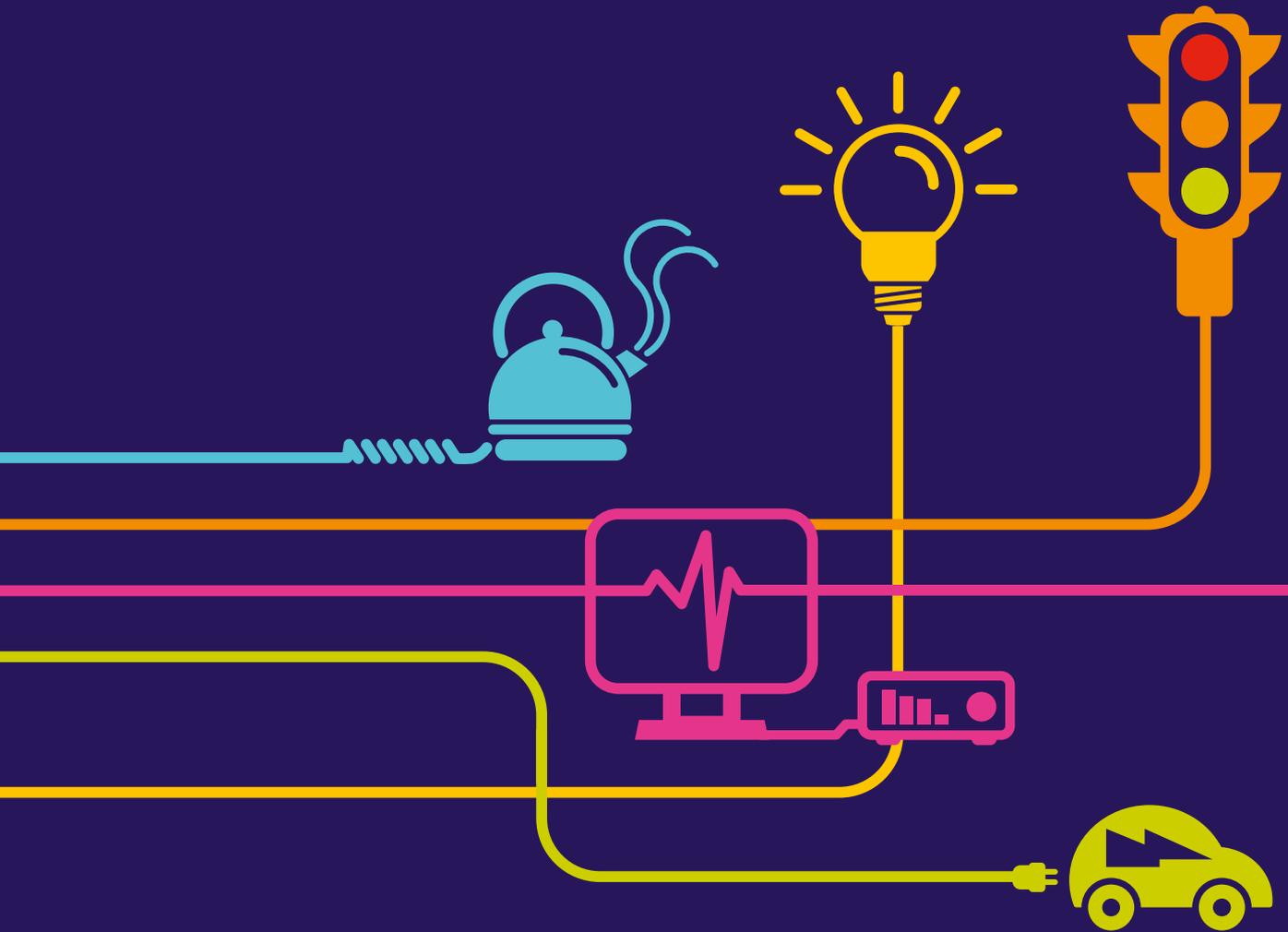


Applicants Response to SEW Deadline 3 Submission

National Grid (Richborough Connection Project) Order



Richborough Connection Project

Volume 8

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Applicants Response to SEW Deadline 3 Submission

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Appendix A Response to Jacobs Response to Mott MacDonald Interaction Report

1. ABOUT THIS DOCUMENT

1.1 Introduction

- 1.1.1 Although not provided for in the examination timetable, this document provides the comments of the applicant, National Grid Electricity Transmission plc (National Grid) in response to some of the South East Water (SEW) submissions to the Planning Inspectorate (PINS) made at Deadline 3 (4th August 2016). National Grid has submitted this document in the belief that it will clarify matters currently before the Examining Authority.
- 1.1.2 National Grid has not provided comments on all SEW submissions. However, for the avoidance of doubt, where National Grid has chosen not to comment on matters raised this is not an indication that National Grid agrees with the point or comment raised or opinion expressed.

2. APPLICANTS RESPONSE TO SEW COMMENTS (REP3-036)

2.1 Introduction

- 2.1.1 At Deadline 2, National Grid submitted a report titled ‘The Applicant’s Response to South East Water’s report ‘Review of Alternative RCP Routes in Area of Interaction with Proposed Reservoir Scheme – July 2016’ (**Doc 8.19 Appendix 5**).
- 2.1.2 Jacobs were commissioned by SEW to produce a response to this report which was submitted at Deadline 3 (**REP3-036**).
- 2.1.3 National Grid’s response to their comments on this report can be viewed in **Appendix A** of this document.

3. APPLICANTS RESPONSE TO SEW'S DOCUMENT REP3-031 (NOTE ON BIRD STRIKE)

3.1 Introduction

3.1.1 This section provides National Grid's response to SEW's deadline 3 document **REP3-031** (note on bird strike) which is Doc 10, representation No. 14, report entitled "Assessment of Bird Collision Risk submitted by South East Water" produced by South East Water submitted for Deadline 3, August 2016.

3.2 Specific Comments

3.2.1 In relation to the general and specific statements in **Paragraphs 2-3 (REP3-031)** made by South East Water (SEW) the following comments are made:

- As detailed by SEW for Abberton and Arlington Reservoirs it can take "only 14 years" before new reservoir water bodies become attractive to large numbers of birds. However, if this is taken within the context of a potential construction completion date for the Broad Oak Reservoir of 2033 (taken from the Water Resources Management Plan 2014) this indicates that the reservoir may be attracting large numbers of birds some 31 years in the future - by 2047.
- As referenced by SEW, the study by Frost (2008) illustrates that at Abberton Reservoir Special Protection Area (SPA), installation of mitigation measures (*"associated with the provision of shallow water habitat that was required to be provided for waterfowl under the Habitats Directive in association with the planned development for the raising of the reservoir water levels"*) in 2006 (approximately 70 years after the initial construction of the reservoir) significantly reduced bird collision, and enabled the planned development to raise the top water level of the reservoir to proceed with no adverse effects on the SPA. This published research paper, introduced by SEW, indicates that tried and tested mitigation is readily available to allow reservoir development in areas where overhead power lines occur, even on SPAs.

3.2.2 Section 4 of the report (**REP3-031**) erroneously details a number of bird species groups that could potentially utilise the proposed Broad Oak reservoir. The following comments are made to address these inaccuracies:

- SEW state that "divers, grebes, ducks, geese, swans, coots and gulls" are likely to utilise habitats at the proposed reservoir. The two species of diver most likely to be encountered in the UK are red-throated and black throated divers, neither of which breed in England and both of which winter exclusively on the sea. Any records of these species (and the other diver species which are rarer in UK waters – great northern and white billed diver) would only relate to rare occurrences of individual birds utilising the reservoir

in the winter or migration periods, these vagrants being outwith their normal offshore wintering areas.

- Grebes may well utilise the proposed reservoir but only in small numbers, with great-crested and little grebes potentially breeding and wintering on the site. Whilst relatively poor fliers, these birds are not generally recognised as key species susceptible to overhead power line collision mainly due to their relatively low levels of flight activity; birds generally remain on the water surface to roost, display and forage and would not be expected to commute to adjoining water bodies to forage.
- As with grebes, coot have a similar lifestyle pattern spending the majority of their time on or very close to the water surface and consequently are not regularly recorded flying at potential overhead line collision height, particularly not over wooded areas. Locations where collision for this species may occur are those sites when overhead power lines run directly over waterbodies.
- In comparison to those species already discussed, gulls are active and manoeuvrable fliers and as such are not generally associated as a key species group for collision risk with overhead lines even when using reservoirs as roost sites. Gulls are found in and utilise many landscapes where tall structures and overhead power lines are present.

3.2.3 In relation to **paragraphs 6, 7 and 8, (REP3-031)** the following comments are made:

- Risk of collision with overhead power lines can potentially increase in open landscapes. However, the spans of the Richborough Connection project close to the proposed reservoir are not in an open landscape, and would be within an increasingly wooded area, on a steep banked rise as detailed in SEW's aspirational habitat management plans (SEW's Written Representation). The area immediately to the north east of the proposed reservoir currently consists of a more open landscape and would be a more attractive flight corridor for some species of birds which have high wing loading and associated lower levels of manoeuvrability, e.g. swans, to arrive and depart the water body rather than having to rise or descend steeply over the wooded southern boundary area.
- As referenced in **paragraph 7, (REP3-031)** by SEW, Abberton reservoir has an overhead power line directly over the western end of the waterbody. Where this line oversails a flat open area, with arable fields and minimal woodland cover, the location was identified by Frost (2008) as being the key area for swan collisions as birds "*flew from feeding areas to and from the reservoir crossing the route of the power lines*". It was the juxtaposition of the power lines, between the foraging areas and water body, which was leading to the concentration of flight activity and corresponding collisions. This illustrates the importance of identifying foraging areas and associated

commuting routes when assessing flight collision risk with overhead power lines. With a change in farming practice/cropping regime to implement crops that were not attractive to swans, the intensity of the flightline corridor would have been of a lower magnitude, with a likely consequence of a significant reduction in collisions. Swans do not randomly move through the countryside, they utilise roosting and foraging areas dependent on the habitats (or crops) present and the ease of flying through the topographic landscape to reach these preferred foraging/roosting areas. Swans (and other waterfowl) would select the most preferable pathway into and out of any future waterbody. On current landuse, that is probably the North east passage for the SEW proposed reservoir, but without knowledge of future farming practices, species and their numbers and a more considered habitats plan, this cannot be effectively assessed at this stage.

- Only single records for each of the 4 other species referenced as collision casualties in **paragraph 7, (REP3-031)** were recorded in the Frost (2008) study over the two year late-winter monitoring programme.
- Whilst a small part of the Richborough Connection project lies in close proximity to the proposed reservoir, it lies within a very different landscape and type of habitat than the section of line referenced by Frost (2008) at Abberton. Rather than being in an open agricultural flat area it lays in a wooded steeply banked area where no key flightpaths exist connecting roost or foraging areas, it would therefore not be appropriate to use the Abberton case study as a proxy for any potential interactions with the Richborough Connection project overhead line.

3.2.4 The following clarification comment is made in relation to **paragraphs 9 and 10, (REP3-031)**.

- The winter period does not pose a bigger risk of collision for birds per se; it is the increase in numbers of birds present during this period and their reliance on specific foraging areas and associated flight corridors that may bring them into situations where collision may occur with overhead power lines where they interact with the flight corridors. This can also apply to the proximity of overhead power lines to water bodies, it is the presence of foraging areas, roost sites, topographical features and land cover that dictate the commuting/flight corridors that may put susceptible birds at risk of collision.

3.2.5 The following clarification comment is made in relation to **paragraph 11 (REP3-031)**.

- Whilst the existing ZV 400kV overhead line referenced by SEW “*does not either cross or over sail the reservoir*” it should be noted that it is at a comparable distance from the proposed SEW reservoir and similar to a distance where collisions were recorded at the overhead line at Abberton, as

detailed in the Frost (2008) study. It also over sails and bisects farmland areas, as does the overhead line at Abberton Reservoir.

3.2.6 In relation to **paragraphs 13 and 14 (REP3-031)**, the following comments are made in addition to the supporting points made for paragraphs 2-3, 6-8, and 9-10 made previously in this rebuttal.

- There are no operational effects (including collision) on birds in the SEW reservoir Zone of Influence associated with the operational aspect of the Richborough Connection project.
- The operational phase of the SEW reservoir could increase the potential for bird collisions with any overhead power lines in the area which would be a feature of the baseline environment. However, it is not possible to effectively assess any potential future magnitude of bird collision risk for a conceptual body of water (20-30 years before it would potentially attract waterbirds) within a changing agricultural and rural environment. This is especially pertinent when current levels of flight activity and of collision susceptible species in the area are negligible, and no flight corridors currently exist (as illustrated by surveys results **paragraphs 4.3-4.430 Doc 5.4.90(i) (Non Breeding Bird Survey Report 2012-2014)**, **paragraphs 3.2- 3.133 Doc. 5.4.90(ii) (Non Breeding Bird Survey Report 2014-2015)** nor can the species makeup and magnitude of use of any of these theoretical corridors be accurately identified at the present time.
- The first paragraph of **Section 6 of (REP2-201) Summary of Appendix 11 (Part 19) to its WR - Alternative Report Appendix G – Broad Oak Reservoir Bird Study of SEW’s Alternative Report Appendix** states “*At this stage, it would be impossible to accurately predict the different flight paths of the species that could utilise the proposed Broad Oak Reservoir, and therefore anticipate their risk of colliding with the proposed Richborough Connection Project OHLs.*” Notwithstanding the fact that the proposed SEW reservoir was scoped out of the Richborough Connection project ES (in agreement with the Local Planning Authorities), this is why, in addition to the unknown timescales for the reservoir, it would not be feasible to undertake an assessment of the risk of (operational) effects of the proposed reservoir on ornithological interests within the Richborough Connection project ES, as no finalised plans for the proposed reservoir or detailed ornithological assessment of the reservoir impact itself currently exists.
- SEW concludes within **Section 7 of (REP2-201) Summary of Appendix 11 (Part 19) to its WR** - that “*Definitive field studies would be required post reservoir construction but it would be possible to undertake risk based assessments using modelling approaches to inform cumulative risk assessments for EIA and HRA*”.
- SEW also highlight in **REP 2-201 Appendix 11 (Part 19) to its WR** that there is no current relevant ornithological data available to make an assessment and that “*Given the uncertainty over predictions for the different flight paths of the species that could utilise the proposed Broad Oak*

Reservoir, and therefore anticipate their risk of colliding with the proposed Richborough Connection Project OHLs, further study including comprehensive field surveys and modelling would be required". These summary statements from **SEW's WR REP2-201 Appendix 11 (Part 19)** indicate that they fully recognise that it is not currently possible to robustly assess any effects associated with the proposed reservoir on any bird populations.

- The SEW reservoir proposal would be expected to minimise and mitigate any potential collision effects by implementing the best practice measures relevant (via adopting the Best Available Technology – BAT approach) at the time of construction (which with technological development may rely on new technology/methods and be even more effective than the current day recommended best practice). Currently available mitigation measures (including those used in the Frost (2008) study) to minimise impacts of overhead power lines on avian mortality and recognised as effective by relevant statutory authorities are detailed within **Doc 5.5 Appendix E paragraph 6.2.2-6.2.4**.
- All overhead lines in the proposed reservoir area (including the existing 400kV and 132kV line and the proposed Richborough Connection project 400kV line) would form part of the baseline conditions at the time of the SEW reservoir submission. Therefore, there would be no cumulative effects between the SEW reservoir proposal and the constructed Richborough Connection project.

Appendix A

Response to Jacobs Response to Mott MacDonald Interaction Report



Subject Response to Jacobs Response to Mott MacDonald Interaction Report

Our reference 337293 | 02 | A |

Office Bristol (10 Temple Back, Bristol, BS1 6FL)

Date September 2016

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Introduction

Jacobs has been commissioned by South East Water (SEW) to produce a response to the Mott MacDonald interaction report between the RCP and the proposed Broad Oak Reservoir. Jacobs response is included in document EN020017-001551-SEW-Doc 4 inc appendix 4.1 & 4.2 [REP3-036].

The objective of the original Mott MacDonald report was as follows

... to provide our Client (National Grid) with an appropriate level of confidence that both the RCP and the Broad Oak Reservoir project can co-exist. The purpose of this is to promote the sustainable development of both schemes if the Broad Oak Reservoir is constructed in the future.

The limitations of the original Mott MacDonald report was reported as

This study will be undertaken using information made available at the time, which includes two Jacobs studies ... Mott MacDonald accepts no responsibility for the accuracy of this data. Any subsequent changes to these studies, or amendments to the RCP or Broad Oak Reservoir projects, may undermine the conclusions of this report. If any subsequent changes are made, we strongly recommend that the assumptions and conclusions of this study are revisited.

Mott MacDonald has assumed that the designs of the reservoir and the river diversion presented in the Jacobs studies form an acceptable baseline. Mott MacDonald has not undertaken any additional design work of these aspects and has adhered to the Jacobs design principles. Therefore any design solutions presented in this report should be considered concepts only. If they are adopted in the future we strongly recommend a full detailed design is undertaken with associated surveys and investigations.

This response has been produced by Mott MacDonald on behalf of National Grid and responds to specific issues identified in the Jacobs report.

1 Response to Jacobs Executive Summary

Overall, the Jacobs report recognises some agreement between their original reports and the Mott MacDonald report, but also outlines aspects that they have stated to be deficient. Table 1-1 states the deficiencies, as reported by Jacobs, together with the corresponding responses from Mott MacDonald.

Table 1-1 Reported deficiencies from Jacobs report Executive summary, and corresponding responses

Deficiency	Response
<i>The Mott MacDonald study has not considered the full reservoir design envelope, they have not considered reservoir sizes of between 32.5 and 36.0m AOD</i>	The Mott MacDonald report considers the impact at 32.5 and 36mAOD. Any TWL between these levels would only impact PC9 differently and the by-pass channel would be required to divert to the south of the pylon. Mott MacDonald present the 32.5mAOD diverted to the south of PC9 which represents a worst case excavation and hence Mott MacDonald has always shown the min and max requirements for the range between 32.5 and 36mAOD. It would be impractical to develop concept solutions for all potential TWLs between 32.5 and 36mAOD. The concept options developed are based on the options provided in the Jacobs stage 1a and 1b reports.
<i>The Mott MacDonald study has not considered how solutions to the interactions by proposed amendment to the reservoir design comply with the Water Framework Directive</i>	The Mott MacDonald report follows the design principles set out by the Jacobs stage 1a and 1b reports and therefore WFD is inherently considered. For river shading the solutions presented in the Mott MacDonald report adopt a managed section of coppice woodland.
<i>The Mott MacDonald study has not considered the visual impacts of the schemes cumulatively or the proposed amendments to the reservoir design</i>	The Mott MacDonald report has not considered the cumulative visual impacts of the reservoir scheme and the RCP for the reasons set out in Chapter 16 (Doc 5.2) and is also addressed in National Grid's response to Q 2.3.32 .
<i>The requirements for a functioning river corridor and fish pass replacing the existing Sarre Penn river habitat have not been recognised</i>	The Mott MacDonald report follows the design principles set out by the Jacobs stage 1a and 1b reports and therefore the Sarre Penn river habitat is inherently considered. Appendix D to that report illustrated a suggested approach, as to how the wider habitat aspects could be fully functional in any such design
<i>The feasibility of the solutions presented has not been justified (the cost and ecological aspects are not considered)</i>	The level of design is acceptable for concept stage. The purpose of the Mott MacDonald report was to illustrate that the concept design of the schemes could co-exist, and was not to detail the environmental assessment aspects. However, Appendix D to that report illustrated a suggested approach, as to how environmental aspects could be fully functional in any such design.
<i>The combined impacts of applying the mitigations has not been considered (overall project acceptability or total project cost)</i>	Section 6 of the Mott MacDonald report presents a concept combined solution for the two TWL.
<i>Overall the Mott MacDonald report has focused on identifying the interactions and seeking to identify engineering solutions to the reservoir design to mitigate the interaction without taking cognisance of the wider ecological, landscape and regulatory</i>	The purpose of the Mott MacDonald report was to illustrate that the concept design of the schemes could co-exist, and was not to detail the environmental assessment aspects. However, Appendix D to that report illustrated a suggested approach, as to how environmental aspects could be fully functional in any such design. Furthermore, the issue of ecological assessment and

Deficiency	Response
<i>drivers for the reservoir schemes acceptability</i>	<p>ecological drivers were presented in Doc 8.17, Paragraphs 2.21-2.35 for connectivity and related function, Paragraphs 2.36-2.38, 2.46-2.47 for WFD driver issues, and in Doc 8.19 in paragraphs 4.11-4.25 and 4.26-4.36 respectively. Similarly, landscape aspects were considered in Doc 8.17, Paragraphs 2.12-2.16, 2.63 and in Doc 8.19, in Paragraphs 4.37-4.49.</p> <p>The Mott MacDonald report took into account published correspondence between SEW, the Environment Agency and Natural England available prior to Deadline 2. Further correspondence published by SEW at Deadline 2 has since been responded to by National Grid.</p>

2 Response to Jacobs General Comments

Section 2.2 in the Jacobs report outlines general comments regarding the Mott MacDonald Introduction chapter.

Firstly, the following is stated

...the Mott MacDonald report states that the Broad Oak Reservoir Scheme is an aspiration. This is not the case, the reservoir is within the SEW Water Resources Plan. **Page 6**

National Grid has acknowledged the status of SEW WRMP, as stated in the applicant response to South East Water Written Representation [National Grid **Doc 8.19**].

In reference to the term aspiration in the introduction of the Mott MacDonald reports simply identifies the delivery date of 2033 is an aspiration.

Indeed, as stated in [National Grid **Doc 8.19**], SEW acquired the Broad Oak site for the purpose of constructing a reservoir over 40 years ago. The reservoir was also included in SEW's WRMP2009 and WRMP2014, as stated in section 2.2.2 of the Mott MacDonald report. The Mott MacDonald report goes on to identify SEW has an aspiration for a larger reservoir with a TWL of 36mAOD which is larger than that identified in SEW WRMP2014.

Jacobs state

...the reservoir scheme is in the very early stages of design and development, to the extent that the final size of the reservoir has not yet been decided... **Page 6**

Mott MacDonald agrees the level of reservoir scheme is in an early stage of design and development. As such the solutions presented by Jacobs remain concept and are subject to change. Therefore the precise channel alignments presented, which incorporates no tolerances, cannot be fully relied upon and as such interactions shown may not occur or may be overcome via simple alterations to the river channel.

National Grid has advised it could make amendments to pylon locations, within their LoD, however SEW have been unable to advise if this would reduce the interaction. Therefore it would be reasonable for SEW to consider concept options that can allow the schemes to co-exist, such as those identified in section 4 of the Mott MacDonald report.

Finally, the following is stated in regards to the Water Framework Directive (WFD).

It is further important to note that no consideration has been given to whether the design solutions presented within the Mott MacDonald would meet the statutory requirements that SEW must adhere to especially the Water Framework Directive (WFD) **Page 6**

Mott MacDonald have adopted the same design parameters as the Jacobs studies as set out in Section 1.5 of the Mott MacDonald report; therefore WFD is inherently considered (gradient, stream power, meandering etc) In some cases Mott MacDonald have presented a hard-engineered retaining structure, but this does not interact with the low flow channel in cross section and hence does not impact the requirements of the WFD.

In respect of other aspects of WFD, the solutions presented in the Mott MacDonald report would allow for the development of associated woodland habitat to meet the requirements through considered selective management and choice of species. Appendix D to that report illustrated a suggested approach, as to how environmental aspects could be fully functional in any such design.

Furthermore, the issue of ecological assessment and ecological drivers were presented in Doc 8.17, Paragraphs 2.21-2.35 for connectivity and related function, Paragraphs 2.36-2.38, 2.46-2.47 for WFD driver issues, and in Doc 8.19 in paragraphs 4.11-4.25 and 4.26-4.36 respectively. Similarly, landscape aspects were considered in Doc 8.17, Paragraphs 2.12-2.16, 2.63 and in Doc 8.19, in Paragraphs 4.37-4.49.

3 Description of the Richborough Connection Project and Proposed Broad Oak Reservoir

This section covers Section 3 of the Jacobs report.

In Section 3.2, it is stated

This complete [3D] model was not requested by National Grid and as such the Mott MacDonald study has not been based on Jacobs 2 dimensional CAD files **Page 7**

This is incorrect. The Jacobs 2 dimensional CAD files were provided to National Grid by Jacobs on the 9th February 2016 and have been used to inform the Mott MacDonald report.

Jacobs report that there are numerous inaccuracies within Section 2.2, specifically Section 2.2.2, regarding the proposed Broad Oak Reservoir. The following was stated in regard to the WRMP

The status of the WRMP14 is an issue that the Applicant has neither appreciated nor sufficiently addressed within its Proposed DCO and in selecting the route for the Proposed Development. **Page 7**

However National Grid set out the status of the WRMP in Appendix E of the Mott MacDonald report and has further explained their understanding of the WRMP14 in the applicant response to South East Water Written Representation [National Grid **Doc 8.19**].

If such emphasis is placed on the status of the WRMP14, the TWL of 32.5mAOD should form the basis of investigations. However National Grid has worked with SEW and understand their aspirations of a higher TWL, up to 36mAOD.

Joint funding of Jacobs stage 1a and 1b and the subsequent Mott MacDonald report shows National Grid has appreciated and addressed the proposed reservoir when selecting the RCP route.

In addition, it is stated

NE met with SEW on 17 May 2016, and at this meeting designs for the Reservoir were reviewed with a maximum size being 36mAOD

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This is an agreement in principle with one stakeholder. It is for a TWL of 36.0mAOD and is not presented in the latest WRMP14.

4 Identification of Design Criteria and Limitations

This section discusses the base data available to Jacobs hence subsequently Mott MacDonald in the production of the studies. In general the contents are agreed. The understanding by Mott MacDonald was that all available data was provided by SEW and Jacobs in order to complete the study. However the following statement contradicts this

Mott MacDonald states that there has been no non-intrusive utility services search for the proposed Broad Oak Reservoir...The statement made by Mott MacDonald is not true. Jacobs undertook buried service investigations for their GI surveys but these are not published

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As set out in section 1.5 of the Mott MacDonald report, a limitation of the study is that it is based on the information made available at the time.

Mott MacDonald has not been provided a plan of all utilities in the reservoir area and this was not reported in the stage 1a or 1b studies. The Mott MacDonald report specifically states that the investigation is based on the stage 1a and 1b studies. It is not clear why this information was not reported if it was available.

5 Identification of Design Conflicts

This section presents a response to the design conflicts of the two schemes and gives consideration for reservoir sizes of 32.5 and 36 mAOD. Jacobs has advised they broadly agree with the interactions found. In addition they advised that the cross-sections through the river diversion and RCP serve well to present the interactions, but go on to state that

...the tree planting shown on the sections is misleading. The cross sections show mature planting, which in the case of high canopy woodland would require at least 30 years, and more likely 50 years for maturity

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These sections illustrate the arrangement of elements within both schemes and do not make reference to a specific date. The introductory paragraph preceding the section drawings explains that they are *to identify areas of conflict between the RCP and the proposed Broad Oak Reservoir* and are not intended to constitute either photomontage evidence or a detailed scheme design. For the purpose of considering the relationship between the RCP proposal and SEW concept, it is appropriate to use a mature tree size to describe an as-built relationship. Any representation of interaction based on immature tree size (e.g. during construction of a reservoir) would tend to underestimate the interaction because the primary nature of the interaction is in terms of tree height. National Grid's approach therefore reflects the worst case in terms of vegetation interaction. It should be noted that the trees shown are 15 to 25m high (coppice trees up to 10m high) whereas the planting shown in Jacobs Stage 1b Report is 30 to 35m high, which is the subject of Written Question WQ2-3-10.

In addition, the trees that are illustrated would be those planted as part of SEW's own scheme; any shortcoming in mitigation function attributable to lack of tree maturity rather than height management would be a function of the delivery date of such a scheme and not the RCP. The RCP would not affect the rate of tree growth in any

mitigation planting scheme developed by SEW except where tree height would be constrained by safety clearances. The rate of tree growth and delayed accrual of mitigation function such as shading or screening must be considered in any mitigation proposal, including those of SEW.

Jacobs has identified that they have taken a different approach in considering the interactions, as stated below

Considering interactions at each pylon and then the overhead lines between them is a different approach to that considered by Jacobs... This Mott MacDonald approach does find many of the same interactions as the Jacobs approach however misses some of the project wide interactions, such as visual impacts, amenity users and ability to meet WFD requirements

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In relation to the visual impact on the reservoir and the wider landscape with the reservoir, National Grid has previously stated that it does not consider a cumulative assessment appropriate or necessary for the reasons set out in Chapter 16 (**Doc 5.2**) and in its response to **Q 2.3.32**. It is also worth highlighting, that should a cumulative assessment have been undertaken it would only have considered existing receptors i.e. those that are currently present and which have been assessed in relation to the RCP. Future receptors such as users of any new Public Right of Way (PRoW) delivered by the reservoir, birdwatchers or participants in water sports, would not have been identified as receptors as they would only be there as a result of the reservoir and would not experience any change due to the RCP which they would only 'know' to be part of the baseline.

In relation to amenity users, National Grid has previously stated at paras 2.15 and 2.16 of Doc 8.17 (Summary of Case for the Broad Oak Hearing) that overhead transmission lines and pylons are not incompatible with recreational activities and would compromise the overall function of the reservoir as an amenity facility.

In SEW's Written Representation there is no specific guidance given as to what would be required of shade trees in terms of functional mitigation parameters. WFD requirements make clear, however, that any newly created habitat should reflect the current habitat type as closely as possible so that ecological status is maintained and there is no deterioration results.

The basis for establishing the requirements for habitats in relation to the riparian corridor was initially described in SEW's Jacob's Stage 1a Study (Appendix 9 (Part 1) to SEW's WR) paragraph 4.7.1, the creation of the riparian vegetation should be on a "like-for-like basis to meet WFD requirements. As much of the river is a semi-continuous riparian corridor, flanked by semi-natural woodland, mature trees and scrub, it will be necessary to recreate these habitats within the riparian corridor of the new river alignment. The tree species found along the Sarre Penn include pedunculate oak, alder, field maple, ash, crack willow and grey willow, some of which have been coppiced; a well-established shrub layer comprising hawthorn, hazel, elder and dogwood is also present. It is therefore desirable to include these species in any new landscape or mitigation planting alongside the new river" and in paragraph 4.7.2 "Riparian shading should be as per the current upper reaches of the Sarre Penn, in its semi-continuous nature, and reflect the current species distribution as far as possible". Section 7.5 of the Jacob's Stage 1b Study supports that assessment and recognises that the suite of species suggested by National Grid match those current conditions (Appendix 10 (part 1) to SEW's WR) goes on to say that "All the species currently found along the existing Sarre Penn and proposed for the mitigation are listed within National Grid's Tree Planting Palettes.

Maintaining standard trees beneath the overhead line would create a requirement to undertake regular pruning and would increase the clearance required between trees and conductors for the safety of operatives during pruning operations. However, coppicing is done at ground level and coppice regrowth would therefore be capable of reaching a greater height before management of height beneath the conductors would become necessary because there is no requirement for aerial work adjacent to the Vicinity Zone. It would be possible to maintain continuous cover by the selective coppicing of a set proportion of scattered individual trees each year. The appropriate proportion would depend on the length of the coppice cycle, which would be a function of species,

aspect, and conductor height. This would ensure that there would be a permanent mix of trees at every stage in the cycle including an even distribution of those at or close to maximum height providing diversity, shade and associated wood material requirements. Consequently, the provision suggested planting (Appendix D of Mott MacDonald's report at Appendix F of **Doc 8.2.1**), or a comparable species mix such as those described in National Grid's Concept Mitigation Planting Plan (**Doc 8.11**) could be delivered as a coppiced woodland with continuous canopy connectivity. This would meet both the Environment Agency's and Natural England's requirements, and those of the WFD to match or better existing habitat conditions, would be met in full

6 Potential Solutions to Design Conflicts

This section provides a high level concept options for both the 32.5mAOD and 36mAOD reservoir to water levels, it considers each interaction and looks a technically feasible solutions to overcome them.

Jacobs have reported

This [presenting solutions to an initial reservoir scheme design] is highlighted by the fact that the reservoir top water level has not yet been decided, and although some confidence has been gained in river diversion gradient, and format of the fish pass, no agreement has been obtained with the Environment Agency. Therefore it is not possible to present detailed potential solutions without a full understanding of the extent of the interaction.

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All solutions presented are concept and to the similar level of detail as the stage 1a and 1b reports. The range of potential solutions presented in section 4 of the Mott MacDonald report provides it client National Grid, significant confidence that an acceptable solution can be found.

Furthermore the lack of design development supports the statement that the Broad Oak Reservoir above that presented in the WRMP14 is an aspiration.

Jacobs have reported

The section [Section 4] assumes that any engineered solution is feasible, regardless of cost, or environmental issues

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The solutions are design concepts in line with the level of detail provided by SEW and Jacobs in the stage 1a and 1b study reports. The impact of each solution would need to be assessed like all other aspects of the final reservoir scheme.

Jacobs have reported

A number of the solutions listed put forward, such as culverting the river diversion, or reducing the gradient of it, go against the design principles for the river diversion and will reduce the ability to provide an acceptable functional replacement for the Sarre Penn

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These are localised solutions to allow the two schemes to co-exist. If these designs were taken forward as the preferred option, careful design could eliminate or control any risks to the design principles.

It should be noted that many of the options presented could meet the design principles, and would only have an impact on the concept alignment that has been presented by Jacobs.

Jacobs have made the following statement regarding channel gradients

The Jacobs Stage 1b study has found that it is required to have an average gradient of 1:400 and to allow cleansing velocities and channel movement within the corridor **Page 17**

The channel is 1v:1000h across the secondary bund to the south west which fails to meet this design parameter.

Jacobs stage 1a report shows that for a 36mAOD TWL the channel upstream, as well as over the secondary embankment falls at a 1 in 1000 gradient. Therefore their solution of a 1 in 400 gradient presented fails to meet their own design parameters. This issues in unrelated to the RCP but shows that compromises will have to be made in other areas of their final scheme.

Jacobs have reported

The Mott MacDonald report does not consider the extent of mitigation required which will vary depending on the final reservoir top water level, for pylon PC9 a size midway between 32.5m and 36m AOD requires the largest extent of mitigation to avoid the pylon as pylon would be located in the centre of the river diversion cutting **Page 17**

This is generally true as it would be impractical to develop concept solutions for every potential TWL between 32.5 and 36mAOD.

However figure 5.4 in the Mott MacDonald report does show the impact of moving the 32.5mAOD channel to the south of the pylon, this would be the greatest possible excavation for any TWL in the range. This figure also has a second dashed cross section line which represents the 36mAOD TWL (this was not specifically drawn out in the report, but the reader can see the potential range of impacts).

With regards to the fish pass Jacobs have stated

A 'bioengineered' channel structure of the types indicated by Mott MacDonald go against the design principles directed by the EA and would therefore not achieve acceptability and therefore deliverability of the reservoir scheme **Page 18**

A 'bioengineered' channel structure was presented in Jacobs stage 1a study. There are design precedents UK and worldwide where culverts and engineered fish passes are acceptable.

However, Mott MacDonald believes the preferred naturalised channel is feasible with the pylon and proposed overhead line route in place.

7 Feasible Solutions

This section provides a high level concept option for the 32.5mAOD and 36mAOD reservoir to water levels. It considers the schemes as a whole and shows that there is the required space to engineer the Sarre Penn river diversion with the proposed overhead line route in place.

Mott MacDonald description of a feasible and acceptable solution is technically feasible at a concept level of design.

Jacobs have made the following statement in regards to sheet piles

It is Jacobs experience that cut off piles, in the form of sheet piles, leak between the clutch connections between each pile and would not consider this a suitable mitigation. **Page 21**

The need for seepage control would be considered during the appropriate design stage. The Mott MacDonald report has raised it only as a possible measure for the solution to locally shift the channel north at PC9, where the minimum design requirement of 10m from the reservoir edge is very close.

The clutches of cut off piles can leak, however there is significant precedent of the use of cut off piles in flood defence schemes, embankment dams, etc across the UK, which operate satisfactorily. Mott MacDonald considers cut of piles to control seepage rates is a feasible option.

Jacobs have identified that they have only presented the above ground dam footprint and further parts of the structure underground has not been considered in the Mott MacDonald study.

A suggested fish pass alignment is shown on Figure 6.2. However the drawing only includes the above ground section of the dam, it does not show the dam foundations which extend beyond the toe of the dam, and depending on ground conditions this area could be significant. The fish pass as shown in Figure 6.2 would encroach upon the foundations for the dam and is therefore not appropriate.

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The realigned fish pass would not need to encroach closer than the currently present stage 1b report alignment. It is therefore not clear why there would be any further interaction with dam foundations compared to that shown. This also suggests that Jacobs have undertaken further design of the dam embankment which does not follow the concept approach of the remainder of the scheme. If this is the case it is not clear why this has not been presented by Jacobs, especially when suggesting this is a significant interaction.

Jacobs have reported

The work in the Mott MacDonald report does not consider the deliverability of the reservoir scheme in terms of acceptance by the regulatory bodies, or the economic deliverability due to cost of the mitigated scheme.

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Although the EA or NE has not been consulted with, Mott MacDonald has considered their previous comments provided on the Broad Oak Reservoir scheme and a response is provided in Section 5 above.