tr>
<td>Civils total</td>
<td>2,222,504</td>
<td>1,199,881</td>
<td>8,534,473</td>
<td>11,956,858</td>
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<tr>
<td>Civils Contingency</td>
<td>15%</td>
<td>333,376</td>
<td>1,280,171</td>
<td>1,793,529</td>
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<td>ITS</td>
<td>0</td>
<td>179,982</td>
<td>85,000</td>
<td>85,000</td>
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<tr>
<td>Landscaping</td>
<td>3%</td>
<td>57,785</td>
<td>31,197</td>
<td>88,982</td>
</tr>
<tr>
<td>Fees, Supervision, Support, Investigations</td>
<td>23.5%</td>
<td>761,438</td>
<td>411,084</td>
<td>2,943,918</td>
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<tr>
<td>Land - not included</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Utilities - covered in Risk Allowance</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<td>Risk Register</td>
<td>626,498</td>
<td>338,233</td>
<td>2,405,769</td>
<td>3,370,500</td>
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<tr>
<td>Optimism Bias</td>
<td>44%</td>
<td>1,760,705</td>
<td>950,566</td>
<td>6,807,340</td>
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<tr>
<td>Grand Total</td>
<td>5,762,306</td>
<td>3,110,942</td>
<td>22,278,567</td>
<td>31,151,815</td>
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<tr>
<td>Construction Duration</td>
<td>48 Weeks</td>
<td>20 Weeks</td>
<td>78 Weeks</td>
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</tbody>
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Exclusions/Assumptions:
- VAT - excluded
- Construction detail as per Rob Ward Request for QS Services dated 14th September 2015
- Allowed 600mm capping for main carriageway.
- No allowance made for any PU Works, Gas, Comms and the like.
- No allowance for site specific restrictions or environmental constraints.
### North Bishopstoke Bypass - Allbrook Hill

#### PRE-RISK ALLOWANCE

**Job No. R.J567621**  
Feasibility Estimate for SE7 Regional Framework  

<table>
<thead>
<tr>
<th>Description</th>
<th>Option 1A</th>
<th>Option 1B</th>
<th>Option 1C</th>
</tr>
</thead>
<tbody>
<tr>
<td>200 - Site Clearance</td>
<td>105,000</td>
<td>105,000</td>
<td>105,000</td>
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<tr>
<td>300 - Fencing and Barriers</td>
<td>25,720</td>
<td>29,420</td>
<td>29,420</td>
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<td>400 - Safety Barriers</td>
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<td>0</td>
</tr>
<tr>
<td>500 - Drainage and Ducts</td>
<td>174,068</td>
<td>241,213</td>
<td>241,213</td>
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<tr>
<td>600 - Earthworks</td>
<td>623,190</td>
<td>570,060</td>
<td>569,260</td>
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<tr>
<td>700 - Pavements</td>
<td>563,228</td>
<td>676,723</td>
<td>675,303</td>
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<tr>
<td>1100 - Kerbs, Footways and Paved Areas</td>
<td>114,948</td>
<td>177,900</td>
<td>179,412</td>
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<tr>
<td>1200 - Traffic Signs and Road Markings</td>
<td>10,750</td>
<td>12,500</td>
<td>12,000</td>
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<tr>
<td>1300 - Road Lighting</td>
<td>41,300</td>
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<td>Structures</td>
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<tr>
<td>Special elements</td>
<td>10,000</td>
<td>10,000</td>
<td>10,000</td>
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<tr>
<td>Preliminaries and Temporary work</td>
<td>267,820</td>
<td>360,306</td>
<td>359,596</td>
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<td>Price Fluctuation - Not Included</td>
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<td>0</td>
<td>0</td>
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<tr>
<td><strong>Civils total</strong></td>
<td>1,936,024</td>
<td>2,224,422</td>
<td>2,222,504</td>
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<tr>
<td><strong>Civils Contingency</strong></td>
<td>20%</td>
<td>444,884</td>
<td>444,501</td>
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<td><strong>ITS</strong></td>
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<td>0</td>
</tr>
<tr>
<td><strong>Landscaping</strong></td>
<td>3%</td>
<td>57,835</td>
<td>57,785</td>
</tr>
<tr>
<td><strong>Fees</strong></td>
<td>15%</td>
<td>400,396</td>
<td>400,051</td>
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<tr>
<td><strong>Site Supervision</strong></td>
<td>4%</td>
<td>106,772</td>
<td>106,680</td>
</tr>
<tr>
<td><strong>Lab Test</strong></td>
<td>1%</td>
<td>26,693</td>
<td>26,670</td>
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<td><strong>Land</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Utilities</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inflation 5%/yr for 4 yrs compound</td>
<td>21.6%</td>
<td>703,769</td>
<td>703,769</td>
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<td>Risk Register</td>
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<tr>
<td>Optimism Bias</td>
<td>44%</td>
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<td>1,743,262</td>
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<td><strong>Grand Total</strong></td>
<td>4,969,821</td>
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<td>5,705,223</td>
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<td><strong>Construction Duration</strong></td>
<td>16 Weeks</td>
<td>20 Weeks</td>
<td>20 Weeks</td>
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</table>

**Exclusions/Assumptions:**  
VAT - excluded  
Construction detail as per Rob Ward Request for QS Services dated 14th September 2015  
Allowed 600mm capping for main carriageway.  
No allowance made for any PU Works, Gas, Comms and the like.  
No allowance for site specific restrictions or environmental constraints.
## North Bishopstoke Bypass - Highbridge Road

### Feasibility Estimate for SE7 Regional Framework

#### PRE-RISK ALLOWANCE

**Job No. R.J567621**

**Option H1**

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost 1</th>
<th>Cost 2</th>
<th>Cost 3</th>
<th>Cost 4</th>
<th>Cost 5</th>
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<tbody>
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<td>200 - Site Clearance</td>
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<td>1,000</td>
<td>26,000</td>
<td>26,000</td>
<td>1,000</td>
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<tr>
<td>300 - Fencing and Barriers</td>
<td>22,152</td>
<td>36,656</td>
<td>51,308</td>
<td>51,308</td>
<td>46,942</td>
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<td>400 - Safety Barriers</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>500 - Drainage and Ducts</td>
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<td>125,605</td>
<td>179,316</td>
<td>179,316</td>
<td>166,980</td>
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<td>600 - Earthworks</td>
<td>79,500</td>
<td>136,150</td>
<td>341,850</td>
<td>367,850</td>
<td>365,250</td>
</tr>
<tr>
<td>700 - Pavements</td>
<td>225,896</td>
<td>401,547</td>
<td>578,792</td>
<td>578,792</td>
<td>529,999</td>
</tr>
<tr>
<td>1100 - Kerbs, Footways and Paved Areas</td>
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<td>92,379</td>
<td>132,997</td>
<td>132,997</td>
<td>121,728</td>
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<td>1,750</td>
<td>1,750</td>
<td>1,750</td>
<td>1,750</td>
</tr>
<tr>
<td>1300 - Road Lighting</td>
<td>6,195</td>
<td>6,195</td>
<td>6,195</td>
<td>6,195</td>
<td>6,195</td>
</tr>
<tr>
<td>Structures</td>
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<td>266,000</td>
<td>816,800</td>
<td>816,800</td>
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<td>Special elements</td>
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<td>10,000</td>
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<td>10,000</td>
<td>10,000</td>
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<td>Preliminaries and Temporary work</td>
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<td>122,599</td>
<td>169,200</td>
<td>169,200</td>
<td>168,698</td>
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<td>Price Fluctuation - Not Included</td>
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<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td><strong>Civils total</strong></td>
<td>820,991</td>
<td>1,199,881</td>
<td>2,314,208</td>
<td>2,340,208</td>
<td>1,664,542</td>
</tr>
<tr>
<td><strong>Civils Contingency</strong></td>
<td>20%</td>
<td>164,198</td>
<td>239,976</td>
<td>462,842</td>
<td>468,042</td>
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<td><strong>ITS</strong></td>
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<tr>
<td><strong>Landscaping</strong></td>
<td>3%</td>
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<td>31,197</td>
<td>60,169</td>
<td>60,845</td>
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<td><strong>Fees</strong></td>
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<td><strong>Site Supervision</strong></td>
<td>4%</td>
<td>39,408</td>
<td>57,594</td>
<td>111,082</td>
<td>112,330</td>
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<td><strong>Lab Test</strong></td>
<td>1%</td>
<td>9,852</td>
<td>14,399</td>
<td>27,770</td>
<td>28,082</td>
</tr>
<tr>
<td><strong>Land</strong></td>
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</tr>
<tr>
<td><strong>Utilities</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Inflation 5%/yr for 4 yrs comp’d</strong></td>
<td>21.6%</td>
<td>259,972</td>
<td>379,950</td>
<td>732,808</td>
<td>741,041</td>
</tr>
<tr>
<td><strong>Risk Register</strong></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Optimism Bias</strong></td>
<td>44%</td>
<td>643,960</td>
<td>941,149</td>
<td>1,815,192</td>
<td>1,835,586</td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td>2,107,504</td>
<td>3,080,124</td>
<td>5,940,629</td>
<td>6,007,372</td>
<td>4,272,920</td>
</tr>
<tr>
<td><strong>Construction Duration</strong></td>
<td>16 Weeks</td>
<td>20 Weeks</td>
<td>24 Weeks</td>
<td>24 Weeks</td>
<td>24 Weeks</td>
</tr>
</tbody>
</table>

**Exclusions/Assumptions:**

- VAT - excluded
- Construction detail as per Rob Ward Request for QS Services dated 14th September 2015
- Allowed 600mm capping for main carriageway.
- No allowance made for any PU Works, Gas, Comms and the like.
- No allowance for site specific restrictions or environmental constraints.
## North Bishopstoke Bypass - Bypass

### PRE-RISK ALLOWANCE

#### Job No. R.J567621

Feasibility Estimate for SE7 Regional Framework

<table>
<thead>
<tr>
<th>Description</th>
<th>Option 2A</th>
<th>Option 2B</th>
<th>Option 2C</th>
</tr>
</thead>
<tbody>
<tr>
<td>200 - Site Clearance</td>
<td>60,000</td>
<td>60,000</td>
<td>17,000</td>
</tr>
<tr>
<td>300 - Fencing and Barriers</td>
<td>238,200</td>
<td>253,370</td>
<td>167,826</td>
</tr>
<tr>
<td>400 - Safety Barriers</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>500 - Drainage and Ducts</td>
<td>1,003,311</td>
<td>1,083,488</td>
<td>710,792</td>
</tr>
<tr>
<td>600 - Earthworks</td>
<td>2,433,000</td>
<td>3,754,900</td>
<td>1,535,920</td>
</tr>
<tr>
<td>700 - Pavements</td>
<td>2,387,060</td>
<td>2,558,495</td>
<td>1,724,889</td>
</tr>
<tr>
<td>1100 - Kerbs, Footways and Paved Areas</td>
<td>590,715</td>
<td>568,920</td>
<td>422,388</td>
</tr>
<tr>
<td>1200 - Traffic Signs and Road Markings</td>
<td>35,750</td>
<td>35,750</td>
<td>35,750</td>
</tr>
<tr>
<td>1300 - Road Lighting</td>
<td>82,600</td>
<td>82,600</td>
<td>82,600</td>
</tr>
<tr>
<td>Structures</td>
<td>31,400</td>
<td>2,401,000</td>
<td>0</td>
</tr>
<tr>
<td>Special elements</td>
<td>111,000</td>
<td>111,000</td>
<td>85,000</td>
</tr>
<tr>
<td>Preliminaries and Temporary work</td>
<td>1,561,437</td>
<td>1,561,437</td>
<td>1,206,480</td>
</tr>
<tr>
<td>Price Fluctuation - Not Included</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Civils total</strong></td>
<td><strong>8,534,473</strong></td>
<td><strong>12,470,960</strong></td>
<td><strong>5,988,645</strong></td>
</tr>
<tr>
<td><strong>Civils Contingency</strong></td>
<td>20%</td>
<td>20%</td>
<td>20%</td>
</tr>
<tr>
<td><strong>ITS (£85,000 / Junction)</strong></td>
<td>85,000</td>
<td>0</td>
<td>170,000</td>
</tr>
<tr>
<td><strong>Landscaping</strong></td>
<td>3%</td>
<td>3%</td>
<td>3%</td>
</tr>
<tr>
<td><strong>Fees</strong></td>
<td>15%</td>
<td>15%</td>
<td>15%</td>
</tr>
<tr>
<td><strong>Site Supervision</strong></td>
<td>4%</td>
<td>4%</td>
<td>4%</td>
</tr>
<tr>
<td><strong>Lab Test</strong></td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td><strong>Land</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Utilities</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Inflation 5%/yr for 4 yrs compound</strong></td>
<td>21.6%</td>
<td>21.6%</td>
<td>21.6%</td>
</tr>
<tr>
<td><strong>Risk Register</strong></td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Optimism Bias</strong></td>
<td>44%</td>
<td>44%</td>
<td>44%</td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td>22,057,041</td>
<td>32,013,262</td>
<td>15,670,676</td>
</tr>
</tbody>
</table>

**Construction Duration**: 72 Weeks 72 Weeks 56 Weeks

**Exclusions/Assumptions:**
- VAT - excluded
- Construction detail as per Rob Ward Request for QS Services dated 14th September 2015
- Allowed 600mm capping for main carriageway.
- No allowance made for any PU Works, Gas, Comms and the like.
- No allowance for site specific restrictions or environmental constraints.
APPENDIX L

RISK REGISTER
### Risk Management

Risk Management is a modern management discipline and is about getting the right balance between innovation and change on the one hand, and the avoidance of shocks and crises on the other.

### Putting Risk into Context

- **What objectives are we trying to achieve?**

<table>
<thead>
<tr>
<th>Identify risks</th>
<th>Evaluate risks</th>
<th>Treat risks</th>
<th>Monitor &amp; Review</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Risk:</strong> the <strong>Effect</strong> of <strong>Uncertainty</strong> on Objectives</td>
<td>Combination of the probability (Likelihood) of an event and its consequences (Impact)</td>
<td>Named person responsible for each risk</td>
<td><strong>Risk Registers:</strong> Baseline data to be prepared and monitored regularly. These should clearly indicate consequences, countermeasures and contingencies as well as the risk owner</td>
</tr>
<tr>
<td>Determine what the Uncertainties are</td>
<td><strong>Impact x Likelihood</strong></td>
<td>Concentrate on 10-15 Top Risks</td>
<td>Assessment before controls, with current control, with proposed controls</td>
</tr>
<tr>
<td><strong>Cause + Consequence</strong></td>
<td>Set ratings for levels of risk (e.g. what is a high, medium, low risk?)</td>
<td>What can we do to:</td>
<td>Review <strong>Top Risks</strong> regularly as agenda item</td>
</tr>
<tr>
<td><strong>Includes:</strong> Threats &amp; Opportunities</td>
<td></td>
<td>• influence the likelihood?</td>
<td>Report progress to senior management</td>
</tr>
<tr>
<td><strong>When:</strong> Setting strategic aims</td>
<td><strong>Impact:</strong> the Effect of Uncertainty on Objectives</td>
<td>• influence the impact or consequences?</td>
<td></td>
</tr>
<tr>
<td>Setting business objectives</td>
<td><strong>Causes + Consequences:</strong></td>
<td>• influence the cause?</td>
<td></td>
</tr>
<tr>
<td>Early stages of project planning &amp; key stages</td>
<td><strong>Impact x Likelihood</strong></td>
<td><strong>Avoid Reduce Transfer Tolerate</strong></td>
<td></td>
</tr>
<tr>
<td>Options appraisals</td>
<td>Set ratings for levels of risk (e.g. what is a high, medium, low risk?)</td>
<td>Evaluate current control measures</td>
<td></td>
</tr>
<tr>
<td>Service improvement plans</td>
<td></td>
<td><strong>Devise Contingencies</strong></td>
<td></td>
</tr>
<tr>
<td>Determining risk-based priorities</td>
<td>Consider impact in Financial, Reputation and Business/Service terms</td>
<td>- Business Continuity Planning</td>
<td></td>
</tr>
<tr>
<td>Categories can help: Strategic/Operational Internal/External</td>
<td>Determine what level of risk can be tolerated</td>
<td><strong>Undertake identified risk treatment measures</strong></td>
<td></td>
</tr>
<tr>
<td>Best done in groups – by those responsible for delivering the objectives</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Risk Registers:
- Baseline data to be prepared and monitored regularly. These should clearly indicate consequences, countermeasures and contingencies as well as the risk owner.
- Assessment before controls, with current control, with proposed controls.
- Review Top Risks regularly as agenda item.
- Report progress to senior management.

#### Diagram:
- Business Objective
- Identify
- Risk Assessment
- Monitor & Review
- Evaluate
- Treat
## Project Risk Register

**Scheme Title:** North Bishopstoke Bypass  
**Job Number:** RJ567621.01

**Date of Assessment:** 18/11/2015  
**Client Manager:** Walmsley  
**Date of Last Assessment:**  
**Project Manager:** Linda Wickens

### Risk Description Table

<table>
<thead>
<tr>
<th>Risk ID</th>
<th>Risk Category</th>
<th>Description of Potential Risk</th>
<th>Effect of Risk Occurring</th>
<th>Mitigating Action</th>
<th>Residual Risk</th>
<th>Financial Impacts</th>
<th>Potential Programme Impact of Residual Risk</th>
<th>Comments (to include details of any revisions, date and who by)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Design</td>
<td>Cost estimate exceeds budget due to work not identified within scope of project</td>
<td>Delays scheme and costs increase</td>
<td>Review and control changes to scope of works</td>
<td>4 3 12</td>
<td>£100,000</td>
<td>£300,000</td>
<td>0.350</td>
</tr>
<tr>
<td>2</td>
<td>Design</td>
<td>Inadequate resources across disciplines to deliver the project</td>
<td>Delays scheme and costs increase</td>
<td>Consider alternative means of procuring design resources</td>
<td>3 3 9</td>
<td>£25,000</td>
<td>£100,000</td>
<td>0.350</td>
</tr>
<tr>
<td>3</td>
<td>Design</td>
<td>AEA or Natural England may have additional restrictions</td>
<td>Delays scheme and increases fee costs</td>
<td>3 4 12</td>
<td>£0</td>
<td>£300,000</td>
<td>0.650</td>
<td>£97,500</td>
</tr>
<tr>
<td>4</td>
<td>Design</td>
<td>Drainage design can only be finalised with SI info and details of existing drainage in the area.</td>
<td>Increases costs</td>
<td>2 4 8</td>
<td>£0</td>
<td>£50,000</td>
<td>0.650</td>
<td>£16,250</td>
</tr>
<tr>
<td>5</td>
<td>Ecological/Environmental</td>
<td>Unknown cost and extent of existing tree removal</td>
<td>Increases costs</td>
<td>2 2 6</td>
<td>£0</td>
<td>£50,000</td>
<td>0.125</td>
<td>£3,125</td>
</tr>
<tr>
<td>6</td>
<td>Ecological/Environmental</td>
<td>Unknown cost for Geophysical issues</td>
<td>Delays scheme and costs increase</td>
<td>Extensive trial pits to 5% of area be carried out</td>
<td>2 2 4</td>
<td>£5,000</td>
<td>£100,000</td>
<td>0.125</td>
</tr>
<tr>
<td>7</td>
<td>Ecological/Environmental</td>
<td>Additional ecological mitigation measures</td>
<td>4 4 16</td>
<td>£0</td>
<td>£50,000</td>
<td>0.650</td>
<td>£16,250</td>
<td>Design</td>
</tr>
<tr>
<td>8</td>
<td>Ecological/Environmental</td>
<td>Habitats Nego Assessment costs</td>
<td>2 4 8</td>
<td>£0</td>
<td>£20,000</td>
<td>0.650</td>
<td>£6,000</td>
<td>Design</td>
</tr>
<tr>
<td>9</td>
<td>Statutory Undertakers</td>
<td>EU services diversions and protection</td>
<td>Cost</td>
<td>None</td>
<td>5 5 20</td>
<td>£500,000</td>
<td>£1,500,000</td>
<td>0.900</td>
</tr>
<tr>
<td>10</td>
<td>Construction</td>
<td>Unknown services encountered - inaccurate records</td>
<td>Delays scheme and costs increase</td>
<td>Trial pits to establish locations of services</td>
<td>3 3 9</td>
<td>£10,000</td>
<td>£300,000</td>
<td>0.350</td>
</tr>
<tr>
<td>11</td>
<td>Construction</td>
<td>Adverse weather conditions during the works i.e Flooding requiring remediation such as de-watering</td>
<td>Delays scheme and increases fee costs</td>
<td>2 2 4</td>
<td>£5,000</td>
<td>£50,000</td>
<td>0.125</td>
<td>£4,688</td>
</tr>
<tr>
<td>12</td>
<td>Construction</td>
<td>Pretreatment costs (site preamels and site super - £22,000/wk)</td>
<td>Delays scheme and costs increase</td>
<td>Carry out full ground survey</td>
<td>3 4 12</td>
<td>£20,000</td>
<td>£100,000</td>
<td>0.650</td>
</tr>
<tr>
<td>13</td>
<td>Construction</td>
<td>Unforeseen ground conditions</td>
<td>Delays scheme and costs increase</td>
<td>Carry out full ground survey</td>
<td>2 1 2</td>
<td>£10,000</td>
<td>£100,000</td>
<td>0.025</td>
</tr>
<tr>
<td>14</td>
<td>Construction</td>
<td>High groundwater may pose issues for excavations during construction; both structures and the pavement</td>
<td>Delays scheme and costs increase</td>
<td>2 3 4</td>
<td>£100,000</td>
<td>£500,000</td>
<td>0.350</td>
<td>£105,000</td>
</tr>
<tr>
<td>15</td>
<td>Construction</td>
<td>It is hoped that surplus soil can be used elsewhere for bunds etc - there’s a risk these soils will be unsuitable and hence disposal/export will be required structural fill for embankments will probably need to be imported in any case</td>
<td>Delays scheme and costs increase</td>
<td>2 2 4</td>
<td>£50,000</td>
<td>£200,000</td>
<td>0.125</td>
<td>£15,625</td>
</tr>
<tr>
<td>16</td>
<td>Maintenance</td>
<td>Unable to secure suitable funding to support revenue costs for special non standard items</td>
<td>2 3 6</td>
<td>£0</td>
<td>£0</td>
<td>0.350</td>
<td>£0</td>
<td>Client</td>
</tr>
<tr>
<td>17</td>
<td>Programme</td>
<td>Inflation</td>
<td>5 5 12</td>
<td>£700,000</td>
<td>£4,000,000</td>
<td>0.900</td>
<td>£3,370,500</td>
<td>Client</td>
</tr>
</tbody>
</table>

Sum Total of Forseen Risk: £3,370,500

---

**http://intranet.hants.gov.uk/project_risk_management.doc**  
<< click on link for guidance or refer to scoring criteria and examples attached for details

Please Note Contingencies should still be added for Unforseen Risk Occurring i.e. those not listed above
Scoring Criteria

What is the likelihood of the risk occurring?
The frequency-based score is appropriate in most circumstances and is easier to identify. It should be used whenever it is possible to identify a frequency.

Instructions for use
1. Define the risk(s) explicitly in terms of the adverse impacts(s) that might arise from the risk.
2. Use Table 1 to determine the impacts score(s) (I) for the potential adverse outcome(s) relevant to the risk being evaluated.
3. Use Table 2 to determine the likelihood score(s) (L) for those adverse outcomes. If possible, score the likelihood by assigning a predicted frequency of occurrence of the adverse outcome. If this is not possible, assign a probability to the adverse outcome occurring within a given time frame, such as the lifetime of a project. If it is not possible to determine a numerical probability then use the probability descriptions to determine the most appropriate score.
4. Calculate the risk score the risk multiplying the impact by the likelihood: I (impact) x L (likelihood) = R (risk score)

Table 1

<table>
<thead>
<tr>
<th>Likelihood score</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Descriptor</td>
<td>Rare</td>
<td>Unlikely</td>
<td>Possible</td>
<td>Likely</td>
<td>Almost certain</td>
</tr>
<tr>
<td>Frequency</td>
<td>This will probably never happen/recur</td>
<td>Do not expect it to happen/recur but it is possible it may do so</td>
<td>Might happen or recur occasionally</td>
<td>Will probably happen/recur but it is not a persisting issue</td>
<td>Will undoubtedly happen/recur, possibly frequently</td>
</tr>
<tr>
<td>How often might it/does it happen?</td>
<td>(0 to 5% chance of occurrence)</td>
<td>(6 to 20% chance of occurrence)</td>
<td>(21 to 50% chance of occurrence)</td>
<td>(51 to 80% chance of occurrence)</td>
<td>(81 to 100% chance of occurrence)</td>
</tr>
</tbody>
</table>

Table 2

<table>
<thead>
<tr>
<th>Domains</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost</td>
<td>Negligible</td>
<td>Minor</td>
<td>Moderate</td>
<td>Major</td>
<td>Catastrophic</td>
</tr>
<tr>
<td></td>
<td>Small loss / Insignificant cost increase</td>
<td>$5 per cent over project budget</td>
<td>$5–10 per cent over project budget</td>
<td>$10–25 per cent over project budget</td>
<td>$&gt;25 per cent over project budget</td>
</tr>
<tr>
<td></td>
<td>Variations manageable against internal project budget headings</td>
<td>Requires some additional funding from the programme</td>
<td>Requires significant additional funding from the programme</td>
<td>Requires significant reallocation of funds from programme</td>
<td>Increases threaten the viability of the programme</td>
</tr>
<tr>
<td>Time</td>
<td>Slight slippage against internal targets</td>
<td>Slight slippage against key milestones or published targets</td>
<td>Delay affects key stakeholders &amp; causes loss of confidence in the enterprise</td>
<td>Failure to meet deadlines in relation to priority outcomes</td>
<td>Delay jeopardizes viability of the enterprise or partnership</td>
</tr>
<tr>
<td>Quality</td>
<td>Barely noticeable reduction in scope or quality</td>
<td>Minor reduction in quality/scope</td>
<td>Reduction in scope or quality</td>
<td>Failure to meet secondary objectives</td>
<td>Failure to meet primary objectives</td>
</tr>
<tr>
<td>Service/ business interruption</td>
<td>Little or no impact on service delivery</td>
<td>Minimal service disruption having limited impact on service delivery</td>
<td>Moderate service disruption having adverse impact on service delivery</td>
<td>Major service disruption having serious impact on service users</td>
<td>Major service disruption having serious impact on the public</td>
</tr>
<tr>
<td></td>
<td>Permanent loss of service or facility</td>
<td>Breach of statutory legislation</td>
<td>Reduced performance rating if unresolved</td>
<td>Multiple breaches in statutory duty</td>
<td>Multiple breaches in statutory duty</td>
</tr>
<tr>
<td>Statutory duty/ inspections</td>
<td>No or minimal impact or breach of guidance/ statutory duty</td>
<td>Breach of statutory legislation</td>
<td>Single breach in statutory duty</td>
<td>Multiple breaches in statutory duty</td>
<td>Prosecution</td>
</tr>
<tr>
<td></td>
<td>Reduced performance rating if unresolved</td>
<td>Challenging external recommendations/ improvement notice</td>
<td>Critical report / Improvement notices / Enforcement action</td>
<td>Low performance rating</td>
<td>Complete systems change required</td>
</tr>
<tr>
<td></td>
<td>Breaching internal requirements/ inspection audits</td>
<td>Multiple breaches in statutory duty</td>
<td>Critical report / Improvement notices / Enforcement action</td>
<td>Low performance rating</td>
<td>Severe breach of statutory duty</td>
</tr>
</tbody>
</table>
Rumours (Potential for public concern)

Local media coverage –
short-term reduction in public confidence
Elements of public expectation not being met

Local media coverage – long-term reduction in public confidence

National media coverage with >3 days service well below reasonable public expectation.

Total loss of public confidence

---

Sustainability / Environmental impact

Minimal or no impact on the environment or sustainability targets

Minor impact on environment or sustainability targets

Moderate impact on environment or sustainability targets

Major impact on environment or sustainability targets

Catastrophic impact on environment or sustainability targets

---

Table 3

<table>
<thead>
<tr>
<th>Likelihood</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impact score</td>
<td>Rare</td>
<td>Unlikely</td>
<td>Possible</td>
<td>Likely</td>
<td>Almost certain</td>
</tr>
<tr>
<td>5</td>
<td>Catastrophic</td>
<td>5</td>
<td>10</td>
<td>15</td>
<td>20</td>
</tr>
<tr>
<td>4</td>
<td>Major</td>
<td>4</td>
<td>8</td>
<td>12</td>
<td>16</td>
</tr>
<tr>
<td>3</td>
<td>Moderate</td>
<td>3</td>
<td>6</td>
<td>9</td>
<td>12</td>
</tr>
<tr>
<td>2</td>
<td>Minor</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>1</td>
<td>Negligible</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

Table 4

<table>
<thead>
<tr>
<th>Risk Score</th>
<th>Risk Level</th>
<th>Recommended Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 - 25</td>
<td>High Threat</td>
<td>Risk : Immediate action or detailed planning to be included within implementation plans</td>
</tr>
<tr>
<td>8 - 14</td>
<td>Medium Threat</td>
<td>Measures to be included into action plans and monitored</td>
</tr>
<tr>
<td>1 - 7</td>
<td>Low Threat</td>
<td>Limited action and review will be undertaken</td>
</tr>
</tbody>
</table>